

Faculty for the Future

2010 BIOGRAPHY BOOKLET

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Dear Faculty for the Future Fellows,

The Schlumberger Foundation Faculty for the Future program welcomed 33 new Fellows in 2010. The community today stands at 142 women scientists from 43 countries.

As the flagship program of the Schlumberger Foundation, Faculty for the Future supports women from developing and emerging economies to pursue advanced graduate study in science and engineering. You were chosen for your scientific talent, your academic achievement, your capacity as a role model and for being an inspiration to other young women to endorse careers in science and engineering.

You are part of a close-knit community, and we are committed to providing as much support as possible for you to continue to strengthen the community. The on-line forum provides a popular venue for daily interactions, and every 18 to 24 months approximately 35 Fellows meet face-to-face in an informal conference setting that provides an opportunity to interact, share research and life experiences, advance topics about the relationships between gender, science and socio-economic development and also to develop friendships and offer each other moral support.

Last year the Schlumberger Foundation published the first edition of the Faculty for the Future Biography Booklet. We were pleased to observe that the majority of you stated that it has become an important tool for the community and it helped you to get to know each other better. We are therefore delighted to share with you the 2010 edition of the Biography Booklet, and hope it will bring the same value to our newcomers.

On behalf of the Schlumberger Foundation board members and the Faculty for the Future coordination team, we wish all of you the best in your research and career endeavors.



Jean-Marc Perraud
Chairman, Schlumberger Foundation

A handwritten signature in black ink, which appears to read "Jean-Marc Perraud". The signature is written in a cursive style and is underlined.

FELLOWS 2010

Deborah AJAYI**Home Country**
Nigeria**Degree**
Post-Doctorate in Mathematics**Expertise**
Mathematics**Research Focus**
Interactions of Combinatorics
and Algebraic Topology**Host University**
Pennsylvania State
University, United States**Fellowship Awarded**
2010

Deborah Ajayi was born in Leeds, England but at a young age she moved to Ibadan, Nigeria where she lived with her grandmother, an uneducated but wealthy trader in textiles. Deborah helped her grandmother count money, which developed her numeracy aptitude. The fourth-born in her family of three girls and three boys, Deborah loves teaching. She married a lecturer and professor in Nigeria, and they have three boys.

While attending the University of Ibadan Deborah received her undergraduate degree in 1986 in education, specializing in pure and applied mathematics. In 1990 she obtained her Master of Science degree in mathematics specializing in functional analysis, and then went on to earn her PhD in mathematics in 1996 in the field of algebraic topology, where she became interested in combinatorics because it has widespread applications for real-world problems in such fields as computer science, chemistry, molecular biology and engineering.

Deborah is now enrolled in post-doctoral studies at Pennsylvania State University in the United States, where she will focus her research on the interactions of combinatorics and algebraic topology and the use of combinatorial methods in contact geometry. Her research in algebraic topology has applications in differential geometry, especially the characteristic classes and the span of certain manifolds. She intends to focus on aspects of combinatorics such as graph theory and Tverberg theorems using her knowledge of characteristic classes and combinatorial methods to solve problems in contact geometry. The results of her research should benefit computer scientists and enhance multidisciplinary research in such fields as mathematics, computer science, medicine and engineering.

When she completes her post-doctoral studies, Deborah intends to return to the University of Ibadan. She says that despite the importance of her field, there is no known expert on this research area in Nigeria.

Eyiwunmi AKINSANMI**Home Country**
Nigeria**Degree**
PhD in Electrical Engineering**Expertise**
Engineering and Public Policy**Research Focus**
Optoelectronics-Based
Solar Applications**Host University**
Carnegie Mellon University,
United States**Fellowship Awarded**
2010

Eyiwunmi Akinsanmi was born in Lagos, Nigeria where she grew up in a large family of four girls and two boys, of which she is the youngest. She likes to write and says if she hadn't chosen a career in engineering she would have chosen literature. She also enjoys travelling and trying new types of food, and she recently took up tennis.

The year she turned 18, Eyiwunmi accepted a presidential scholarship to study electrical engineering at Howard University in Washington, DC. She graduated summa cum laude in 2007 and started a career as a hardware design engineer. She began pursuing her PhD in engineering and public policy at Carnegie Mellon University because she feels a compelling urgency to help make an impact on the development of her home country.

At Carnegie Mellon her research objective is to investigate how recent advancements in optoelectronics-based solar applications can be harnessed together with the growing mobile telephone network in sub-Saharan Africa to provide educational and developmental opportunities on that continent. Her research sits at a unique confluence of manufacturing, education and cutting-edge solar technology advancements—her aim is not only to discover the factors needed to seed a viable solar-manufacturing industry in Africa, but also to leverage technical and manufacturing expertise to model the economic viability of new cost-cutting advances in solar technologies.

When she completes her doctorate in the United States, Eyiwunmi intends to teach in Nigeria, where she has already co-founded a non-profit organization called Nigerians4Change that has established a scholarship for girls in high school designed to help increase the number of young women who choose careers in science and engineering.

Suman ANAND

Home Country
India

Degree
Post-Doctorate in Physics

Expertise
Optical Coherence,
Laser Tweezers

Research Focus
Optical Trapping
of Aerosol Particles

Host University
University of Dundee,
United Kingdom

Fellowship Awarded
2010



Suman Anand was born and raised with two sisters and two brothers in Gomia, India. Her mother encouraged her academic pursuits and her father, a chemist, would describe his experiments at home, inspiring her to pursue a career in science. Married to a telecommunications engineer in 1997, Suman has one son.

After qualifying for the National Talent Search Examination (NTSE) Indian National Mathematics Olympiad (INMO) during high school, in 1989 Suman received her BSc (Hons) degree in physics from Ranchi University. She then moved to Banaras Hindu University in Varanasi, graduating in 1992 with a MSc in physics and in 1999 with a PhD in physics. During her doctoral studies she received a Best Researcher award for excellence in science.

In 2001 Suman took up post-doctoral studies at the National Physical Laboratory (NPL) in New Delhi, where she began working on problems in optical coherence. In 2004 she received funding from DST for an independent project on optical phase singularity, and in 2009 she received the prestigious Leverhulme Fellowship in the United Kingdom. Now at the University of Dundee in the UK, she is involved with experiments related to optical manipulation and freezing of aerosol particles. Her research aim is to develop new techniques to explore aerosol properties by making use of optical tweezers that can trap and manipulate aerosols in a controlled, non-destructive way.

Suman uses optical tweezers and laser probes to explore the size and composition of aerosol particles. Her methods for sampling and analyzing atmospheric aerosol particles enable chemical reactions and physical transformations to be followed under controlled laboratory conditions. Her work may help in resolving environmental issues such as climate change, global radiation uncertainty and the effects of aerosols on cloud formations.

At the completion of her studies in the UK Suman intends to teach in the Amity Institute of Nanotechnology at Amity University, India.

Shehla ARIF

Home Country
Pakistan

Degree
Post-Doctoral Research in
Mechanical Engineering

Expertise
Soft Matter, Fluid Mechanics

Research Focus
Advanced Composite Materials

Host University
McGill University, Canada

Fellowship Awarded
2010



Shehla Arif was born and raised in Lahore, Pakistan. Both her parents are academics and they instilled a life-long commitment to intellectual inquiry in their three children. An avid cyclist, she admires nature, finds respite in yoga, and has recently discovered a passion for Kung Fu. She also paints and cooks and is interested in sustainable urban living.

Shehla graduated in 1996 with her undergraduate degree in mechanical engineering from the University of Engineering and Technology in Lahore. She taught at National College of Textile Engineering in Faisalabad for two years, where she was the first woman faculty member. She taught for another two years at National University of Sciences and Technology in Karachi before proceeding abroad for her graduate work. After earning her master's degree in mechanical engineering at Bucknell University in the United States in 2004, she entered the PhD program in mechanical engineering at Northwestern University in the US, where she graduated in July 2010.

Shehla is now conducting post-doctoral research at McGill University in Montreal, Canada, where her focus is on advanced composite materials used in a diverse range of materials science and bioengineering applications. She is using an electric field to mobilize silica particles encapsulated in hydrogel colloids. This technology will have widespread application for academic and industrial purposes, such as catalysis, bio-sensing, drug delivery, photonic crystal sensors, enhanced ultrasound imaging and infrared cancer radiation treatment.

When she completes her post-doctoral research Shehla intends to teach at the National University of Sciences and Technology in Pakistan.

Rana BILBEISI**Home Country**
Jordan**Degree**
PhD in Chemistry**Expertise**
Chemistry**Research Focus**
Drug Delivery Systems**Host University**
Cambridge University,
United Kingdom**Fellowship Awarded**
2010

Rana Bilbeisi was born and raised in Amman, Jordan. Her hobbies and interests include sports, reading, cooking and travelling.

Rana obtained her Bachelor of Science (Honors) in Biochemistry in 2005 from Concordia University in Canada. As part of her co-op undergraduate degree she worked in the pharmaceutical industry. She completed her Master of Science degree in Chemistry at McGill University in Canada in 2008, and following that she taught chemistry at Kings Academy in Madaba, Jordan before beginning her doctoral studies in science and chemistry in 2009 at Cambridge University in the United Kingdom.

Rana is focusing her PhD research project on drug delivery systems. She is particularly interested in the development of a subcomponent self-assembly methodology to form tetrahedral capsules. Rana is investigating the concept of host-guest chemistry in which rigid, hollow-cage structures with cavities of well-defined sizes and shapes are able to encapsulate guest molecules with high affinity and selectivity. These cages can be used as sensors and as drug delivery tools, and they can serve in catalysis.

Rana's research motivation is driven by the project applications, and by its potential impact within the pharmaceutical industry, and she is optimistic that ongoing drug delivery challenges can be addressed by her research. She says that designing and synthesizing supra-molecular molecules (cages) in water is a key challenge in the creation of enzyme-like artificial catalysts. The drug delivery systems she is helping develop are designed from the ground up to work in water as a new generation of green nano-scale receptors and catalysts.

When she completes her doctoral studies in Cambridge Rana intends to return to Jordan to teach.

Heyddy CALDERON-PALMA**Home Country**
Nicaragua**Degree**
PhD in Hydrology**Expertise**
Groundwater and
Surface Water Interactions**Research Focus**
Water Resources and Availability**Host University**
UNESCO-IHE, The Netherlands**Fellowship Awarded**
2010

Heyddy Calderon-Palma was born in a small town in Nicaragua where her mother worked as a school teacher and her father was a university professor teaching English. The third of four children, she has two brothers and one sister.

Heyddy says that a major satisfaction for her is in finding versatile applications to scientific knowledge. She delights in persevering in finding answers to scientific questions, and in achieving her life goals. One of her favorite quotes is, "To strive, to seek, to find and not to yield."

While studying for her doctorate in hydrology at UNESCO-IHE Institute for Water Education in Delft, The Netherlands, Heyddy is researching the interactions that take place between groundwater and surface water. Water availability is a growing concern throughout the world. Mismanagement of existing water resources and sometimes natural conditions can lead to a deterioration of water quality and cause water scarcity.

Groundwater resources are usually obviated from water resources management strategies, where the focus is mainly placed on surface water bodies such as lakes and rivers. However, both types of reservoirs (groundwater and surface water) are vital to humankind, as both are intrinsically related. Smart planning strategies should consider these relationships and provide integrated solutions to water availability and water quality problems. Heyddy is working at a catchment scale looking at a variety of mechanisms and types of interactions and the consequences for quality of water resources and availability.

When she completes her studies in The Netherlands Heyddy plans to teach at the National Autonomous University of Nicaragua (UNAN/Managua). She says Nicaragua is a small, developing country struggling with economical and social inequities where women face obstacles to careers in science due to cultural and social barriers.

Pelin CANDARLIOGLU

Home Country
Turkey

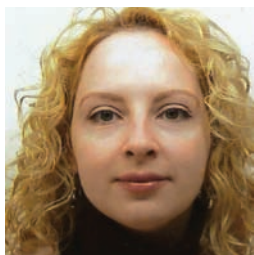
Degree
PhD in Materials Science

Expertise
Bioengineering

Research Focus
Bone Tissue Engineering
and Regenerative Medicine

Host University
Imperial College London,
United Kingdom

Fellowship Awarded
2010



Pelin Candarlioglu is the second of two daughters raised in a small town in Turkey. Her parents attached great importance to knowledge and did everything possible to provide the best education. Fluent in German, she is professionally interested in proteomics, and in her leisure time she enjoys learning about art.

Pelin graduated in 2005 with her BSc in biological sciences and bioengineering from Sabanci University in Istanbul. She obtained her master's degree in biotechnology and bioanalytics at the Vienna University of Technology in Austria, and in 2009 she began studying for her PhD in bone tissue engineering and regenerative medicine at Imperial College London in the United Kingdom.

Pelin's research focuses on developing new biomaterials for bone tissue engineering. She aims to incorporate strontium, the main ingredient of Protelos, a well-known osteoporosis drug, into Bioglass, a bioactive material used for bone replacements. Bioactive glasses dissolve in bodily fluids and release ions that promote bone production. Incorporating strontium into Bioglass offers the possibility of slow release and local delivery of strontium at the defect site, and local delivery of its therapeutic effect. As well, Bioglass may be formed into a tissue engineering scaffold when embedded in a collagen mesh to increase the flexibility of the material.

Her work is especially promising for young patients where longevity of the implant is a critical factor, as well as for patients with osteoporosis where these biomaterials help to control drug release at the trauma site. It is also important for aging populations in developed countries, where orthopedic interventions are becoming more frequent and the lifespan of implants has risen from less than 10 years to more than 20 years.

Pelin plans to continue post-doctoral research and following that to take a lecturer position at Sabanci University in Turkey.

Bridget CHUKUALIM

Home Country
Sierra Leone

Degree
PhD in Medical Informatics

Expertise
Sleeping Sickness

Research Focus
Comparative Genomic Analysis
of Kinetoplastid Protozoa

Host University
University of Cambridge,
United Kingdom

Fellowship Awarded
2010



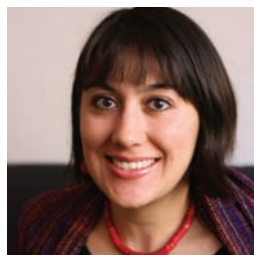
Bridget Chukualim was born in Freetown, Sierra Leone and grew up with her father, founder of the first commercial training college in Freetown. While in secondary school she loved to read biographies of famous scientists. Now married with three children of her own, she enjoys reading and playing tennis.

Bridget graduated in 1991 from the University of Port Harcourt, Nigeria with her BSc in biochemistry. She earned her MSc in bioinformatics in 2006 from the University of Manchester in the United Kingdom, and in 2010 she began studying for her doctorate in medical informatics at the University of Cambridge in the UK.

At Cambridge her research interest is in a comparative genomic analysis of kinetoplastid protozoa and related parasites. She is performing literature searches to identify novel drug targets in corresponding parasitic diseases such as *Trypanosoma brucei*, the causative agent for sleeping sickness in humans and for nagana in cattle. These diseases currently plague the sub-Saharan Africa continent, affecting more than 60 million people and contributing to loss of lives and cattle throughout the region. Related parasites include *Trypanosoma cruzi*, which causes the disease American trypanosomiasis (Chagas disease), which affects about 11 million people in America, and leishmania, which causes the disease leishmaniasis and affects about 12 million people in tropical and sub-tropical regions worldwide.

Bridget's analysis of these parasitic genomes is aimed at dissecting the genetic susceptibility and resistance to trypanosomiasis. She hopes her work will help in better understanding the pathogenesis of these diseases and lead to the production of effective treatments and management regimes.

When she graduates with her doctorate, Bridget intends to contribute to the curriculum development of medical informatics research in Sierra Leone and other countries in West Africa.

Rosana COLLEPARDO-GUEVARA**Home Country**
Mexico**Degree**
Post-Doctorate in
Biomolecular Simulations**Expertise**
Theoretical Chemistry**Research Focus**
Biomolecular Simulations**Host University**
New York University, United States**Fellowship Awarded**
2010

Rosana Collepardo-Guevara was born and grew up in Mexico, where her parents inspired her to succeed academically. She enjoys hiking, creative cooking, independent cinema and reading, particularly feminist literature and books about how the human mind and human behavior are shaped by evolution.

Rosana graduated from the National Autonomous University of Mexico (UNAM) in 2004 with a BSc (honours) in chemistry. During her final undergraduate year she specialized in high-performance supercomputing. The following year she graduated with her MSc in theoretical chemistry from the University of Oxford in the United Kingdom, where in 2009 she also completed her doctorate in physical and theoretical chemistry. Rosana was elected president of the Oxford University Mexican Society, a student organization that helps Mexicans adapt to the experience of studying abroad, and for three years she also taught mathematics to undergraduates.

Rosana's post-doctoral research in theoretical chemistry at New York University in the United States involves biomolecular simulations. Her research focuses on refining and applying innovative computational methods and multi-scale models to help understand how the structures and motions of complex biological systems regulate fundamental cellular processes. Using supercomputers to study the factors that drive and alter the compaction of DNA inside human cells, she is attempting to provide atomic views and quantitative information on energetics that cannot be easily revealed from experimental studies.

An accurate computational study such as the one Rosana is performing is key to understanding aberrant cellular processes and, in turn, to designing agents that can prevent associated illnesses such as multiple sclerosis, diabetes and cancer.

When she completes her studies Rosana intends to teach and become a researcher at a Mexican public university.

Masoumeh GHARAEI**Home Country**
Iran**Degree**
PhD in Mathematics**Expertise**
Mathematics**Research Focus**
Mathematical Theory
of Random Dynamical Systems**Host University**
Amsterdam University,
The Netherlands**Fellowship Awarded**
2010

Masoumeh Gharaei was born in Gonbad-e-Kavoos, Iran and partly raised in Gorgan, a beautiful city near the Caspian Sea. The eldest of two brothers and one sister, Masoumeh considers herself introspective and says that she puts a lot of thought into what she does. She uses mathematics as a tool for logical thinking and powering her mind. Adventurous and interested in travelling, she likes learning about new perspectives as well as the arts, mysticism and philosophy. In her spare time she enjoys reading, sports, music and singing. She is married to an industrial engineer.

Masoumeh attended Iran University of Science and Technology (IUST) in Tehran, where she obtained her bachelor's degree in pure mathematics. In 2006 she received her MSC degree in mathematics from Ferdowsi University of Mashhad (UM). After graduation she taught mathematics at Azad University, and in 2010 she enrolled in a doctoral program at Imperial College London in the United Kingdom.

Masoumeh is focusing her research on random dynamical systems, a field of research that has broad relevance in applied sciences such as finance, weather forecasting and statistical mechanics. Weather phenomena associated with climate change and the current worldwide financial crisis are examples of systems with deep economic impact that require sophisticated stochastic models that can take abrupt changes into account. Studying such things as random billiards (a key topic in dynamical systems) or bifurcation patterns of a random time-series modeling one of these world-wide phenomena, for instance, helps to understand such complex systems and to discover new features.

After graduating with her doctorate in mathematics, Masoumeh intends to pursue post-doctoral research in Europe or the United States and then return to Iran, where she hopes to continue research and teaching at one of the universities. She also hopes to establish a mathematical institute for girls and women.

**Ana Paulina
GOMORA-FIGUEROA**

Home Country
Mexico

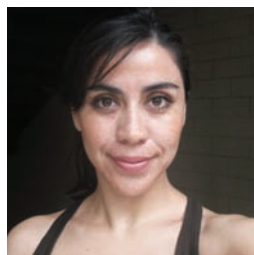
Degree
Post-Doctorate in Chemistry

Expertise
Chemistry

Research Focus
Porous Metal-Organic
Frameworks

Host University
University of California Berkeley,
United States

Fellowship Awarded
2010



Ana Paulina Gomora-Figueroa was born and raised as the eldest of five children in Mexico City. Both of her parents are engineers and as a child she often played in the lab of her mother, a chemical engineer and researcher at the Mexican Institute of Oil.

Ana Paulina earned her BSc and MSc degrees in chemistry at the National Autonomous University of Mexico (UNAM) before becoming an exchange doctoral student in 2008 at Masaryk University in Brno, Czech Republic. She obtained her doctorate in chemistry in 2010 from the Institute of Chemistry at UNAM.

An instructor of thermodynamics at UNAM, she is researching the development and deployment of recyclable and long-lived CO₂ capture and storage materials. Her research pursues the generation of water-stable and well-defined metal-organic frameworks (MOFs), which exhibit a high surface area for interaction with fossil-fuel-burning flue gases.

The targeted applications of the resulting materials will range from the high selectivity and storage for CO₂ to a more efficient capture from a low pressure stream of flue gas. In addition, these small molecules may be used as chemical feedstock for the construction of more complex molecules. This will allow, in turn, the development of more efficient and atom-economical process technologies for their use in commercial applications.

Ana Paulina considers that her research will provide significant contributions to help her country manage current environmental challenges such as alternative energies and global warming. She is also interested in helping initiate collaborative and interdisciplinary research programs in Mexico.

Ana Paulina intends to teach at the National Autonomous University of Mexico.

Saima HASHIM

Home Country
Pakistan

Degree
Post-Doctorate
in Weed Genomics

Expertise
Molecular Mechanism of
Herbicide Resistance in Weeds

Research Focus
Genomics of Weedy Species

Host University
Ohio State University,
United States

Fellowship Awarded
2010



Saima Hashim was born and raised in Peshawar, Pakistan. Her mother and father supported her academic aspirations and those of her elder sister and younger brother. She is interested in nature and history, particularly the evolutionary stages of humankind, and she loves to observe other cultures while travelling. She also likes reading, cooking and listening to music. Saima is married to a biotechnologist, and they have one daughter and one son.

After receiving a gold medal for academic achievement while studying for her master's degree in agriculture, Saima was subsequently offered a teaching position in her own department at the Agricultural University Peshawar in Pakistan. At Ohio State University in the United States, where she is now enrolled in post-doctoral agricultural research, her focus is on the genomics of weedy species, and in weed ecology.

Until the recent past, chemical weed control was considered the most effective weed control measure. However, repeated use over decades of the same herbicides eventually resulted in the development of herbicide-resistant weed biotypes. This phenomenon has alarming implications for farmers. In her research, Saima is trying to find the cause and the solution to this situation in our natural and agro ecosystems.

Saima feels that weeds need to be managed wisely in harmony with our natural environment, and she believes that nature has its own way of balancing the things it has purposely created. Her research on the genomic study of weed species and how they are related to crop plants may enable scientists to develop more comprehensive weed management strategies and manage the potential threat of genes escaping from genetically modified herbicide-resistant crops into their weedy relatives. As well, the results of her research may aid sustainable crop production.

Saima plans to teach at the Agricultural University Peshawar in Pakistan.

Basma HASHMI**Home Country**
Pakistan**Degree**
PhD in Bioengineering**Expertise**
Bioengineering**Research Focus**
Reprogramming Adult Bone
Marrow Stem Cells**Host University**
Harvard University, United States**Fellowship Awarded**
2010

Basma Hashmi was born and raised in Saudi Arabia, where her family continues to reside. Her interests and hobbies include horse riding, poetry and outdoor activities.

At the age of 14, she was the youngest research team member of the world's first uterine transplantation research and medical team. Although the transplant was ultimately not successful, the experience taught her the importance of biomedical engineering research. She pursued her undergraduate degree in biomedical engineering at Boston University in the United States and graduated Magna Cum Laude prior to becoming a PhD candidate in bioengineering in 2008 at Harvard University in the US.

At Harvard Basma is researching a novel method of engineering tooth formation by reprogramming adult bone marrow stem cells on a polymeric biomaterial/scaffold. The goal of this research is to use the mechanical, chemical and engineering blueprints determined from the tooth model and to apply them to larger organs of interest such as the pancreas, kidney and heart. To date there have been no successful reports of tooth formation in vitro using this method. Organ regeneration is of particular importance in developing countries, which report one of the highest incidences of diabetes in the world.

Basma intends to return to Saudi Arabia to teach, although she has not yet chosen a university in her home country. She says that she is excited to be pursuing education in a relatively unknown field, and she aims to be one of the first female professors in Saudi Arabia to begin teaching in this field.

Sheeja JAGADEVAN**Home Country**
India**Degree**
PhD in Engineering Science**Expertise**
Environmental Engineering**Research Focus**
Toxic Metalworking
Fluid Wastewater**Host University**
University of Oxford,
United Kingdom**Fellowship Awarded**
2010

Sheeja Jagadevan was born in Trivandrum, India. In her spare time she enjoys reading and travelling. Active in community service and teaching, she is attempting to foster the values of responsibility, sharing and selflessness in her own daughter.

Sheeja graduated in 1996 with her BSc in life sciences from Andhra University in India, and in 1998 she earned her MSc in environmental science, also from Andhra University. She spent two years at the Indian Institute of Technology in Bombay, where she earned her Master of Technology degree in environmental engineering. In 2008 she enrolled as a PhD student at the University of Oxford in the United Kingdom.

At Oxford Sheeja is researching hybrid technologies for remediation of industrial wastewater. She says that nature has an amazing ability to cope with small amounts of water wastes and pollution, but it would be overwhelmed if we stopped treating the billions of gallons of wastewater and sewage produced every day before releasing it back to the environment. Treatment plants reduce pollutants in wastewater to a level nature can handle. Sheeja is focusing on treatment of toxic metalworking fluid (MWF) wastewater. Using a combination of advanced oxidation processes and bioremediation, her approach combines complementary physico-chemical and biological technologies to optimize the processing of MWF wastewater treatment. The toxicity associated with this MWF formulation is largely due to biocides added into the blend to prevent bacteriological action during its lifetime.

Most major cities in India face severe urban water management challenges related to drinking water supply, storm water and wastewater treatment. Sheeja believes that a clever manipulation of chemistry, microbiology and engineering could tackle this problem in a sustainable manner.

Sheeja plans to teach at the Indian Institute of Technology.

Zegbeh JALLAH

Home Country
Liberia

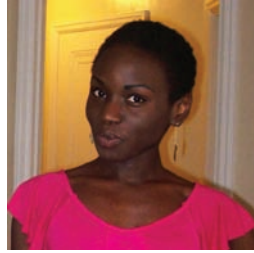
Degree
PhD in Bioengineering

Expertise
Female Pelvic Floor Disorders

Research Focus
Pelvic Organ Prolapse
and Urinary Incontinence

Host University
University of Pittsburgh,
United States

Fellowship Awarded
2010



Zegbeh Jallah was born in Liberia as the second and youngest child in her family. As a child she was always eager to learn new things and her great interest was reading and mastering new words. Growing up during years of civil war in Liberia, the idea of peace seemed fragile and the educational system suffered greatly due to frequent school closures during times of civil unrest.

Zegbeh attended high school in the United States and graduated in 2006 from Saint Augustine’s College in North Carolina with a Bachelor of Science degree in mathematics. She then worked in the pharmaceutical industry and as a researcher at the Georgia Institute of Technology before enrolling in doctoral studies in bioengineering at the University of Pittsburgh in Pennsylvania.

At the University of Pittsburgh her area of research is in pelvic floor disorders with a focus on pelvic organ prolapse and urinary incontinence. Pelvic organ prolapse and urinary incontinence are disorders for which childbirth is a primary risk factor. These conditions affect women all over the world, but they are especially prevalent in Africa. Liberia is one of the many African countries facing an increase in the number of women affected by urinary problems. In countries where a woman’s worth is defined by her ability to have children, these conditions can lead to social isolation and exclusion. Zegbeh feels that women facing these challenges need to have a female figure who understands the challenge and is working to find a remedy.

When she returns to her home country with her PhD, Zegbeh intends to take up a teaching position at the University of Liberia.

Xiaoxu KANG

Home Country
China

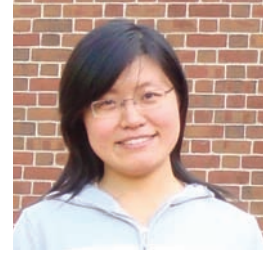
Degree
PhD in Bioengineering

Expertise
Neuroscience

Research Focus
Neural Signal Processing,
Instrumentation,
Clinical Neuroscience

Host University
Johns Hopkins University,
United States

Fellowship Awarded
2010



Xiaoxu Kang grew up in Harbin, China. She writes novels and articles as a hobby—she was one of the finalists in an international competition in 2007 and she publishes an ongoing serialized Chinese novel on a Taiwanese website. She also enjoys drawing, calligraphy, chess, badminton, jogging, yoga and regular exercise.

After graduating in 2007 with her BSc in biomedical engineering from Beijing University of Aeronautics and Astronautics in China, Xiaoxu attended the biomedical engineering program at Johns Hopkins University in Baltimore, where she graduated with her master’s degree in 2009 and where she is now studying for her PhD in biomedical engineering.

Her long-term goal is to advance development of a fully implantable neuro-optic vestibular prosthesis. The function of the vestibular part of the inner ear is to stabilize our gaze via the angular Vestibulo-Ocular Reflex (aVOR). This is the fastest human reflex and the only means to stabilize our vision during common fast-head movements such as walking. It is estimated that more than two million people in the world have vestibular dysfunction, and the condition is especially prevalent in China due to continued use of medicines that are toxic to the inner ear.

Xiaoxu is working to address these problems by helping to develop a prototype vestibular prosthesis that encodes head movements via electrical stimulation of the corresponding vestibular nerve, much like cochlear implants now commonly used to restore hearing to deaf individuals. Initial tests of this device in animals have been promising, but so far the spread of stimulus current leads to a distorted pattern of head movement sensation. On the other hand, laser stimulation of neural tissue shows promise in selectively stimulating auditory nerves, and she hopes to apply this novel approach to the vestibular system.

Xiaoxu plans to teach at Beihang University in China.

Witri Wahyu LESTARI**Home Country**
Indonesia**Degree**
PhD in Science**Expertise**
Chemistry**Research Focus**
Organometallic
Co-ordination Chemistry**Host University**
University of Leipzig, Germany**Fellowship Awarded**
2010

Witri Wahyu Lestari grew up in a small village in Central Java, Indonesia. An only child of parents who are both elementary school teachers and who always encouraged her education, she is married to a chemist and they have one daughter. Her hobbies are cooking, computers and the Internet.

Witri pursued her BSc in chemistry at Sebelas Maret University in Surakarta and graduated cum laude in 2003. She became a junior lecturer at UNS in 2003 and in 2008 she earned her MSc in chemistry at the University of Leipzig in Germany, where she is also enrolled in a doctoral program studying organometallic co-ordination chemistry.

Her research focuses on the synthesis of Metal-Organic Frameworks (MOFs), which are of interest due to their novel structures, interesting properties and potential applications as new materials such as molecular magnets, as heterogeneous catalysts for gas separation and storage, for ion exchange and as drug delivery systems. MOFs with micro-porous architecture are promising alternatives for renewable energy in the future. Witri is aiming at generating catalytically active MOFs by employing functionalized (chiral) building blocks as bridges between the metal centers for a well-defined three-dimensional framework.

Her research is important because catalysis plays a significant role in many areas of life. A large number of organic and inorganic reactions need catalysts to reduce their activation energy and to accelerate the reaction, increasing the selectivity of specific products. Catalysts for asymmetric hydrogenations are useful in pharmaceutical industries, and heterogeneous catalysis is important in hydrocarbon cracking within oil refineries and petrochemical industries. MOFs are feasible candidates as environmentally friendly solid catalysts that are easier to separate and recover and are thus reusable.

Witri plans to teach at Sebelas Maret University in Indonesia.

Indira MAHMOUD**Home Country**
Sudan**Degree**
PhD in Environmental Engineering**Expertise**
Geology**Research Focus**
Groundwater Pollution
Assessment for
Environmental Management**Host University**
University of Sheffield,
United Kingdom**Fellowship Awarded**
2010

Indira Mahmoud was born in Sudan but at the age of 11 her father's work took her family to Yemen. Described as a curious child, she now believes that science was a good career choice for her. She has four younger sisters.

Indira graduated in 1994 with a BSc (Honours) in geology from the University of Khartoum in Sudan, and four years later she earned her MSc in geology from the same university. In 2010 she joined the University of Sheffield in the United Kingdom to pursue her PhD in environmental engineering.

At the University of Sheffield Indira is preparing a groundwater pollution assessment for environmental management of water resources in Sudan. One of the most important natural resources in Sudan, a developing country with a semi-arid climate and an unsystematic distribution of population, water resources are being threatened by ever-growing industrial activities that could have drastic environmental impacts due to contamination.

Indira is motivated by a genuine sense of responsibility toward the natural environment of our planet. As a human being and as a scientist, she says she can't think of anything more important than water. Her research is focusing on developing an integrated approach to groundwater pollution by providing a base of scientific information required to develop policies that would help to avoid exposure of groundwater to contaminating substances or to minimize the impacts of those substances, to provide cost-effective cleanup and waste disposal strategies, and to reduce future risk of contamination. Her expected results will lead to an integrated mechanism for assessing groundwater pollution and an evaluation model based on bio-geochemical and socio-economic parameters as the basic components for assessing, monitoring and predicting environmental impacts.

When she completes her studies in the United Kingdom Indira plans to teach at the University of Khartoum.

Taryn MORRIS

Home Country
South Africa

Degree
PhD in Ecology

Expertise
Ecology and Invasion Biology

Research Focus
Introduction of Invasive
Alien Species

Host University
University of Colorado
at Boulder, United States

Fellowship Awarded
2010



Taryn Morris was born in Johannesburg, South Africa as the youngest of four siblings. She loves being outdoors and is a keen runner and hiker as well as a passionate photographer.

In 2004 Taryn graduated cum laude with a BSc (Hons) in zoology from the University of the Witwatersrand in Johannesburg, where in 2008 she also graduated cum laude with her MSc degree. After earning a professional certificate in environmental policy and economics at the Centre for Environmental Policy at Bard College in New York, United States, in 2010 she enrolled in doctoral studies in ecology at the University of Colorado at Boulder.

Taryn’s research will be carried out in the Cape Floral region of South Africa, which supports one of the richest diversities of flora in the world. While representing less than 0.5 percent of Africa’s land area, it is home to nearly 20 percent of the continent’s flora. It also displays remarkable levels of endemism with almost 60 percent of plant species being found nowhere else in the world. The biome’s high plant diversity as well as its unique plant reproductive strategies, nutrient cycling patterns, adaptations to fire, pollination biology and patterns of endemism and adaptive radiation found in the flora are of outstanding value to science.

Taryn’s research aims to investigate biogeochemical dynamics and ecophysiological properties of the unique fynbos biome in response to several anthropogenic pressures, particularly the introduction of invasive alien plant species. Her research will enhance understanding of how such pressures can influence diversity, structure and functioning within this unique and fragile ecosystem. She feels that her research is not only pertinent to the conservation of the unique Cape Floral region, but insights gained there can also be extended to many other parts of the globe.

Taryn plans to teach at the Organization for Tropical Studies in South Africa.

Tuyeni MWAMPAMBA

Home Country
Tanzania

Degree
PhD in Ecology

Expertise
Tropical Forest Ecology
and Conservation Management

Research Focus
Community Forests and
Payment for Ecosystem Services

Host University
National Autonomous
University of Mexico, Mexico

Fellowship Awarded
2010



Tuyeni Mwampamba was born in Bucharest, Romania and raised in Tanzania, where her father was a university professor. After acquiring her love for the outdoors at an early age she continues to enjoy gardening and hiking. She is married with two children and they all enjoy hiking and camping together as a family.

In 1999 Tuyeni completed a study abroad program with the Center for International Education Exchange in Costa Rica, and she graduated magna cum laude in 2000 with her BA in environmental studies from Mount Holyoke College in the United States. She earned a conservation management graduate academic certificate at the University of California at Davis where she also completed doctoral studies in ecology. She is currently pursuing a post-doctorate in community forests and payment for ecosystem services at the National Autonomous University of Mexico.

In Mexico Tuyeni is researching forest-derived ecosystem services with a focus on ecosystem services in secondary forests (forests that regenerate after the primary forest is removed). As an ecologist she is looking at various types of ecosystem services in forests that are managed or owned by local communities, and as a social scientist she is examining social and institutional aspects of forest management.

She says that ecosystem services are a new commodity on the world market, and that poor communities in developing countries are in a good position to produce these services. Working with the Tanzanian Forest Conservation Group, she is hoping to apply her research to protect forests in Tanzania and to benefit local communities. At an international level her research is designed to contribute to the role of communities in climate change policy discussions, especially those policies that relate to trading of carbon and other ecosystem services.

When she completes her post-doctorate Tuyeni plans to teach at Sokoine University of Agriculture in Tanzania.

Sidrotun NAIM**Home Country**
Indonesia**Degree**
PhD in Environmental
Science and Pathobiology**Expertise**
Aquaculture**Research Focus**
Reducing Viral and Bacterial
Disease in Shrimp Farming**Host University**
University of Arizona,
United States**Fellowship Awarded**
2010

Sidrotun Naim was born and raised in Solo City and moved to Bandung City, Indonesia to pursue higher education. She comes from a long line of teachers in her family, and she likes to quote a native American proverb: "We do not inherit the Earth from our ancestors, we borrow it from our children."

After graduating in 2002 from Bandung Institute of Technology (ITB), Sidrotun worked as an environmental consultant for Freeport Indonesia in Papua, Indonesia. In 2005 she earned a Master of Marine Studies degree from the University of Queensland in Australia with the dean's commendation for high achievement, and in 2006 she began working as a marine program consultant for World Wildlife Fund Indonesia in Aceh—the epicenter of the devastating 2004 tsunami and considered one of the best shrimp broodstock areas in the world.

While working in Aceh she became involved in tsunami reconstruction efforts, which proved to be a turning point in her life. After receiving a 2009 UNESCO-L'Oréal Award For Women in Science, she began studying for her PhD in Environmental Science and Pathobiology at the University of Arizona in the United States, where her research focuses on sustainable aquaculture. In 2010 she won an Alltech Young Scientist award, and she will represent Indonesia in 2011 for an international fellowship with the UNESCO-L'Oréal Award For Women in Science program.

Sidrotun is researching the potential of a polyculture between shrimp and tilapia to reduce viral and bacterial disease in shrimp farming. Using a green water technique of stocking tilapia in reservoirs to stimulate the production of microalgae may help in reducing disease due to the presence of antibacterial and antifungal properties on the skin mucus of tilapia. She hopes that her aquaculture research will help improve the quality of life in coastal communities throughout her country.

Sidrotun plans to teach at the Bandung Institute of Technology.

Esther NGUMBI**Home Country**
Kenya**Degree**
PhD in Entomology**Expertise**
Chemical Ecology**Research Focus**
Alternative Strategies
for Controlling Insect Pests**Host University**
Auburn University, United States**Fellowship Awarded**
2010

Esther Ngumbi comes from a family of seven. Her parents supplemented their small teaching salaries with subsistence farming so that their children could attend university. They inspired Esther and her sisters to pursue their educational goals and to persevere against challenges.

Active in a number of professional associations, Esther is an advocate for ending world hunger. She speaks on this topic at conferences and interacts with policy makers from organizations such as the World Bank, USAID and the United Nations.

After earning her Bachelor of Science degree in biochemistry and zoology in 1999 at Kenyatta University in Kenya, where she also graduated in 2002 with her Master of Science degree, in 2008 Esther began studying for her PhD in entomology at Auburn University in the United States.

At Auburn her research involves insect pests affecting crops, one of the most serious constraints on food security worldwide. The majority of insect pests are controlled by spraying insecticides, but insecticide use creates problems such as human poisoning along with health risks, environmental hazards, loss of biodiversity and resistance among pests. In developing countries such as Kenya women contribute most to food production and are especially vulnerable to the risks associated with pesticide use.

Esther is researching more sustainable ways to feed our expanding population. She is seeking to characterize mechanisms of olfaction and response to host-related odor in two parasitoid wasps using a multidisciplinary approach that integrates analytical, behavioral and electrophysiological techniques. Her results may help understanding of better olfaction in parasitoids and may open avenues for improved insect pest management.

Esther plans to teach at Egerton University in Kenya.

Oluwabukola Abiodun OKE

Home Country
Nigeria

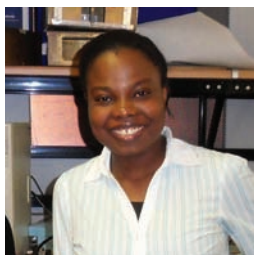
Degree
PhD in Electrical and
Electronic Engineering

Expertise
Renewable Energy

Research Focus
Statistical Load Flow for
Energy Distribution Systems

Host University
University of Nottingham,
United Kingdom

Fellowship Awarded
2010



Oluwabukola Abiodun Oke is from Are-Ekiti, Nigeria where she was the youngest in her family of two boys and three girls. Mathematics is her favorite subject and she has always wanted to be an engineer. In her leisure time she enjoys reading motivational books and listening to or singing hymns.

The only female in a class of 45 engineering students at the University of Ado-Ekiti in Nigeria, she graduated in 2007 with first-class honours as the best student in the Faculty of Engineering. In 2009 she earned her MSc with distinction in electrical technology for sustainable and renewable energy systems at the University of Nottingham, United Kingdom, where she is also pursuing a PhD.

Oluwabukola is researching statistical load flow for energy distribution systems. Global developments within the energy sector have emphasized renewable and sustainable energy to reduce CO₂ emissions. Along with the advent of deregulated electricity, this has encouraged a rise in small renewable energy generators, but most of these power sources have varying output which makes it imperative to have a method to fully account for uncertainties in the power network.

Probabilistic load flow analysis can account for and estimate power system operation during such uncertainties, but the main method employed in probabilistic load flow, the Monte Carlo simulation, is unwieldy due to the high computational burden placed on systems that have many renewable power generators. To forestall this problem, Oluwabukola is developing a fast but accurate method to estimate the probability distribution needed for a probabilistic load flow calculation while taking a variety of loads and power sources into consideration. Her research may be used by power grid operators worldwide and especially in Nigeria, where state governments are now making efforts to invest in renewable energy solutions to local power issues.

Oluwabukola plans to join the University of Ado-Ekiti in Nigeria.

Nimalika PERERA

Home Country
Sri Lanka

Degree
PhD in Physics

Expertise
Chemical Engineering

Research Focus
Cost-Effective Renewable
Energy Source for Fuel Cells

Host University
University of Cambridge,
United Kingdom

Fellowship Awarded
2010



Nimalika Perera was born and raised in Negombo, Sri Lanka. The eldest in her family, she has two brothers. Her mother, a librarian, encouraged reading which resulted in her thirst for knowledge since early childhood for which she is grateful. In her spare time she enjoys reading, painting and needlework.

Nimalika entered a mathematics stream in national school and passed her advanced-level examination with high marks. She then entered the University of Moratuwa in chemical and process engineering, from which she graduated with first-class honors. Her master's degree research focused on nanotechnology and its applications for the Sri Lankan food processing industry.

Now at the University of Cambridge in the United Kingdom, her doctoral research is related to the development of fuel cells based on hydrogen produced by microbes. Fuel cell technology is an efficient method for energy generation and has been developed for catalytically reformed hydrogen, which is generated from non-renewable sources such as fossil fuel. Fuel cells have many uses as portable power supplies for automobiles and industrial machines, as clean power generation units for community power supply, and as micro-power generators for laptops and cameras.

Her research seeks to further knowledge of hydrogen generation using micro-organisms with waste substrates as a cost-effective renewable energy source for fuel cells. Fuel cells are viewed as a promising method for future energy generation due to low carbon emissions and high efficiency. Nimalika hopes her work to develop hydrogen as a cost-effective energy source will help reduce the cost of fuel cells and increase their popularity as a power source for most everyday electrical devices. Moreover, since her focus is on microbe-based hydrogen, it has the potential to help solve many of the world's waste challenges.

When she completes her doctoral studies Nimalika plans to teach at Uva Wellassa University in Sri Lanka.

Sobia Anwar QAZI**Home Country**
Pakistan**Degree**
PhD in Civil Engineering**Expertise**
Material and Structural
Aspects of Concrete**Research Focus**
Design and Improvement of
Reinforced Concrete Structures**Host University**
Imperial College London,
United Kingdom**Fellowship Awarded**
2010

Sobia Qazi was born in Karachi, Pakistan. She has one sister and two brothers. Her hobbies are reading, photography, developing her computer skills and listening to music.

Sobia received her bachelor's degree in civil engineering from NED University of Engineering and Technology in Karachi, graduating in 2007 among the top ten students in her class. She obtained her Master of Science degree in civil engineering from University Technology Petronas in Malaysia in 2010. During her studies she earned silver and gold medals for excellence along with a Best Paper award. Sobia is now enrolled in a doctoral engineering program at Imperial College London, United Kingdom.

In London Sobia is focusing her research on the development of improved design methods for shear in reinforced concrete. Considerable economies can be achieved in construction through the use of light-weight aggregate concrete (LWAC) and high-strength concrete (HSC). Because the shear strength of LWAC and HSC members can be reduced if the aggregate fractures due to a reduction in shear transfer along cracks, current codes of practice account for the effects of aggregate fracture by empirically reducing the shear strength of LWAC and HSC.

Sobia's research model will consider equilibrium at the crack and will relate the stresses in the concrete and in the reinforcement to the crack displacements. Key issues Sobia is examining include the influence of tension stiffening in the concrete between cracks and aggregate type, the definition of crack roughness, influence of the shear reinforcement type and amount of shear transfer along cracks. She hopes that her research will provide a valuable tool for assessing shear transfer along cracks in concretes made with non-conventional aggregate types, and that it may be applied in the design of low-cost structures in her home country.

When she returns to Pakistan Sobia intends to teach at NED University of Engineering and Technology in Karachi.

**Maria Claudia
SEGOVIA-SALCEDO****Home Country**
Ecuador**Degree**
PhD in Molecular Systematics**Expertise**
Botany**Research Focus**
Conservation Genetics
and Molecular Systematics**Host University**
University of Florida, United States**Fellowship Awarded**
2010

Claudia Segovia-Salcedo was born the oldest of four children (she has two sisters and one brother) in Cuenca, Ecuador but spent her childhood in the capital city of Quito. She loves travelling, trekking expeditions and spending time with her two children along with reading and making jewelry. She is married to a biologist and says that for as long as she can remember she has been fascinated by living things.

Claudia obtained her bachelor's degree at the Pontifical Catholic University of Ecuador in 1996 and her Master of Science degree in environmental and plant biology at Ohio University in 2000, where she also began studying for her PhD in molecular and cell biology. In 2009 she became a PhD candidate in the biology department at the University of Florida.

In Florida she is interested in the Andean paramos—high-elevation, neo-tropical ecosystems now occupying less than two percent of the northern Andes and characterized by high biodiversity, large numbers of endemic species and isolated distribution as a result of large-scale destruction. The tree genus *Polylepis* is the dominant vegetation of the Andean paramos, but *Polylepis* forests continue to disappear at an alarming rate partly due to population growth and partly because people follow unsustainable cultural traditions such as slash-burn agriculture and shepherding exotic animals. Claudia is researching the genetic composition of *Polylepis* as an essential component of comprehensive conservation planning. Her research is among the first to use genetic divergence and uniqueness to identify areas of conservation importance in Ecuador, and she hopes it will be used in the development of reforestation programs across the Ecuadorian highlands.

When she completes her PhD Claudia plans to teach at the Army Politechnic School in Ecuador.

Sitara Parveen SHAH

Home Country
Pakistan

Degree
PhD in Geography

Expertise
Geography

Research Focus
Impact of Climate Change
on Rural Populations

Host University
University of Bonn, Germany

Fellowship Awarded
2010



Sitara Parveen Shah was born in Gulmit Gojal, a village in Pakistan near the Chinese border. She grew up in a big family with eight sisters and one brother. Married with two children, a boy and a girl, she enjoys cooking and reading books.

Sitara completed her undergraduate education in the city of Gilgit, where she obtained her higher secondary education from the Federal Board of Intermediate and Secondary Education. She also attended Aga Khan University in Karachi and Punjab University in Lahore before graduating with her master's degree in geography from the University of Peshawar in Pakistan. She is now attending the University of Bonn in Germany, where her doctoral research is focusing on climate change in northern Pakistan.

In her research Sitara is examining how climate change is affecting people living in the high, mountainous regions of northern Pakistan. The vulnerable populations of these areas are suffering from climatic changes due to global environmental problems such as rising temperatures, changes in precipitation, floods, droughts and other extreme weather events. Evidence shows that a trend toward longer winters is causing dramatic declines in agricultural productivity in many high, mountainous areas in Asia, where much of the population depends for survival on agricultural activities.

Sitara is studying the effects of climate change on a local and regional scale because this provides first-hand evidence of impacts and how people must adapt and prepare for an uncertain future—beyond the obvious need to secure critical resources for survival such as water, food, shelter and firewood. Her research will contribute to indigenous knowledge and may help in designing climate-change mitigation programs. Her work will also help create general awareness about the impacts of climate change on rural populations.

Sitara plans to teach at Karakoram International University in Gilgit.

Sadiyo SIAD

Home Country
Somalia

Degree
PhD in Infectious Diseases
and Immunology

Expertise
Medical Research

Research Focus
Role of Properdin in
Infectious Diseases

Host University
University of Leicester,
United Kingdom

Fellowship Awarded
2010



Sadiyo Siad was born in the capital city of Somalia, Magadishu, and is the first in her family to go on to higher education. She and her sister were raised by their mother, who she credits with supporting her academic success. She enjoys playing badminton, reading, travelling, learning about new cultures and meeting people from different backgrounds.

After moving as refugees from Somalia to Denmark in 1994, Siad became interested in infectious diseases and immunology when she witnessed her aunt suffering from tuberculosis, and her grandmother died from the same deadly disease. She obtained her international baccalaureate in Denmark, and in 2008 she earned her BSc (Hons) in biological sciences with a focus on microbiology and biochemistry at the University of Leicester in the United Kingdom, where she later graduated with a master's degree in infection and immunity and where she is now pursuing PhD studies in infectious disease and immunology.

Her research is on the role of properdin, an important innate immune protein, in the cellular response to mycobacterial infection. Properdin is emerging as a central player in the complement-mediated immune response to a variety of inflammatory situations such as infections and autoimmunity. Siad is also investigating the role of properdin in the cellular response to latent tuberculosis infections.

Sadiyo has always dedicated her life to serving others. In addition to her PhD studies she works as a health education coordinator raising awareness about infectious diseases, and she is also working to put an end to the practice of female genital mutilations, a major problem in the communities she serves.

When she completes her doctoral studies, Sadiyo plans to pursue post-doctoral research before returning to Somalia to become a researcher and a lecturer in infectious diseases and immunology at one of the universities in Magadishu.

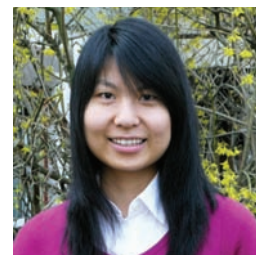
Sithabile TIRIVAROMBO**Home Country**
Zimbabwe**Degree**
PhD in Water Science**Expertise**
Aquatic Chemistry and Hydrology**Research Focus**
Climate Change and
Variability Impacts on Water
Resources Management of the
Zambezi River Basin**Host University**
Rhodes University, South Africa**Fellowship Awarded**
2010

Sithabile Tirivarombo was born and raised in Gweru, Zimbabwe, where she attended secondary school. Married at the age of 25, she has two sons. Her husband unfortunately died in a traffic accident in 2001. Overcoming this setback required a fresh start and a redoubling of effort in her scientific career.

After obtaining a Bachelor of Science honors degree in chemistry at the University of Zimbabwe in 1994, Sithabile became a teaching assistant in the University's chemistry department. She attained a Master of Science degree in water resources engineering and management in 2000 and in 2003 she joined Chinhoyi University of Technology in Zimbabwe where she later helped found the Department of Environmental Sciences and Technology, developing course synopses and recruiting staff members. She then developed a Bachelor of Technology honors degree in environmental health in 2006, and in 2008 she joined Ethiopian Civil Service College where she lectured in the urban management and planning master's degree program. In 2009 she began full-time doctoral studies at the Institute for Water Research at Rhodes University in South Africa.

Sithabile is modeling climate change impacts on water resources in the Zambezi river basin. She hopes to gain a better understanding of the interaction between climate and hydrologic systems through a comprehensive assessment of the vulnerability of basin water resources to climate change and variability. Her analysis of long-term rainfall runoff data in the basin may help determine how climate change affects freshwater resources and food security. As well, she plans to formulate new hydrologic estimates that can inform better management practices and to assess climate-related vulnerabilities and identify possible adaptation strategies.

Sithabile looks forward to returning home and adding to the scientific knowledge base of her country. She also hopes to inspire other females to pursue scientific careers.

Na XU**Home Country**
China**Degree**
PhD in Environmental Science**Expertise**
Hydrology and Biochemistry**Research Focus**
Dynamics of Dissolved
Organic Matter in Water**Host University**
Yale University, United States**Fellowship Awarded**
2010

Na Xu grew up in Yueyang, a city along the Yangtze River in central China that frequently suffers from flooding. She grew up as an only child, but she and her fiance plan to have several children. She enjoys jogging, hiking and reading as well as travelling the world savoring the beauty of nature and experiencing different cultures.

After receiving her bachelor's and master's degrees from Tsinghua University in China, she entered the doctoral program in 2005 at Yale School of Forestry and Environmental Studies in the United States.

Na is investigating the dynamics of dissolved organic matter (DOM) in terrestrial and aquatic environments. DOM is a complex of organic compounds with differing reactivity and ecological roles. Higher concentrations of DOM may enhance the transport of nutrients and associated pollutants to freshwaters, where they contribute to harmful algal blooms and severe reductions in water quality. Long-term rising trends of DOM export to rivers in the northern hemisphere have been linked to climate change, but a comprehensive understanding of DOM dynamics in watersheds remains challenging due to the complex interactions between hydrological, geochemical, and biological processes.

Na's research objective is to generate knowledge that can be used to make well-informed water-resource management decisions for sites that are impacted by polluted water, or that suffer from freshwater scarcity. She is especially interested in studying the poor quality of freshwater in her home country, where groundwater and surface water are so polluted from man-made or natural contaminants that 60 percent of the rivers cannot be used as sources of drinking water and 320 million people lack access to clean drinking water. Na hopes her research will help to alleviate those challenges.

Na plans to teach at Tsinghua University in China.

Moe Swe YEE

Home Country
Myanmar

Degree
PhD in Agricultural Sciences

Expertise
Global Future of Life,
Food and the Environment

Research Focus
Advanced Agricultural
Technologies for Food Sufficiency,
Food Security, Rural Development
and Environmental Management

Host University
Kyoto University, Japan

Fellowship Awarded
2010



Moe Swe Yee was born and raised in Myanmar. Her father is an education officer serving the townships of the Magway division where she grew up with her elder brother and three elder sisters. She is married to an agricultural extension officer in the Ministry of Agriculture and Irrigation, and they have one son.

After graduating from Yezin Agricultural University in Myanmar with her Bachelor of Agricultural Science degree in 1996, Moe Swe worked in the Ministry of Agriculture and Irrigation before entering Khon Kaen University in Thailand, where she earned her Master of Science degree in systems agriculture in 2009. In 2011 she will begin studying for her doctorate in a new agricultural sciences course for international students called For the Global Future of Life, Food and the Environment at Kyoto University in Japan.

In Japan Moe Swe is researching the role of crops, livestock and traditional practices for sustainable agriculture in the dry zone of Myanmar. She hopes her research will help improve the lives of small farmers in the dry zone, where the majority of farmers hold less than two hectares of land. These farmers generally practice subsistence farming where they need to produce a continuous, reliable and balanced supply of food as well as cash for basic needs and farm expenditures. These small, marginal landholders face different types of problems than large farmers. Moe Swe is helping develop suitable agricultural technologies for single-crop production enterprises—her research focuses on food security, rural development for poverty alleviation, sustainable agricultural development and resource management.

Moe Swe plans to teach in the Ministry of Agriculture and Irrigation within the Department of Agricultural Extension Education.

Eleni YESHANEH

Home Country
Ethiopia

Degree
PhD in Water
Resources Engineering

Expertise
Civil and Environmental
Engineering

Research Focus
Catchment-level Environmental
Changes Using Remotely
Sensed Data

Host University
Vienna Technology
University, Austria

Fellowship Awarded
2010



Eleni Yeshaneh was born and raised in Debre Markos, a small town in northern Ethiopia. She comes from a large family, with five brothers (one of whom has passed away) and five sisters. Before he retired her father was a high school English teacher and she feels lucky that her parents encouraged and supported the educational aspirations of all their children. She is married to an agricultural engineer and they have two children, a boy and a girl. In her spare time Eleni enjoys reading novels, watching movies and cooking.

After earning her BSc in geology in 1995 at Addis Ababa University in Ethiopia, Eleni began studying at the International Institute for Aerospace Survey and Earth Sciences in the Netherlands, where she graduated in 2001 with her MSc in geo-information science and earth observation specializing in environmental systems analysis and management.

She then began working in industry as a GIS and remote sensing expert before joining the faculty of Addis Ababa University in 2003 as a lecturer in GIS and remote sensing.

In 2010 Eleni enrolled at Vienna Technology University in Austria, where she is studying for her PhD in water resources engineering. The aim of her research is to assess typical catchment-level environmental changes that have occurred over the past 30 years using remotely sensed data and long-time series hydrological data. As well, she is attempting to identify possible causes of changes in our environment. She believes the results of her research will enable policymakers to formulate appropriate management strategies for conservation of natural resources.

When she graduates from Vienna Technology University Eleni intends to return to Ethiopia and resume teaching at Addis Ababa University.



Fellows at the Mini-Forum held in Boston, United States, in 2010.

FELLOWS
2009

Maha ABUHAFEETHA**Home Country**
Palestine**Degree**
PhD in Environmental Design**Expertise**
Environmental Design, Project
Management, Architectural
Engineering**Research Focus**
Green Building Design;
Indoor Air Quality**Host University**
University of Calgary, Canada**Fellowship Awarded**
2009

Maha AbuHafeetha grew up in Palestine, where her father and mother are both school teachers. She is married with one child.

Maha obtained her undergraduate degree in architectural engineering from An-Najah National University in Palestine in 2006. She obtained her master's degree in engineering management from the Schulich School of Engineering and the Faculty of Environmental Design at the University of Calgary, Canada in 2009, and subsequently began working toward her PhD at the University of Calgary specializing in environmental design and energy conservation in building sustainability.

Because many conventional buildings are hard on the environment due to construction methods, air emissions, operations, ongoing maintenance and eventual deconstruction, Maha is focusing her doctoral research on designing green buildings that are environmentally friendly and can be designed to reduce direct and indirect environmental consequences. She is designing green buildings optimized for their intended use and for the local climate—buildings that use the natural environment to deliver maximum efficiency and comfort with lower overall lifecycle costs than conventional buildings.

Maha is also investigating the impact of indoor air quality on occupant's health, well-being and performance. Her study focuses on the relationship between indoor air quality and sudden or unexpected infant death. The study focuses on infants because they are actively growing and breathe higher volumes of air relative to their weights, which makes them more susceptible to environmental pollution.

When Maha completes her studies at the University of Calgary, she plans to teach at An-Najah National University in Palestine.

Susana ADDO NTIM**Home Country**
Ghana**Degree**
PhD in Environmental Science**Expertise**
Environmental Science**Research Focus**
Nanotechnology Methods
for Water Treatment**Host University**
New Jersey Institute of
Technology, United States**Fellowship Awarded**
2009

Susana Addo Ntim was born in Akropong Akwapim, a small town in eastern Ghana. She was raised along with her brother and sister by her mother, a high school teacher and, after her mother's untimely death, by her aunt.

After representing her high school at a science and mathematics clinic for girls, Susana decided to pursue a career in science. In 2001 she won the Bentil Prize for Promising Women Scientists from the Ghana Science Association. In 2002 she graduated with a Bachelor of Science degree from Kwame Nkrumah University of Science and Technology. In 2006 she received her MSc in marine estuarine environmental science from the University of Maryland Eastern Shore and since 2007 she has been working toward her PhD at the New Jersey Institute of Technology in Newark, United States.

Her research focuses on using nanotechnology for water treatment. Susana is looking at generating clean water using novel carbon nanotube-based nanocomposites. She is specifically focusing on a nanocomposite system comprised of nanoparticles immobilized on multi-walled carbon nanotubes that can carry out a wide range of diverse functions, from water disinfection to the removal of specific pollutants. Susana's preliminary data has shown that such immobilization is possible, and synergistic activities combining carbon nanotubes and tetragonal zirconia have been demonstrated for the de-fluoridation of water. Of particular interest to her is the application of this approach to arsenic removal from water. The nanocomposite system she is researching has promise for arsenic removal under many different conditions, and may present an efficient, cost-effective technology for water purification.

When she completes her doctoral studies, Susana plans to teach at Kwame Nkrumah University of Science and Technology in Ghana.

Mercy AFADZI

Home Country
Ghana

Degree
PhD in Medical Technology

Expertise
Improved Delivery
of Cytotoxic Drugs

Research Focus
Combining Ultrasound
With Drug Delivery

Host University
Norwegian University of Science
and Technology, Norway

Fellowship Awarded
2009



Mercy Afadzi was born in Kweikuma, Ghana where she grew up with seven brothers and six sisters. Her interests include singing and listening to music as well as reading motivational books.

Mercy attended the University of Cape Coast in Ghana and graduated in 2005 with a bachelor's degree in physics. She received the Dean of Science Award for academic performance in 2001 along with a number of other awards including Best Graduating Student, Unilever Award for Outstanding Performance, and Best Science Graduate. In 2008 she obtained her master's degree in medical technology from the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway, where she is pursuing a PhD in medical technology.

Mercy is working to improve the delivery of cytotoxic drugs to cancer tissues by combining ultrasound with drug delivery. Successful cancer therapy requires that cytotoxic agents reach all cancer cells and deactivate them, but the lack of specificity toward tumor cells is a major obstacle in conventional cancer therapy. During treatment, normal tissue can also be damaged, and this limits the dosage that can be applied to the tumor.

One solution is to deliver large doses in a highly localized manner, but to do that it is necessary to have triggerable release mechanisms such as ultrasound. Ultrasound is of special interest because it is non-invasive, it can be focused on targeted sites, it can penetrate the interior of the body without affecting the interposed tissue, and no ionizing radiation is involved. Mercy is investigating the interaction between ultrasound and encapsulated drugs in solution and tissue, and she is designing ultrasonic beams and transducer arrays for dual frequency detection and destruction of the encapsulated drug.

Mercy intends to return to her native country, Ghana, where she hopes to become a lecturer at the University of Cape Coast and at the University of Ghana.

Arezoo ARDEKANI

Home Country
Iran

Degree
Post-Doctorate in Mechanical
and Aerospace Engineering

Expertise
Fluid Mechanics

Research Focus
Multiphase Fluid Mechanics,
Complex Fluids

Host University
Massachusetts Institute of
Technology, United States

Fellowship Awarded
2009



Arezoo Ardekani was born in Iran and received her undergraduate degree in mechanical engineering in 2003 from Sharif University of Technology in Tehran, Iran. She received Amelia Earhart fellowships in 2007 and 2008 and graduated in 2009 with her PhD in mechanical and aerospace engineering from University of California Irvine in the United States. She is currently a Shapiro post-doctoral fellow at Massachusetts Institute of Technology in the U.S.

Arezoo is seeking to understand fundamental properties of multiphase flows of Newtonian and non-Newtonian fluids. Her PhD research focused on self-assembly and chaining of particles in viscoelastic liquids, particle-droplet interactions, particle-wall collision and instability of thin liquid sheets. She is currently investigating surface tension-driven instability and break-up of viscoelastic jets, which play a crucial role in the use or processing of many multi-component complex fluids such as paints, inks, insecticides, cosmetics and foods.

Another aspect of her research is related to the properties of migration, aggregation and the chaining of small particles in flows of polymer solutions (viscoelastic fluids) in the oil industry. The addition of polymers in drilling mud can prevent the leakage of drilling fluid into the reservoir. Arezoo is seeking to understand the reasons that polymeric drilling muds suppress the loss of drilling fluids.

When she finishes her studies at MIT, Arezoo is planning to apply for a tenure-track faculty position at Sharif University of Technology in Tehran.

**Charlotte Kendra
Gotangco CASTILLO**

Home Country
Philippines

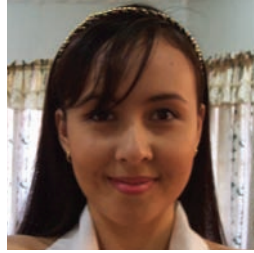
Degree
PhD in Earth and
Atmospheric Sciences

Expertise
Earth and Atmospheric Sciences

Research Focus
Climate and Tropical Deforestation

Host University
Purdue University,
United States

Fellowship Awarded
2009



Charlotte Kendra Gotangco Castillo was born and raised in Metro Manila, Philippines. Her family is comprised of scientists, engineers and educators as well as musicians and artists. Kendra chose a career in the sciences but she also enjoys dancing, singing and playing the flute.

At the University of the Philippines she was an Oblation Scholar, an honor given to top applicants in the country. She transferred to Ateneo de Manila University where she received numerous academic awards, graduating as class valedictorian and one of the Ten Outstanding Students of the Philippines in 2004. In 2007 she earned her master's degree in environmental management jointly at Ateneo de Manila University and the University of San Francisco. She began her PhD at Purdue University in the United States as a Fulbright Scholar and was also a recipient of the Purdue Climate Change Research Center Ross Fellowship.

Kendra is researching the interactions between climate and time-dependent tropical deforestation. She is investigating biophysical and biogeochemical feedbacks on climate of different deforestation pathways through the use of the Community Climate System Model, looking at both global teleconnections as well as regional impacts. She is currently testing the sensitivity of the earth system to different deforestation rates and to the presence of forest preservation targets, but ultimately aims to include socio-economic factors into these scenarios.

Kendra's integrative approach may lead to a deeper understanding of how the terrestrial biosphere and climate interact. This in turn may lead to better climate change projections and mitigation decisions as well as to better forest management strategies and policy responses to climate change and sustainable development issues.

Kendra plans to teach at Ateneo de Manila University and to continue with her research while based at the Manila Observatory.

Vivien Suphandani DJANALI

Home Country
Indonesia

Degree
PhD in Mechanical Engineering

Expertise
Computational Fluid Dynamics

Research Focus
Preconditioning in the
Fractional-Step Methods
of Navier-Stokes Equations

Host University
The University of Sydney, Australia

Fellowship Awarded
2009



Vivien Suphandani Djanali was born in 1981 in Madison, Wisconsin in the United States while her parents were pursuing their PhD degrees. At the age of three she moved to Surabaya, Indonesia. Raised in an academic family with a brother and a sister, she loves to teach and since childhood has dreamed of becoming a lecturer.

Vivien is now married with two young children. Although she recognizes the difficulties involved in simultaneously managing children and PhD work, she is determined to achieve her goals.

In 2003 Vivien finished her undergraduate studies in the Mechanical Engineering department at ITS, which she then joined as a lecturer. In 2008 she obtained her Master of Engineering (Research) degree from the Faculty of Engineering and Information Technology at The University of Sydney in Australia, where she is now enrolled as a PhD candidate in mechanical engineering.

Vivien is conducting research on direct numerical simulations of incompressible flows using a fractional-step method to simplify the coupling between velocity and pressure in Navier-Stokes equations. Solving the pressure poisson equation in the fractional step method is often the most consuming part, in terms of work, memory and computation time.

The focus of her study is to develop an efficient preconditioner for the pressure poisson equation. The preconditioner is implemented in Fortran language in the code developed at The University of Sydney. It is expected that the resulting preconditioner will accelerate the convergence of the iterative solvers, and thus will improve the efficiency of direct numerical simulations.

When she completes her PhD, Vivien plans to return to teach at ITS in Indonesia.

Fatma Nazli DONMEZER

Home Country
Turkey

Degree
PhD in Mechanical Engineering

Expertise
Mechanical Engineering

Research Focus
Thermal Engineering
of Electronic Devices

Host University
Georgia Institute of Technology,
United States

Fellowship Awarded
2009



Fatma Nazli Donmezer was born and raised in Ankara, Turkey. She has one sister. While in high school Nazli became interested in science and teaching as well as in her current hobby, learning French language and culture.

After graduating in 2007 with her BSc in science from Middle East Technical University in Ankara, she began studying for her MSc in mechanical engineering with a specialization in thermo-fluid sciences, especially spectrally selective heating of nano-sized particles and agglomerates.

She received her MSc degree in July 2010 and started working toward a PhD at Georgia Institute of Technology in Atlanta, United States. Nazli's doctoral research will focus on thermal issues related to Gallium Nitride (GaN) electronic devices. Interest in high-power, high-frequency transistor technologies is growing in the telecommunication sector. Thermal issues resulting from the high power loads applied to these devices is a major obstacle to engineering better devices. Nazli's goal is to understand thermal problems such as hot spots associated with these devices by using experimental techniques, and to work on heat transfer models that are capable of explaining heat transfer at such small scales.

She is attracted to the thermal engineering of electronic devices, a cutting-edge subject today, and to the strong interdisciplinary nature of her research area, one that binds electronics, mechanical engineering and physics. She feels that many disciplines can benefit from the knowledge gained by another, and that in the future scientists and engineers seeking solutions to technological problems must be open to interdisciplinary perspectives.

Partly because gender roles within science and engineering are changing in Turkey today, She intends to pursue a career teaching at the Middle East Technical University in Ankara, Turkey.

Olga DUDCHENKO

Home Country
Ukraine

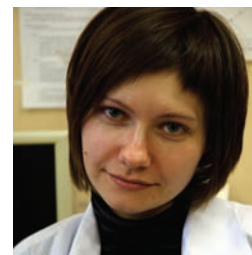
Degree
PhD in Biophysics

Expertise
Biophysics

Research Focus
Fluid Flow in Deformable
Vessels; Hydrodynamic
Aspects of Blood Coagulation

Host University
Moscow Institute of Physics
and Technology, Russia

Fellowship Awarded
2009



Olga Dudchenko was born in Kiev, Ukraine, where she attended an elementary school with a liberal bias while at the same time taking piano lessons at the Children's Artistic School. After transferring to Kiev Lyceum of Natural Sciences, she became enthusiastic about chemistry and took part in National Chemistry Olympiads while continuing to play piano. She is also interested in classical and contemporary fine arts, literature and sports.

In 2001 Olga was an exchange student at the Department of Molecular and Biological Physics at the Moscow Institute of Physics and Technology (MIPT) in Russia. In 2004 she worked at the National Hematology Research Center of the Russian Academy of Medical Sciences. In 2005 she graduated Magna Cum Laude with a BSc in applied physics and mathematics. In 2007 she obtained a MSc in applied physics and mathematics with honors. The research for her MSc was in collaboration with the Bogomoletz Institute of Physiology, National Academy of Sciences of Ukraine.

Olga's PhD research focus is on hemodynamics in large elastic vessels considering features associated with blood coagulation. Present-day developments on the subject concern mostly low-Reynolds phenomena in small vessels, while clotting under intensive flow conditions is poorly understood, although progress in computer engineering may widen understanding of the problem using the prognostic potential of methods for numerical simulations of reactive flows. One practical aspect of her work is on the correlation between blood coagulation and pathological tissue processes such as atherosclerosis, inflammation or cancer development. The idea is to detect blood coagulation system alterations and draw conclusions about the evolution of tissue pathology based on the distribution of chemical traces within the flow. If successful, her work may lead to improved diagnostic facilities for cancer and other patients.

Olga plans to teach at the National Technical University of Ukraine.

Nada Bushra EL TAHIR AHMED**Home Country**
Sudan**Degree**
PhD in Seismology**Expertise**
Seismology**Research Focus**
Seismic Velocity Structure of the Crust and Upper Mantle in Sudan**Host University**
University of the Witwatersrand, South Africa and The Pennsylvania State University, United states**Fellowship Awarded**
2009

Nada Bushra El Tahir Ahmed was born in Omdurman City, Sudan. She grew up as part of a large family with three sisters and four brothers, and she is now married with one son and one daughter. From an early age Nada was interested in exploring our planet, so when it came to choosing an academic path she decided to study geology and learn about the outer compositions of the Earth's surface. She earned her BSc in geology with honors in 1995 at Khartoum University in Sudan.

Her first chance to study the deep Earth came when she joined the Faculty of Solid Earth Physics at the University of Bergen in Norway, where she worked toward her master's degree in geophysics. She is particularly interested in earthquakes, and she notes that although earthquakes can cause great damage to humans, they can also yield valuable information about the deeper Earth—information that may one day lead to a greater understanding of the phenomena.

Nada intends to obtain a PhD degree in seismology working under the Africa Array program between the University of the Witwatersrand in South Africa and The Pennsylvania State University in the United States.

In her research, Nada will investigate the seismic velocity structure of the crust and upper mantle in Sudan using seismograms from local, regional and teleseismic earthquakes recorded by the Sudan Seismic Network (SSN). The results of her research will provide the first seismic estimates of crustal thickness and velocity structure of the crust and upper mantle for many parts of Sudan.

Since little is currently known about the structure of the crust and upper mantle in that area of the world, her research may be of great value to the SSN, who may be able to obtain accurate locations of earthquakes.

Patricia ILLOLDI-RANGEL**Home Country**
Mexico**Degree**
Post-Doctorate in Biodiversity**Expertise**
Emergent Diseases and Conservation**Research Focus**
Lyme Disease**Host University**
The University of Texas at Austin, United States**Fellowship Awarded**
2009

Patricia Illoldi-Rangel, the eldest of three siblings, was born and raised in Mexico City. She is married. She has traveled extensively throughout the United States and loves nature and the outdoors.

Patricia received her undergraduate degree in biology at the National Autonomous University of Mexico (UNAM) in 1994 along with two awards for achieving the best grades during undergraduate studies.

While working as a biology teacher at the middle and high school levels, she earned her MSc in ecology at UNAM in 1998 and her PhD in biological sciences from the same institution in 2005. In addition, she earned her MSc from the Technological University of Monterrey in 2009, and she is now enrolled as a post-doctoral student at the Biodiversity and Biocultural Laboratory of The University of Texas at Austin in the United States.

Patricia's post-doctoral research focus is in the field of emergent diseases in Mexico. Using state-of-the-art technology such as remote sensing, climate change scenarios and niche modeling, she is working to identify potential areas where Lyme disease can appear. Using systematic conservation planning, she is also attempting to identify areas where potential reservoirs for Lyme disease can be found.

The results of her research may provide useful information about different climate change scenarios and actions to be taken in strategic health campaigns.

Patricia is an experienced biology teacher in Mexico and intends to continue teaching in her chosen field.

Farhana JABEEN

Home Country
Pakistan

Degree
PhD in Distributed
and Adaptive Systems

Expertise
Computer Science

Research Focus
Ad-Hoc Wireless
Sensor Networks

Host University
University of Manchester,
United Kingdom

Fellowship Awarded
2009



Farhana Jabeen was born in rural Pakistan and raised in the city of Rawalpindi, where her parents encouraged her and three brothers to pursue higher education. She enjoys challenges and learning new perspectives.

After beginning her academic studies in mathematics, statistics and economics, she found her calling in computer science and earned her undergraduate and graduate degrees in that field at the University of Peshawar.

She then went on to earn a master’s degree in software engineering at the National University of Science and Technology in Pakistan, and she is now pursuing a PhD in computer science at the University of Manchester in the United Kingdom.

In the United Kingdom her research focus is on distributed spatial analysis over wireless sensor networks (WSNs), which are collections of spatially distributed nodes equipped with sensing, communication and processing capabilities. Sensor nodes can be considered small computers, but they are extremely resource-constrained in terms of communication, power, storage and computational resources. WSNs are becoming an essential technology for monitoring the natural environment and for modeling the behavior of physical phenomena over space and time.

The importance of identifying, tracking and reporting relationships between dynamic, transient spatial phenomena and application-specific geometries (e.g., building, fields) has been stressed in environmental monitoring applications. Farhana believes that WSNs can be used effectively as spatial information systems, allowing management decisions about processes in the physical world to be made on the basis of sensed data. Her main research challenge in this respect is how to support in-network spatial analysis in a cost-effective manner.

Grace OFORI-SARPONG

Home Country
Ghana

Degree
PhD in Energy and
Mineral Engineering

Expertise
Biohydrometallurgy and
Environmental Biotechnology

Research Focus
Enhancing Gold Extraction
from Refractory Gold Ores

Host University
The Pennsylvania State
University, United States

Fellowship Awarded
2009



Grace Ofori-Sarpong was born and raised in Ghana, and she is the highest educated person in her family. She has two sisters and one brother, and she is the mother of an adopted daughter. Grace earned her undergraduate degree (honors) in 1998 in metallurgical engineering at Kwame Nkrumah University of Science and Technology in Kumasi, Ghana, where in 2002 she also obtained her MSc in environmental resources management. Since 2006 she has been working toward her PhD in energy and mineral engineering at The Pennsylvania State University in the United States.

Gold is a major income earner for Ghana, which has large reserves of refractory ores and hosts two of the largest bio-oxidation plants in the world. Grace is focusing her doctoral research in this area.

Refractory gold ores contain sulfides and carbonaceous matter and require pre-treatment to oxidize these minerals and free the metal before gold leaching. Sulfide minerals encapsulate fine gold particles, and carbonaceous matter adsorbs gold during leaching, resulting in low gold extraction. Traditional treatment methods are expensive and create pollution. As well, bacteria oxidation is used in the decomposition of the sulfides, but the organisms are not able to oxidize the carbons.

Using fungi, Grace is developing a cost-effective, technically simple, environmentally friendly process to simultaneously oxidize sulfides and deactivate carbonaceous matter in gold ores. This process will liberate gold for dissolution and prevent carbon from picking up the dissolved gold, increasing recovery during leaching.

Grace began lecturing in 2002 and has been motivating young girls to enter the fields of science, technology and mathematics. After obtaining her PhD, she plans to teach at the University of Mines and Technology in Ghana.

Premaladha PODDUTOORI**Home Country**
India**Degree**
Post-Doctorate in Organic
Chemistry and Materials Science**Expertise**
Organic Chemistry and
Materials Science**Research Focus**
Highly Efficient Systems
for Solar Fuel Generation**Host University**
Northwestern University,
United States**Fellowship Awarded**
2009

Premaladha Poddutoori was born in Eraiyur, a small village in India. She has one brother. Both of her parents were teachers.

After earning her BSc in physical sciences (chemistry, physics and mathematics) at Madras University in 1996, Premaladha obtained her master's degree in chemical sciences at Pondicherry University in 1999 and her doctorate in bio-inorganic chemistry at Hyderabad University in 2006. She is now a post-doctoral researcher in organic chemistry and materials science at Northwestern University in the United States, where her research focus is on highly efficient systems for solar fuel generation.

Photosynthesis is the most important biological process on earth. It converts sunlight into energy-rich fossil fuels. However, the rate of fossil fuel production is about 500,000 times slower than our current consumption rates. As a result, our energy reserves are progressively decreasing. Moreover, the continued use of fossil fuel produces harmful effects such as pollution and greenhouse gases. Hence, it is clear that sustainable and environmentally friendly energy sources need to be developed.

Solar energy is the only source with sufficient capacity to meet our projected energy needs. The energy supply from the sun to the earth is 3×10^{24} J/year, or about 104 times more than what humans currently consume.

Premaladha is looking at porphyrin and perylene derivatives as potential candidates to tap this huge source of energy and to utilize it for solar cells based on the concepts of natural photosynthesis. Solar energy (fuel) produced by artificial photosynthesis using abundant, inexpensive raw materials such as water and carbon dioxide can be economical and environmentally beneficial.

When she completes her post-doctoral research, Premaladha plans to teach at the Indian Institute of Chemical Technology.

Betty PURWANDARI**Home Country**
Indonesia**Degree**
PhD in Web Science**Expertise**
Web Science**Research Focus**
Impact of Mobile Web
on Emerging Economies**Host University**
University of Southampton,
United Kingdom**Fellowship Awarded**
2009

Betty Purwandari was born in Bandung, Indonesia, where her parents pursued higher education. Betty has one sister and one brother. She is married to an industrial engineer and they have a son and a daughter.

After earning her undergraduate degree in computer science at the University of Indonesia, Betty obtained her MSc in data communications, networks and distributed systems at University College London in the United Kingdom. She is now pursuing her PhD in Web Science at the University of Southampton in the UK.

Betty is developing a methodology to measure the impact of accessing the Web from mobile phones on people in emerging economies. Her goal is to identify and evaluate the interplay between the mobile Web and its stakeholders in the developing world. It is crucial to enable the advancement of mobile Web technology, as well as to anticipate the potential impact on society.

In developing countries mobile phones are often the only means of communication. The International Telecommunication Union reports that in 2009 only 10 percent the world population was not covered by mobile signals. Because many mobile phones are cheaper than PCs or notebooks and consume less electricity, mobile handsets are attractive to people in the developing world.

Betty's PhD is closely related to the research agendas of the Web Science Trust, Web Foundation and World Wide Web Consortium (W3C)-Mobile Web for Social Development (MW4D) Interest Group. They work hand in hand to understand the Web and explore new ideas with interdisciplinary approach, leverage the Web for social and economic change, as well as to advance the Web on mobile phones to bridge digital divide and serve under privileged populations in developing countries.

Betty intends to teach and continue Web science research in the Faculty of Computer Science at the University of Indonesia.

María del Carmen RODRÍGUEZ-VALLARTE

Home Country
Mexico

Degree
Post-Doctorate in Mathematics

Expertise
Lie Algebras and Lie Superalgebras

Research Focus
Natural Generalizations of Heisenberg Lie Algebras

Host University
Massachusetts Institute of Technology, United States

Fellowship Awarded
2009



María del Carmen Rodríguez-Vallarte was born in Mexico and grew up in Puebla, a beautiful colonial city in that country. Although her parents did not achieve their professional goals, they always supported and encouraged her academic interests. She is married with one daughter, and she has one sister.

As an undergraduate in mathematics, she participated in a summer session at the Institute for Advanced Study in Princeton, New Jersey on the topic of representation theory of Lie groups. She graduated with a BSc in mathematics in 2000 from the University of the Americas in Puebla and earned her mathematics MSc in 2003 from the Research Center for Mathematics (CIMAT) in Guanajuato, Mexico. In 2008 she obtained her PhD in mathematics at CIMAT. Her specialization areas are Lie algebras and Lie superalgebras. She is now a post-doctoral student at the Massachusetts Institute of Technology (MIT).

In mathematics, a Lie algebra (named after Sophus Lie, a prominent mathematician) is an algebraic structure used in studying geometric objects such as Lie groups and differentiable manifolds. Lie algebras were introduced to study the concept of infinitesimal transformations. Her research seeks to determine the existence of invariant geometric structures and superstructures in certain classes of solvable Lie algebras and Lie superalgebras. In her doctoral research she studied Heisenberg Lie algebras, which have received special attention in physics as they provide an isomorphic image of the so-called canonical commutation relations in quantum mechanics. Heisenberg Lie superalgebras provide a way to generalize the former when super-symmetric principles are involved. María aims to study natural generalizations of Heisenberg Lie algebra within the category of finite dimensional complex Lie superalgebras.

María anticipates joining a Mexican academic institution following completion of her post-doctorate.

Korakot SOMBATMANKHONG

Home Country
Thailand

Degree
PhD in Chemical Engineering

Expertise
Fuel Cells

Research Focus
Micro-Fabrication Techniques for Micro-Fuel Cells

Host University
University of Cambridge, United Kingdom

Fellowship Awarded
2009



Korakot Sombatmankhong was born in Nakhonsawan, Thailand and raised in Chiang Mai as the youngest of three daughters.

After graduating from Chiang Mai University in 2004 with a BSc with first-class honors in industrial chemistry, she obtained her MSc in 2006 in polymer science at the Petroleum and Petrochemical College in Chulalongkorn University, Thailand. After being awarded a Royal Thai scholarship she earned another MSc in chemical engineering at Imperial College London in the United Kingdom, where she graduated in 2007. In the same year she enrolled in a PhD program in chemical engineering at the University of Cambridge in the UK.

Korakot notes that worldwide energy consumption has been rapidly increasing and that the majority of our energy needs continue to be met by the combustion of fossil fuels, which has resulted in an increase of atmospheric carbon dioxide linked to global warming. Depletion of the world's limited fossil fuel reserves provides further motivation for the development of a novel technology to harness alternative sources of energy with minimal or no pollutant emissions. Korakot sees fuel cell technology as a possible solution, and in her research she is exploring the merits of micro-fabrication techniques to develop highly efficient micro-fuel cells—particularly fuel cells aimed at replacing batteries in portable devices such as cordless tools, mobile phones, laptops, camcorders and digital cameras. She is investigating the use of alternative electro-catalytic materials to increase cell performance, and has identified as a key target the use of porous materials to increase the available surface area in small, portable devices.

When she completes her studies, Korakot intends to become a researcher in Thailand's National Science and Technology Development Agency, which is part of the Ministry of Science and Technology, and she plans to teach at Chulalongkorn University.

WIRATNI

Home Country
Indonesia

Degree
Post-Doctorate in Engineering

Expertise
Bioprocess Engineering

Research Focus
Small-Scale Continuous
Bio-Digesters

Host University
Cornell University,
United States

Fellowship Awarded
2009



Wiratni was born and raised along with her brother in Yogyakarta, Indonesia. Engineering runs in her family—her father is a mechanical engineer, her mother a chemical engineer (both retired), and her husband is a chemical engineer. They have one daughter.

Wiratni obtained her BSc in chemical engineering at Gadjah Mada University in Yogyakarta in 1996 and her MSc in 1999, graduating with a GPA of 4.0. She obtained her PhD in chemical engineering in 2003 at West Virginia University in the United States, again graduating with a GPA of 4.0.

As a post-doctoral student, she is working on biogas production rate enhancement in household bio-digesters for rural energy sufficiency. Biogas is a clean fuel developed mainly from waste materials. Wiratni is helping develop a small-scale continuous bio-digester that is cheap, easy to handle and installable near remote cattle pens.

A full-scale and low-cost anaerobic digester was developed with a 0.3-millimetre diameter PVC pipe and was subsequently tested in about 30 households in rural Indonesian areas. Diluted cow manure was fed to one end of the digester while effluent was collected from the other end for land application. For each digester, enough biogas was accumulated in a gasbag to cook for approximately one hour per day. However, some of these plug-flow digesters clogged after a one-year operating period. During her stay in Cornell University, Wiratni worked to optimize the digester configuration to guarantee maximum methane yields while preventing clogging.

Wiratni has been a faculty member at Gadjah Mada University since 1996, and she plans to continue teaching there. Besides her teaching and research activities, she is also active in community empowerment programs, especially in the efforts of technology transfer for rural communities.

Euis Tintin YUNINGSIH

Home Country
Indonesia

Degree
PhD in Geology

Expertise
Economic Geology

Research Focus
Epithermal Gold, Silver and
Base Metal Mineralization
in West Java, Indonesia

Host University
Hokkaido University, Japan

Fellowship Awarded
2009



Euis Tintin Yuningsih was born and raised in Bandung, Indonesia as the youngest of three brothers and one sister.

Euis completed her BSc in geology in 1999 at Padjadjaran University (UNPAD) and began working as a junior lecturer in the geology faculty's Petrology and Mineralogical Laboratory. In 2003 she obtained her MSc at Technology Institute of Bandung (ITB) and in 2008 she began studying for her PhD in geology at Hokkaido University in Japan.

In Japan, Euis is studying the genetic and metallogenic context of gold, silver and base metal mineralization in the Arinem area of Western Java in Indonesia. The main objective of her research is to test the hypothesis that gold mineralization in the Arinem area is an epithermal type. More than 13,000 islands are spread throughout the Indonesian archipelago, which is 9,000 kilometres long and 5,200 km wide. In recent years new mineral discoveries in the archipelago have made Indonesia the sixth-largest gold producer in the world, and the country is experiencing an exploration boom due to huge foreign investments.

Euis is developing genetic, metallogenic and exploration modeling to test for mineral exploration within and around the areas of interest. Her work involves detailing ore and gangue mineral petrography to determine the mineralization paragenesis and their associated alteration types, studying fluid inclusion based on drill core sample depths to determine ore formation temperatures, heat sources and depth of mineralization, analyzing bulk geochemistry and mineral chemicals to determine the sources and mobility of elements, including gold, during hydrothermal fluid circulation, and conducting a stable isotope analysis on sulfides and silicates to determine the sources and origin of ore fluids.

After completing her studies at Hokkaido University, Euis plans to continue working as a lecturer at the Faculty of Geology at Padjadjaran University in Bandung.

FELLOWS 2008

Suma ADINDLA**Home Country**
India**Degree**
PhD in Computer Science**Expertise**
Computer Engineering**Research Focus**
Information Retrieval in
Natural Language Processing**Host University**
University of Essex,
United Kingdom**Fellowship Awarded**
2008

Suma Adindla was born at Deverkonda in Andhra Pradesh, India, where she grew up with her two sisters and one brother.

After graduating with a Bachelor of Technology degree from Jawaharlal Nehru Technological University (JNTU) in 2004, Suma worked as a lecturer in an engineering college before being accepted to a software engineering program at JNTU, where she received her master's degree in 2007. She is now a doctoral student at the University of Essex in the United Kingdom studying computer science.

At the University of Essex, Suma's research goal is to develop efficient methods for information retrieval and to help develop novel systems for human-computer interactions in real-time applications. She is particularly interested in the information retrieval aspects of Natural Language Processing (NLP), an area of Artificial Intelligence concerned with software that will analyze, understand and generate languages that humans can use naturally—she says that eventually we will be able to address our computers as though we were addressing another person.

Web search engines are information retrieval systems built to help web users locate information quickly and efficiently. These search engines provide considerable assistance in locating information, but one of the main difficulties is in matching information needs with documents that satisfy those needs. The challenge is to adapt search systems to user needs. One possible solution is the application of natural language dialogue systems, an area that is becoming increasingly prominent in the NLP field. Using efficient techniques to facilitate fast and accurate information retrieval and web mining, natural language dialogue systems can help analyze, understand and generate languages that humans use naturally so that computers can interact intelligently with humans.

When she finishes her doctorate, Suma plans to teach at Jawaharlal Nehru Technological University in India.

**Martha Beatriz
ALVAREZ-ELIZONDO****Home Country**
Mexico**Degree**
PhD in Information Technology**Expertise**
Optics**Research Focus**
Use of Optical Tweezers to
Measure Cell Viscoelasticity**Host University**
University of Queensland,
Australia**Fellowship Awarded**
2008

Martha Alvarez-Elizondo was born and raised in Monterrey, Mexico. During her academic career she has been a research assistant, teaching assistant, lecturer and painter as well as an entrepreneur.

While an undergraduate student at the Monterrey Institute of Technology (Monterrey Tech), Martha studied physics engineering, and she obtained her master's degree in electronics systems and optics. She completed her PhD studies in information technology with a focus on biophysics at Monterrey Tech in December 2008 and is now conducting research at the University of Queensland Physical Sciences in Brisbane, Australia.

Working with the Queensland Brain Institute at the University of Queensland to learn how physics and biology can be combined to achieve applications in medicine, Martha is using optical tweezers and confocal imaging to study physical changes in cells that undergo exocytosis. Optical tweezers use a focused laser beam to provide an attractive or repulsive force to hold and move microscopic dielectric objects—they are particularly useful in studying a variety of biological systems.

Martha performs experiments using optical tweezers to measure viscoelasticity in the cells and utilizes mathematical models to understand the signals obtained from the movement of vesicles before and after stimulation of exocytosis. Changes in the dynamics of vesicles due to viscosity variation caused by drugs or cellular processes can be an early indicator of disease, since these cytoskeleton changes occur right at the onset of the disease. Her work may help in our understanding of the altered neuronal activity associated with learning and memory, along with neurodegenerative diseases such as Parkinson's disease.

Martha plans to pursue post-doctoral research in the United States and then to apply for a teaching position at Monterrey Institute of Technology in Mexico.

Ruth AMUTA

Home Country
Nigeria

Degree
PhD in Agricultural Economics

Expertise
Agriculture

Research Focus
West African Agricultural
Trade and Competitiveness

Host University
Texas A&M University,
United States

Fellowship Awarded
2008



Ruth Amuta was born in Kaduna, Nigeria where she lived until the age of five when her family moved to Makurdi. She has two brothers and two sisters. Both of her parents work in an academic environment, and she says that education plays a pivotal role in the values of her family.

Following in the footsteps of her parents, she began teaching in 2002 after obtaining her bachelor's degree in agricultural economics from the University of Agriculture in Makurdi, where she earned first-class honors as Best Graduating Student. She met her husband while studying for her master's degree at the University of Reading in Reading, United Kingdom in 2004 and 2005, and they now have a daughter.

Ruth is studying for her PhD in agricultural economics at Texas A&M University in the United States, where she is mainly interested in international trade and development as well as in climate change. Her research topic is "Implications of Trade Policy Reform and Debt Cancellations on the Competitiveness of West African Agriculture in the International Market using Computable General Equilibrium Analysis." Recommendations based on this analysis will give insight into World Trade Organization structuring and possible directions for future policy reform within the emerging and developing economies of West Africa.

Her research is important in the development of West African trade and Ruth believes that in the long run her research will make a difference for trade opportunities and commerce for West African women. She is also interested in climate change and the implications of greenhouse gas emissions.

Ruth points out that only about 10 percent of universities in Nigeria have science and engineering faculties. The University of Agriculture in Makurdi, where she intends to continue teaching, is a science-only institution where approximately eight percent of students are female.

Jeanne Therese Hilario ANDRES

Home Country
Philippines

Degree
PhD in Chemical Engineering

Expertise
Chemical Engineering

Research Focus
Carbon Dioxide Capture
and Storage

Host University
University of Cambridge,
United Kingdom

Fellowship Awarded
2008



Jeanne Therese Hilario Andres is married and has two children. In the past she was a university faculty instructor and research assistant as well as a youth worker, trainer, singer, writer and environmentalist. After taking a career break to care for her children, she considers herself fortunate to be able to return to academic life.

Jeanne Therese is pursuing doctoral research as a Clare Hall student at the University of Cambridge, United Kingdom. Her research on carbon dioxide sequestration seeks to study, predict and model the effects of Carbon Dioxide Capture and Storage (CCS), a technology currently being employed to re-inject waste carbon dioxide from industrial sources back into subsea surfaces, spent oil and gas fields, or deep geological formations.

She has developed and utilized a mathematical model to understand and simulate the long-term fate of captured carbon dioxide in saline aquifers. She supervises graduating chemical engineering students in conducting experimental CCS-related research projects, and she designs and performs experiments to validate her simulation results and to further extend knowledge of subsurface fluid behavior in porous media.

Advanced study of CCS technology as a current climate change mitigation method is undoubtedly timely and relevant, not only for predicting timescales for complete CO₂ dissolution and leakage potential as well as for optimizing resources and storage capacities, but also to increase knowledge about other unintentional chemical emissions discharged into subsurface geological formations.

Jeanne Therese plans to conduct regular teaching visits to the University of Santo Tomas Faculty of Engineering in her home country, the Philippines, while maintaining academic ties with the University of Cambridge to establish long-term research linkages and collaborations between the two institutions.

Isil AYRANCI KILIÇ**Home Country**
Turkey**Degree**
Post-Doctorate in
Combustion Diagnostics**Expertise**
Chemical Engineering**Research Focus**
Combustion Characteristics
of Liquid Fuel Injectors**Host University**
University of Cambridge,
United Kingdom**Fellowship Awarded**
2008

Isil Ayranci Kiliç is a post-doctoral research associate at Cambridge University, United Kingdom. Her research in combustion diagnostics and thermoacoustics focuses on low-emission fuel injection technologies for next generation aero-engines. She has been leading the research activities at the Cambridge High Pressure Combustion Facility since 2008.

Born in 1978 in Ankara, Turkey, Isil completed a French-Turkish joint doctoral program in 2007, receiving a doctorate in thermal and energy science from INSA Lyon and a doctorate in chemical engineering from Middle East Technical University (METU) in Ankara. She was honored with international recognition including the 2007 Young Scientist Award in Radiative Transfer from Elsevier; METU 2007 Best Thesis Award from Mustafa Parlar Foundation; and 2007 Best Dissertation Award in Physics and Materials Science from the EADS Foundation in France.

Her research is on the experimental investigation of fuel injectors of aircraft engine gas turbine combustors using optical- and laser-based diagnostic techniques. Her objective is to contribute to ongoing research on lean-burn combustion technologies for next-generation aero-engines. Currently in a development stage, these engines will improve fuel efficiency and reduce pollutant emissions to meet increasingly stringent environmental regulations. Lean-burn combustors offer strong potential to reduce nitrous oxide emissions which contribute to photochemical smog formation along with acid rain and depletion of the stratospheric ozone layer. Isil carries out her experimental studies in a high-pressure combustion facility funded by a University Gas Turbine Partnership between the University of Cambridge and Rolls-Royce plc. The test facility can operate at realistic high pressures and temperature conditions with full-size prototype injectors.

When she returns to Turkey Isil plans to become a faculty member at one of the leading technical universities.

Nana Ama Kum BROWNE**Home Country**
Ghana**Degree**
PhD in Environmental
and Geographical Science**Expertise**
Physics**Research Focus**
Climate Prediction Systems**Host University**
University of Cape Town,
South Africa**Fellowship Awarded**
2008

Nana Browne was born in Saltpond, Ghana but hails from Nyanfeku Ekroful. She is married with a son and has three sisters, two of whom are younger.

While attending Anomabu Methodist Primary and Junior Secondary School in Saltpond, Nana's father and teachers encouraged her to pursue an academic career in physics.

She obtained her bachelor's degree in physics in 2003 from the University of Cape Coast in Ghana, and her master's degree in physics from the same institution in 2006. Following the first year of her PhD studies at the University of Cape Coast, Nana was admitted to a doctoral program in Environmental and Geographical Science at the University of Cape Town in South Africa, where she is now applying her interest in physics and mathematics in the area of climate science.

Extreme weather events such as cyclones, hurricane, severe storms and heat waves remain a threat to society. In addition to destroying lives and property, these events can lead to food shortages and to outbreak of disease.

To make weather forecasts more reliable, forecasters have started using results from many climate models instead of only one. Nana's research tests the capability of climate models in producing seasonal forecasts of extreme events. She investigates the best way to combine the results of these models to produce more reliable forecasts.

Although her research focuses on Africa, if she is successful in developing a reliable seasonal climate prediction it would contribute to global climate prediction systems.

Nana plans to teach at the University of Cape Coast in Ghana. She is of the opinion that girls should be encouraged at the basic level to build their interest in science.

Folasade Mojisola DAHUNSI

Home Country
Nigeria

Degree
PhD in Electrical Engineering

Expertise
Electrical Engineering

Research Focus
Accuracy of Location-
Based Services

Host University
University of the Witwatersrand,
South Africa

Fellowship Awarded
2008



Folasade Mojisola Dahunsi is married and is blessed with a daughter. She loves reading, athletics and singing.

A PhD student at the School of Electrical and Information Engineering in the University of the Witwatersrand in Johannesburg, South Africa, Folasade is a member of the Centre for Telecommunication Access and Services (CETAS) research group. This group is focused on research in telecommunication access and services and has one of the best convergence laboratories in Africa geared toward research and teaching for Next Generation Networks and Network Convergence.

In her research Folasade is seeking to determine the accuracy of Location-Based Services (LBS). She is working to develop a model that can be employed to estimate the accuracy of positioning techniques offered by LBS providers based on the topology, mobile-wireless environment and other parameters of the mobile network.

Her work will assist in optimizing the infrastructure of mobile operators and their mobile user devices (legacy and modern), and it will provide improved serviced quality for users. Her research will have a significant impact on anywhere, anytime services, which are widely expected to become ubiquitous in the future as we move toward a more converged world.

After completing her studies Folasade will be returning to her academic duties with the Federal University of Technology Akure in Nigeria where as a full-time academic staff member she enjoys the opportunity to not only teach but also to mentor, motivate and provide counsel to her students.

Zoila Luz EPOSSI NTAH

Home Country
Cameroon

Degree
PhD in Archaeometry

Expertise
Chemistry

Research Focus
Production Techniques
and Provenance of Ancient
Ceramics from Cameroon

Host University
University of Leipzig, Germany

Fellowship Awarded
2008



Zoila Luz Epossi Ntah is from Cameroon in Central Africa, where for several years she has been teaching secondary courses in chemistry and physics. She obtained her Secondary School Teacher Certificate and her Diplome d'Etudes Approfondies (the equivalent of a Master of Science degree in the English-speaking university system) from the University of Yaounde in Cameroon.

She is now pursuing her doctorate in archaeometry at the University of Leipzig in Germany. Her research objective is to understand the production technique and the provenance of ancient ceramics (pottery) using analytical methods. In Cameroon the ceramics industry has a long history, and the richness of pottery artifacts in archaeological sites provides great opportunities for research.

Using non-destructive methods (3D laser scanner, 3D X-ray computed tomography) and destructive methods (X-ray diffraction, X-ray fluorescence, polarized light microscopy, differential thermal analysis and thermogravimetry) to study ancient pottery shards, Zoila looks at the provenance (local production or imported), mineralogy, microstructure, firing temperature, firing atmosphere, firing system, molding techniques, age, surface treatment, tools and techniques of ornaments. Local raw materials are examined for chemical and mineralogical composition and thermal decomposition along with physical properties such as mineralogy and microstructure of the fired products to compare them with the analyzed shards.

Her research focusing on the cultural heritage of her country requires a great deal of cooperation between archaeologists and natural scientists (chemists, geologists, petrographists, mineralogists and physicists), and constitutes a great contribution to the knowledge of the archaeology of Cameroon.

Zoila plans to teach at the University of Yaounde or at the University of Douala.

Dawn FOX**Home Country**
Guyana**Degree**
PhD in Chemical Engineering**Expertise**
Chemical Engineering**Research Focus**
Environmentally Friendly Water
Filters Using Cactus Mucilage**Host University**
University of South Florida,
United States**Fellowship Awarded**
2008

Dawn Fox was born in Bartica, Guyana, as the eldest of three children. Along with her brother and sister she grew up in many places, spending much of her childhood in Bartica and Caracas, Venezuela. She and her husband share a love of teaching.

Dawn's decision to pursue a career in chemical sciences was supported by two strong female role models—her mother, who inspired her to be strong and independent and not to set limits on her goals, and a female chemistry teacher whose courses sharpened her analytical reasoning skills and whose encouragement gave her self-confidence.

In August 1994 the tailings pond of Omai Gold Mines Guyana Ltd. suffered a breach and spilled cyanide-containing waste water into the Omai and Essequibo rivers adversely affecting the environment and the livelihoods of downstream riverain communities including Bartica. This event became a major factor in Dawn's decision to focus her research on remediation of contaminated water resources. She completed her Bachelor of Science degree in chemistry at the University of Guyana in 1997, and subsequently completed her master's degree in chemical and materials engineering at the University of Auckland in New Zealand. She returned home to take up a teaching appointment in the Department of Chemistry at the University of Guyana.

Currently enrolled in a doctoral program in chemical engineering at the University of South Florida in the United States, Dawn is researching ways to safely remove arsenic from groundwater using cactus mucilage. Using a combination of molecular spectroscopy and analytical spectrometric techniques to examine the interaction between the mucilage and arsenic, her research goal is to develop a safe and environmentally friendly water filter to remove arsenic and other contaminants from groundwater.

Upon completion of her doctorate Dawn plans to resume teaching and research at the University of Guyana.

Tendai GADZIKWA**Home Country**
Zimbabwe**Degree**
Post-Doctorate in Chemistry**Expertise**
Chemistry**Research Focus**
Design and Synthesis of
Supramolecular Catalysts**Host University**
University of Amsterdam,
The Netherlands**Fellowship Awarded**
2008

Tendai Gadzikwa was born the third of four children in Kariba, a small resort town in Zimbabwe, but grew up in Harare, the capital city. Over the last two decades while the economic and social situation in Zimbabwe changed drastically Tendai's family grew through adoption—she now has a total of eight siblings.

The deteriorating education system in Zimbabwe forced Tendai to pursue post-secondary education abroad. She obtained her undergraduate degree in chemistry from Macalester College in St. Paul, Minnesota in 2003, and her doctoral degree in chemistry at Northwestern University in Evanston, Illinois. She is currently pursuing post-doctoral research at the University of Amsterdam in The Netherlands.

Tendai's research focus at Northwestern was directly related to sustainable technologies. Her doctoral thesis work involved the design and synthesis of metal-organic frameworks (MOFs)—materials with applications in hydrogen storage, gas separations and catalysis.

In Amsterdam, she has turned her focus towards the synthesis of supramolecular catalysts that mimic enzymes. Catalysts are known to reduce the cost, in both time and energy, of reactions. However, they can also be used to guarantee the formation of only one type of product, out of the several that are possible. This ability is termed selectivity, and the most selective catalysts known are enzymes. Tendai is constructing structures that may be considered artificial enzymes, and is applying them to the catalysis of industrially relevant processes.

Tendai says that while the past several years abroad have been extremely fruitful, she misses home and family and this has made her passionate about improving higher education institutions in her region. She plans to teach at a university in southern Africa.

Nada HASHMI

Home Country
Pakistan

Degree
PhD in Technology, Innovation and Entrepreneurship

Expertise
Healthcare Information and Communication Technologies

Research Focus
Technologies for Remote Health Care

Host University
Massachusetts Institute of Technology, United States

Fellowship Awarded
2008



Nada Hashmi is originally from Pakistan but grew up in Saudi Arabia. In her spare time she enjoys horseback riding, photography and learning about different cultures and traditions.

Nada graduated from Washington College, Maryland with a Bachelor of Arts (Magna Cum Laude) degree in computer science and a Bachelor of Arts (Magna Cum Laude) degree in math. She obtained her master’s degree in computer science from the University of Maryland and in September 2008 she began working toward her PhD in technology, innovation and entrepreneurship at the Massachusetts Institute of Technology (MIT) in the United States.

At MIT her research focuses on developing and setting up remote technologies that help city hospitals communicate with village clinics in developing and emerging economies. Generally, doctors do not relocate to villages, and government spending is not aimed at rural health care development. As such, the quality of the health care system in villages is lacking and insufficient to accommodate local villagers. Telemedicine and remote diagnosis, in conjunction with other healthcare information and communication technologies, can alleviate the problem by raising the quality of health care at the villages to provide effective remote diagnosis. Nada’s research aims to bridge the gap between city hospitals and villages in emerging economies by developing affordable health care solutions using technology.

Nada is passionate about using education to empower individuals to help themselves and the society around them. When she graduates from MIT, she plans to teach in Saudi Arabia.

Saira HASHMI

Home Country
Pakistan

Degree
Doctor of Design (DDes)

Expertise
Water Resources

Research Focus
Designing Water Infrastructure and Water Policy Resource Management Issues in United Arab Emirates

Host University
Harvard University, United States

Fellowship Awarded
2008



Saira Hashmi is originally from Pakistan but grew up in Saudi Arabia. In her leisure time she enjoys glass painting, photography and working out.

After obtaining her undergraduate degree in civil engineering at the University of Engineering and Technology in Lahore, Pakistan, Saira obtained her master’s degree in environmental engineering at Harvard University in the United States. She is currently pursuing a Doctor of Design degree in the Harvard Graduate School of Design with a focus in designing water infrastructure.

Her research at Harvard involves designing an optimal water infrastructure model for sustainable cities that embodies the culture and the environment. She is focusing on the Middle East and North Africa (MENA) region especially the Abu Dhabi region in the United Arab Emirates (UAE) which is facing water scarcity issues. Saira is developing a model that will integrate all sources and uses of water, including rainfall, groundwater and surface water, water treatment, reuse and recycling of water, alternate technologies and the quality of water received from desalination plants along with environmental, social, economic and political constraints and policies.

Her objective is to help in maximizing reuse of water sources and minimizing water consumption by investing in appropriate and efficient water-saving technologies along with unconventional water resources within the city. Her proposed model will provide different cost analyses of newly available technologies and may be used to minimize investments in water management systems and to maximize social benefits. This will help in pricing water and in the evaluation of future water demands. While based on the city of Abu Dhabi, her model is applicable at a global level and is particularly appropriate for emerging and developing economies.

Saira plans to teach in Saudi Arabia after her graduation from Harvard.

Jenny HO

Home Country
 Malaysia

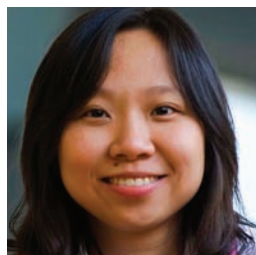
Degree
 Post-Doctorate in Bioengineering

Expertise
 Chemical Engineering
 and Bioengineering

Research Focus
 Genetic Therapeutics

Host University
 Monash University, Australia

Fellowship Awarded
 2008



Jenny Ho is the eldest child in a family of five. She was born and raised in Malaysia, where she obtained her bachelor's degree in chemical engineering with first-class honors from the University of Technology Malaysia.

Since a young age she has pursued academic excellence with diligence, and this passion is reflected in the academic laurels she has earned. She received several scholarships during her bachelor and PhD studies, best poster and travel awards and was named best graduating student in chemical engineering.

Her ultimate aim is to combine engineering and medical knowledge to improve human health care and quality of life. Throughout her PhD studies she has been recognized as innovative, productive and solution-oriented through the publication of papers in internationally recognized peer-reviewed journals and her presentations at several national and international conferences.

Jenny's research focus is in the area of genetic therapeutics and targeting delivery especially for DNA vaccines and protein biopharmaceuticals. The central aim of her research is to develop feasible and scalable production methods to reliably produce therapeutic products that facilitate the cellular uptake of biopharmaceuticals such as plasmid DNA and antibodies for infectious diseases and cancer therapies.

Jenny intends to pursue her dream of developing frontier science and technology products to improve the well being of humankind. With the experience and expertise she has obtained, she hopes to help advance biotechnology research in her home country and in the world.

When she completes her current studies Jenny plans to work as a post-doctoral fellow to gain related research experience, then to teach at the Monash University campus in Malaysia.

Edu INAM

Home Country
 Nigeria

Degree
 Post-Doctorate in Chemistry

Expertise
 Groundwater Monitoring

Research Focus
 Environmental Monitoring
 and Risk Assessment

Host University
 Gwangju Institute of Science and
 Technology, Republic of Korea
 (South Korea)

Fellowship Awarded
 2008



Edu Inam received her PhD in chemistry from Loughborough University, United Kingdom in 2005. She has participated in a variety of professional training programs in the United Kingdom and at the United Nations University in Japan. She recently completed a three-year post-doctoral study program at the International Environmental Research Centre, Gwangju Institute of Science and Technology in Korea.

During her post-doc studies Edu was involved in several research projects including international collaborative research on the impact of climate change on water quality in southeast Asia. This afforded her the opportunity to work with scientists in various disciplines from eight southeast Asian countries.

Edu initiated and carried out a joint research project on geochemical distribution of trace element concentrations in the vicinity of the Boroo gold mine in Mongolia, working with the National Agency for Meteorological and Environmental Monitoring in that country. Her work was accepted for publication in a special edition of the Journal of Environmental Geochemistry and Health. Edu's research on concentrations of trace elements in ground water and packaged water in Akwa Ibom state in Nigeria was published by the Korean Society for Geosystems Engineering in its Geosystems Engineering Journal.

After completing her post-doctorate studies Edu returned to Nigeria where she is teaching at the University of Uyo in Akwa Ibom State. She is seeking funding to establish a research group within the Department of Chemistry with a focus on environmental monitoring and risk assessment of hazardous chemicals.

Edu has mentored several female students from Thailand, Mongolia, Vietnam and Nigeria.

Kissa KULWA

Home Country
Tanzania

Degree
PhD in Applied
Biological Sciences

Expertise
Consumer Sciences
and Human Nutrition

Research Focus
Infant and Young Child Growth
and Micronutrient Intake

Host University
Ghent University, Belgium

Fellowship Awarded
2008



Kissa Kulwa has one child, two sisters and one brother. She enjoys reading, cooking, travelling, meeting people and learning their culture.

After obtaining her Bachelor of Science degree in 1995, Kissa completed her Master of Science degree in applied human nutrition in 2001 at the Department of Food Technology and Nutrition, University of Nairobi, Kenya. She joined the Sokoine University of Agriculture in December 2001 as an assistant lecturer in the Department of Food Science and Technology, and was promoted to lecturer in 2005.

Kissa won a Best Final Year Student award in home economics and human nutrition in 1995, and a Best Overall Staff award in her department in 2005 and 2007. She entered a PhD program at Ghent University in 2008. Her PhD research focus is on infant and young child growth and micronutrient intake in rural Tanzania.

She is particularly interested in investigating the extent to which seasonal variation in food consumption patterns influences nutrient intake and growth; and in the effectiveness of a food-based approach to improving quality of complementary meals, dietary adequacy, and growth of rural children. Her work involves an assessment of feeding practices, consumption patterns and dietary adequacy; an assessment of growth patterns; a determination of nutritional content of key meals; and the formulation of recipes and educational messages promoting increased nutrient intake.

Since under-nutrition is an underlying cause of 60 percent of child deaths in Tanzania, she hopes that understanding behaviors and motivations influencing early feeding will help in developing effective and sustainable nutrition interventions.

Upon completion of her doctoral program, Kissa intends to continue teaching at Sokoine University of Agriculture in Tanzania.

Emily Benice Ngubia KURIA

Home Country
Kenya

Degree
PhD in Medical Sciences

Expertise
Gender Studies Research,
Neuroscience Research,
Science and Technology Studies

Research Focus
Evaluation of the Mental Rotation
Task in its Role in Establishing
Cognitive Gender/Sex Differences
in Intellectual Capacity

Host University
Charité-Humboldt University
of Berlin, Germany

Fellowship Awarded
2008



Emily Benice Ngubia Kuria is known for her energy and her great motivation to see women excel in achieving their goals. She feels that many women lack mentors in scientific disciplines. The conviction that all things are possible comes from her faith and a close relationship with her family. She is the eldest in a family of four, and prefers to be called by her African name, Ngubia.

Ngubia's research focus is on understanding female under-representation in science and on evaluating the validity of research in experimental psychology and neuroscience that continues to allude to biological roots for this phenomenon. She is working to understand the concept of "gender" within neuroscience research, and its representation in experimental designs—specifically in the Mental Rotation Task.

Ngubia says her research is important because normative attributions of sex differences can lead to dissimilarities in the way responsibilities are allocated, resources are distributed, and rights are granted. Policy makers and governments make institutional awards to educational systems based on (sometimes misleading) scientific interpretations.

Ngubia believes that increasing participation by women in science requires active support. The challenge now is to create institutional changes that encourage women to enter science disciplines. and this is where she plans to play a significant role. She hopes to see more Kenyan women choosing careers in science, and she intends to participate actively in the establishment of new academic research facilities in her country when she completes her PhD in gender studies at the Charité-Humboldt University of Berlin in Germany.

Ngubia plans to teach at the University of Nairobi, College of Biological and Physical Sciences, and to participate in capacity-building exercises at a national level.

**Arul MANI
SHANTHI ARUMUGAM**

Home Country
Malaysia

Degree
PhD in Engineering Seismology
and Earthquake Engineering

Expertise
Geology

Research Focus
Subduction Zone
Earthquake-Triggered Tremors

Host University
Imperial College London,
United Kingdom

Fellowship Awarded
2008



Arul Mani Shanthi Arumugam is from Malaysia, where her family includes one older sister and two younger sisters along with one younger brother. Her parents are deceased.

Her research focus is on subduction zone earthquake triggered tremors with a particular emphasis on West Malaysia. Her research objectives are to document and process regional seismic data from all relevant authorities; to characterize and categorize the types of tremors affecting West Malaysia; to identify the geology and localities likely to be more affected by tremors; to model ground failures and structural damage; and to develop a predictive equation for subduction zone earthquake-triggered tremors for West Malaysia.

Malaysia is situated within the “Pacific Ring of Fire” area, which is surrounded by many subduction zones and is prone to large and potentially devastating earthquakes and volcanic eruptions. This area is also home to some of the world’s deepest earthquakes that have high potential to generate big tsunamis along with strong aftershocks and tremors.

Arul’s research will lead to a better understanding of these tremors and their effects. She hopes to develop better methods to alert authorities about high-risk areas and structures, and to provide advice about hazard management and measures. As well as helping to mitigate damage, her research will assist in better educating the general public about earthquakes and tremors; subsequently minimizing panic, chaos and paranoia.

In addition to her career in academia, Arul hopes that as a scientist at the forefront of earthquake and tremor-related matters she will be in a better position to approach the Malaysian government to set up an independent body for an earthquake and tremor control centre for Malaysia, and eventually for the entire southeast Asia region. She plans to teach in the Faculty of Science Department of Geology at the University of Malaya in Malaysia.

Elizabeth MARTÍNEZ GÓMEZ

Home Country
Mexico

Degree
Post-Doctorate in Astrostatistics

Expertise
Astronomy

Research Focus
Planetary Sciences and
Application of Statistics to
Astronomy and Astrophysics

Host University
The Pennsylvania State University,
United States

Fellowship Awarded
2008



Elizabeth Martínez Gómez is from Mexico City and lived there with her parents and her brother until she took a post-doctoral position at Penn State University. She enjoys traveling and meeting new people along with cooking, walking and watching soccer games.

Elizabeth began her academic career in the School of Sciences at the National Autonomous University of Mexico (UNAM), where she obtained her bachelor degree in physics in 2001, and her masters degree in 2003. She received a diploma in applied statistics in 2005, a doctorate in space physics in 2007, and a diploma in econometrics in 2009, all at the same university.

After starting her post-doctoral research at the Institute of Astronomy at UNAM, she is now continuing it in the Center of Astrostatistics at The Pennsylvania State University in the United States. As a researcher, Elizabeth has wide-ranging interests, from solid state physics to computing and statistics. Her main research focuses on the application of statistical methodologies to problems in Astronomy and Astrophysics.

At the Center of Astrostatistics she is learning advanced statistical methods and applying them to several problems. For example, she is analyzing the relationship between exoplanets and their host stars because it is important to find suitable constraints for planet-formation models.

Elizabeth has attended numerous national and international conferences, and in 2010 she was distinguished as a candidate of the Sistema Nacional de Investigadores (SNI) in her home country.

Elizabeth has taught many courses in the undergraduate and graduate levels at her home institution, the National Autonomous University of Mexico, and she intends to return to teaching and doing research there. One of her dreams is to create an Astrostatistics group, which would be the first of its type.

Paula MEJIA VELASQUEZ

Home Country
Colombia

Degree
PhD in Botany and Geology

Expertise
Botany

Research Focus
Diversification and Radiation
of Flowering Plants in Lower
Cretaceous Period

Host University
University of Florida,
United States

Fellowship Awarded
2008



Paula Mejia Velasquez was born and grew up as the eldest of three children in Medellin, Colombia. She is married, and in her spare time she loves to read, hike, dance, bike, crochet and knit.

Paula began her academic career studying biology and geology, her two great passions. She graduated in 2004 with a bachelor's degree in biology from the University of Antioquia in Medellin, where she also pursued athletic activities such as softball, running and rugby.

After working briefly in the private sector she obtained her master's degree in botany in 2007 at the University of Florida in Gainesville, United States. She then was able to combine her two passions when she began to specialize in the area of paleobotany (the study of fossil plants) at the University of Florida, where she is now working toward her doctorate.

Paula's research focus is on the diversification and radiation of flowering plants in the Lower Cretaceous period (120 million years ago) as inferred from fossil pollen. Flowering plants (angiosperms) are the dominant group of plants in most terrestrial ecosystems today. However, their origin and diversification—described by Charles Darwin as “the abominable mystery”—remains one of the major unresolved questions of science.

Paula is attempting to reconstruct the floristic composition and paleo-environmental conditions of several tropical sites during the Lower Cretaceous period. She is sampling cores in Colombia, Brazil, Peru, Gabon and Egypt and analyzing a stratigraphic section of approximately 30 samples per site. In addition to helping determine the conditions under which flowering plants began their rapid and unparalleled process of diversification in the tropics, her research may yield clues as to how different plant groups respond to severe global warming events.

Paula plans to teach at the University of Antioquia in Colombia.

Zahiraniza MUSTAFFA

Home Country
Malaysia

Degree
PhD in Civil Engineering

Expertise
Hydraulics, Hydrology,
Probabilistic and
Pipeline Corrosion

Research Focus
Probabilistic Evaluation of
Corrosion in Offshore Pipelines

Host University
Delft University of Technology,
The Netherlands

Fellowship Awarded
2008



Zahiraniza Mustafa, also known as Zahira, was born in Perak, Malaysia in 1978. The second child in a family of three siblings, she is married to a husband who has a similar career path. They have one son.

Her first degree, a bachelor of engineering (civil) with honors, was earned in 2000 at University of Technology in Malaysia, and in 2003 she obtained her Master of Science degree in water resources engineering from the University of Alberta in Canada. Her PhD research focus is in risk-based modeling, probabilistic mechanics and optimization techniques specializing in stochastic methods. Her work on probabilistic assessment of aging marine pipelines has widespread opportunities for application, and may attract the interest of specialists in stochastic methods and offshore engineering. She hopes her research will lead to a more economic, cost effective and safe design of offshore pipelines from an inspection, maintenance and rehabilitation point of view. The results of her research, conducted under the auspices of the Petroleum National Company in Malaysia (PETRONAS), will be beneficial not only to the university but also to her country, where a complex system totaling thousands of kilometers of offshore pipelines is still the most reliable means of transporting hydrocarbons.

Zahira has chosen an academic career path because teaching satisfies her in many ways. She feels that her friendly, easy-going manner encourages students to come to her for guidance in academic as well as personal matters. During her three years of teaching she received good evaluations from students in each academic semester, and in July 2007 she received an Effective Education Delivery Award.

Zahira plans to teach at the PETRONAS University of Technology in Malaysia, where according to Malaysia's Minister of Women and Family Development about eight percent of women are studying in science and technology at the national level.

Happy Primita NOVANDA**Home Country**
Indonesia**Degree**
PhD in Electrical and Electronic
Engineering**Expertise**
Electronics and Electrical
Engineering**Research Focus**
Power Quality Monitoring
in Wind Farms**Host University**
University of Manchester,
United Kingdom**Fellowship Awarded**
2008

Happy Primita Novanda is a lecturer at the University of Indonesia. She has two older brothers and says that although her family had expected her to become a doctor or to go into one of the pure science fields, they nevertheless supported her decision to pursue a career in electrical engineering.

Happy obtained her first degree in electrical engineering in 2006 at the University of Indonesia, majoring in electric power. She obtained her master's degree in technology management at The University of New South Wales in Australia. Technology management is about how to profit from research findings. This degree taught her that while it is important to conduct research in areas of personal interest, scientists must also think about whether their research will be useful in the future, and whether it will have a positive impact on their communities.

Her PhD research focuses on the integration of intelligent network devices to control electric power in wind farms. Because Indonesia still uses non-renewable resources to generate electrical energy, she feels that it is important to develop new sources of electricity in her home country, but the difficulty of maintaining quality of electric power and of reducing losses during distribution through Indonesia's power networks is a recurring problem.

Happy's work in developing more accurate methods of monitoring power quality will help improve the consistency of electric power generation in wind farms. Lack of power quality, particularly in wind energy power generation, may cause unwanted distortion. Her work in monitoring power quality in wind farms is important because delivering high-quality electric power helps ensure that equipment will operate within its specifications and be reliable.

After completing her PhD, Happy plans to continue teaching in the Faculty of Engineering at the University of Indonesia.

Dade NURJANAH**Home Country**
Indonesia**Degree**
PhD in Computer Science**Expertise**
Computer Science**Research Focus**
Adaptive Educational Hypermedia**Host University**
University of Southampton,
United Kingdom**Fellowship Awarded**
2008

Dade Nurjanah was born in Bandung, West Java, Indonesia and raised in a family that valued the importance of education. Dade's parents believed in education and taught her, along with her two brothers and sister, that it is a way of making life worthwhile.

After graduating from the Institute of Technology Bandung in Indonesia with undergraduate and graduate degrees in Informatics, Dade began teaching at Telkom Institute of Technology in Bandung. In 2008 she began her PhD in the Electronics and Computer Science School at the University of Southampton.

Her research focuses on adaptive educational hypermedia (AEH), social-semantic web technology, and computer-supported collaborative work. Dade proposed a new collaborative authoring model to develop learning resources for adaptive personalized learning systems. This advanced model supports communities of practice, general public and teachers who work collaboratively to establish evolving learning objects. Because many people with different backgrounds contribute to the authoring process, the quality of learning objects is improved. Moreover, as the proposed model encourages authors to continuously update learning objects, the objects will always evolve, thus keeping them relevant to students.

Dade believes that her PhD research is important for disseminating knowledge, improving learning quality and diminishing knowledge gaps in society.

She has been teaching at Telkom Institute of Technology in Bandung, Indonesia for several years and plans to return.

Dyah Ayu Mira OKTARINA

Home Country
Indonesia

Degree
PhD in Dermatology

Expertise
Medicine

Research Focus
Pemphigus Pathogenesis

Host University
University of Groningen,
The Netherlands

Fellowship Awarded
2008



Dyah Oktarina, a medical doctor who graduated from the Faculty of Medicine at Gadjah Mada University in Yogyakarta, Indonesia, comes from a simple Indonesian Javanese family. Her father, who is retired, and her mother, who works as a government employee, always supported her educational goals and motivated her to continue her studies at a higher level.

Dyah’s research focus is on pemphigus, an autoimmune blistering disease of the skin and mucous membranes caused by antibodies which form against the cell surface of keratinocytes. Her research, conducted at the Centre for Blistering Diseases in the Department of Dermatology at the University of Groningen in The Netherlands, involves observing the in vivo patterns of immunoglobulin depositions in the skin of patients with pemphigus.

Pemphigus is often fatal for people who are afflicted with it because they suffer from dehydration or infection. Because their skin is covered in blisters, they are at increased risk of infection, but current treatments involve the use of cortical steroids, which can repress the immune system and lower resistance to infection. Dyah hopes to relate the deposition patterns of immunoglobuline in the skin of pemphigus patients to the pemphigus pathogenesis in the hope that this will lead to the invention of new drugs and treatments that can help patients control the disease and receive a better prognosis.

When she finishes her studies, Dyah plans to teach at Gadjah Mada University in Indonesia.

Yasaman SHADROKH

Home Country
Iran

Degree
PhD in Electronic
and Electrical Engineering

Expertise
Electronics and Electrical
Engineering

Research Focus
Computer-Based Simulations
in Nanotechnology

Host University
Imperial College London,
United Kingdom

Fellowship Awarded
2008



Yasaman Shadrokh was born and grew up in Tehran, Iran. She says that throughout her studies she was a demanding and challenging student who never let obstacles get in the way of what she wanted.

Yasaman obtained her BSc degree in electronic and electrical engineering at Tehran Azad University in 1988 and her MSc degree from Glasgow University in the United Kingdom in 2006, graduating with distinction for her final project. She is pursuing her PhD in micro- and nano-technology at Imperial College London and expects to graduate by the end of 2010.

With rapidly improving technological capabilities and new physical transport processes, interest in nano-sized devices has increased dramatically over the last decade. The size of the control contact in these devices has been reduced to sub-100nm dimensions.

This influences some of the device performance parameters and requires a search for new materials and geometries.

Yasaman’s research uses different device simulators and analysers along with three-dimensional software to study the robustness of device structures to downscaling within the field of digital applications. Her research focus has already turned toward fabrication of the simulated device to evaluate the simulation results. She is also working on nanowires, especially the fabrication process and applications that can be used in making FET transistors.

Yasaman has published widely and presented the results of her work at several conferences. Highlights of her work published in the International Journal of High Speed Electronics received a best-paper award. She has also been teaching subjects such as mathematics and electronics and has given lectures on using the TCAD simulator to third-year undergraduate students.

Sindhu SURESH**Home Country**
India**Degree**
PhD in Electrical Engineering**Expertise**
Electrical and Electronics
Engineering**Research Focus**
Radio Frequency Power Amplifiers**Host University**
Polytechnic University,
United States**Fellowship Awarded**
2008

Sindhu Suresh was born in a village in the Kollam district of Kerala, India. Her father is a retired university registrar. Sindhu was the first graduate of a technical school in her village, although she was followed by her younger brother and more recently by many others. She and her husband have one daughter.

Sindhu earned her Bachelor of Technology degree in electrical and electronics engineering in 1996 at Kerala University and her master's degree in electrical engineering at IIT Madras in India in 1999. She is pursuing her PhD at Polytechnic University in Brooklyn, New York as well as teaching courses there.

Her research focuses on the design and implementation of a digitally controlled polar envelope modulator for radio frequency power amplifiers using a switch mode power supply running at switching frequencies of 100 MHz and above. Her objective is to develop a micro-meter square chip that makes wireless devices more efficient by enhancing battery life.

Switch mode power converters provide one of the most efficient methods to regulate analog and digital supplies for battery-powered radio frequency transceivers, but the conflicting requirements of higher linearity and increased power efficiency pose an enormous challenge for designers of power amplifiers.

Sindhu hopes to overcome this challenge by designing and fabricating a Buck converter with a one-cycle controller as the inner loop and a PI controller as the outer loop. The feedback controller is fabricated using a current conveyor model, which is a major breakthrough in electronics. Energy-efficient radio frequency power amplifiers are critical to achieving longer battery life because they dominate power consumption in wireless devices.

Sindhu says that teaching is her passion, and she plans to teach at Kerala University in India.

Nangula Paulina UUSIKU**Home Country**
Namibia**Degree**
PhD in Nutrition**Expertise**
Nutrition**Research Focus**
Antioxidant Properties
of African Leafy Vegetables**Host University**
University of Pretoria,
South Africa**Fellowship Awarded**
2008

Nangula Paulina Uusiku was born and raised in Ongwediva, Namibia. She is married with one daughter.

Nangula obtained a Bachelor of Science degree in agriculture with a specialization in food science and technology from the University of Namibia in 2000, and in 2003 she graduated with a master's degree in food science from the University of Stellenbosch in South Africa. She joined the University of Namibia as a lecturer in January 2003.

Currently pursuing her PhD in nutrition at the Centre for Nutrition at the University of Pretoria, South Africa. Nangula's research focus is on the antioxidant and free radical scavenging activity of African leafy vegetables (ALVs), and their effects on oxidative DNA damage. Oxidative stress, which is induced by reactive oxygen species, is known to be an underlying factor in a number of chronic diseases of lifestyle (CDL) such as cancers and cardiovascular diseases. Dietary antioxidants protect against free radicals in the human body, and leafy vegetables have been shown to contain antioxidant properties.

This research is important because incidences of CDL are increasing in the communities that traditionally consume ALVs. In her research, Nangula plans to show that traditional and indigenous ALVs have as much or more phenolic compounds than exotic vegetables and that people in Africa, especially those from poor communities, can rely on local vegetables to improve their health.

Nangula plans to resume lecturing at the University of Namibia when she completes her current studies.

Parinda VASA

Home Country
India

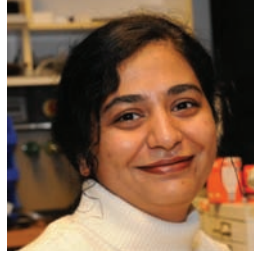
Degree
Post-Doctorate in Ultrafast
Nano-Optics and Physics

Expertise
Physics

Research Focus
Nano-Optics and Exciton-Plasmon
Interactions in Metal Hybrid
Structures

Host University
Carl von Ossietzky University,
Germany

Fellowship Awarded
2008



Parinda Vasa was born in India. Her research focus is on very small metal structures that show the remarkable property of concentrating light over extremely small regions of space. The light energy is stored in a new form of excitation known as Surface Plasmon Polaritons (SPPs).

Plasmonics is a field in which novel devices based on SPPs are designed and investigated. An emerging field of research, it is challenging due to the extremely short SPP lifetimes and the small (nanometer) spatial scale of SPP localization. Plasmonic devices have tremendous advantages in comparison with conventional optical devices. They offer miniaturization similar to that in electronics and the potential of parallel ultrafast processing. Terabit processing rates, as compared to the conventional gigabit rates of today's electronics, seem within reach.

However, the metal structures have high losses and hence SPPs cannot propagate through them over long distances. A possible way to overcome losses is to amplify SPPs in a gain medium similar to the method used for light in lasers. SPP Amplification by Stimulated Emission of Radiation (SPASE R) in metal-semiconductor hybrid structures is very promising. Semiconductor nanostructures (e.g. quantum wells) offer very high gain coefficients and may thus serve as SPP amplifiers. So far, such a device is only theoretically predicted.

Parinda is investigating metal-semiconductor hybrid structures for the possibility of SPP amplification and lasing. She and her colleagues have successfully observed and theoretically modeled the interaction between SPPs excited on a metal grating with excitons in a semiconductor quantum well. The possibility of forming different active and passive optical elements using such hybrid structures is also being explored.

Parinda plans to teach at the Indian Institute of Technology Bombay in Mumbai, India.



Fellows at the forum held in Paris in 2008.

FELLOWS 2007

Swathi ADINDLA**Home Country**
India**Degree**
PhD in Bioinformatics**Expertise**
Bioengineering**Research Focus**
Design of Efficient Enzymes
with Novel Functions**Host University**
Yale University, United States**Fellowship Awarded**
2007

Swathi Adindla was born and raised in the small village of Nalgonda, India. She has two sisters and comes from a conservative family in which her father encouraged her to take up higher studies. She is married and has two daughters.

Swathi obtained her B.Sc degree with distinction in 1997 from Osmania University and then joined the University of Hyderabad, where she obtained her master's degree in 1999, her Master of Philosophy degree in chemistry in 2001, and her PhD in bioinformatics in 2006. During her doctoral studies she was awarded junior and senior research fellowships by the Council for Scientific and Industrial Research (CSIR), a prominent scientific agency of the government of India. She also qualified for the National Eligibility Test (NET), a prerequisite for a faculty position in Indian universities.

Soon after her doctoral studies she had a brief stint as an exchange researcher in chemo-informatics at the Centre for Medical Studies and Research in Normandy (CERMN), France. In 2008 she moved to the California Institute of Technology in the United States where her research focuses on designer enzymes with novel functions. It involves the design of stable and efficient enzymes with new catalytic activities to carry out novel but desired chemical transformations of practical interest, that will have potential applications in biotechnology, biomedicine and in eco-friendly industrial processes.

While at Caltech, Swathi became involved in a research collaboration project at Yale University, where she is engineering lac repressor proteins to respond to orthogonal ligands and also designing new variants of lac repressor proteins that could be used as biosensors. Swathi is working toward her research goals at Yale using both computational and experimental approaches.

When she finishes her postdoctoral studies Swathi plans to teach in her home country.

So-Hye CHO**Home Country**
Republic of Korea (South Korea)**Degree**
Post-Doctorate
in Inorganic Chemistry**Expertise**
Chemistry**Research Focus**
Electron-Dense Labels for Use
in Electron Microscope Imaging**Host University**
The Scripps Research Institute,
United States**Fellowship Awarded**
2007

So-Hye Cho was born and raised in Pusan, South Korea. She received her undergraduate degree in chemistry in 1998 from Ewha Womans University in Seoul, where in 2000 she also obtained her graduate degree in organic chemistry. In 2006 she completed her doctoral studies in inorganic chemistry at Northwestern University in Evanston, Illinois in the United States.

During her academic studies So-Hye received numerous grants and awards including a Korean-American Scientists & Engineers Association San Diego Chapter Service Award; a BP Chemicals graduate student award for excellence in environmental molecular science; Ewha alumnae award for Best Master's Thesis in Science; and Best Graduate Student award from the Basic Science Institute at Ewha Womans University.

In her post-doctoral studies at The Scripps Research Institute in California, So-Hye worked on the development of electron dense labels for use in the electron microscopic imaging of biomolecules such as proteins. This work provides insights into the enzyme functions and molecular mechanisms of biology.

In 2009, So-Hye started her career in South Korea at Korea Institute of Science and Technology (KIST) as senior researcher. There, she researches nano-particle synthesis and their photocatalytic activities.

So-Hye is active in encouraging the participation of women in science. As executive director of the national Korean-American Women in Science and Engineering (KWISE) organization, she plans career development seminars and forums through which she encourages the participation of women professionals and female undergraduates. She has also mentored numerous undergraduate researchers and is supervising several graduate students.

So-Hye is currently a member of WISE and continues to promote science and engineering to young female students.

Maryam EIDINI-NEZHAD

Home Country
Iran

Degree
PhD in Civil Engineering

Expertise
Structural Engineering

Research Focus
Collapse Analysis of Structures

Host University
University of Illinois at
Urbana-Champaign, United States

Fellowship Awarded
2007



Maryam Eidini-Nezhad became interested in civil engineering while attending high school in Tehran, Iran. She has worked in an R&D institute in Tehran as a senior research engineer in the field of seismic vulnerability assessment and rehabilitation of industrial structures, and she has taught at the university level which led to her current interest in a teaching career at a university.

Maryam earned her Bachelor of Science degree in civil engineering at Amirkabir University of Technology (Tehran Polytechnic). After working for a time as a structural designer she decided to continue her studies and subsequently received her master's degree in civil engineering with a specialization in earthquake engineering from the International Institute of Earthquake Engineering and Seismology (IIEES).

Maryam is pursuing a PhD in civil engineering with a specialization in structural engineering at the University of Illinois at Urbana-Champaign in the United States, where her research focus is on seismic response characteristics of a new lateral load resisting system.

This new and innovative concept for improved seismic performance of buildings located in all earthquake-prone areas relies on the stiffness, strength and inelastic deformation capacity of special reinforced concrete masonry panels that are attached to a conventional steel frame via novel steel connectors.

Maryam performs literature reviews and carries out exploratory studies of seismic response characteristics and non-linear dynamic analyses of structures employing different types of this new lateral load resisting system. Her research will advance our understanding of how buildings constructed with these innovative panels respond to earthquakes of varying intensities.

Ilham EL MONIER

Home Country
Egypt

Degree
PhD in Petroleum Engineering

Expertise
Petroleum Engineering

Research Focus
Environmentally Friendly
Clay Stabilizers

Host University
Texas A&M University,
United States

Fellowship Awarded
2007



Ilham El Monier was born and raised in Giza, Egypt. Married with one child, she has one sister and four brothers.

After graduating from Cairo University in 2004, Ilham obtained her master's degree in petroleum engineering and worked as a teaching assistant for three years. She is now a PhD candidate in petroleum engineering at Texas A&M University in the United States.

Ilham's research focus is on clay stabilizers used to prevent fines migration and clay swelling caused by contact with low-salinity or high- pH fluids. Previous clay stabilizers have several drawbacks. Some compounds can be removed by acids, and cationic polymers can cause formation damage. Quaternary amine-based chemicals used for many years as clay stabilizers have a negative environmental profile and in some cases a short lifetime.

Ilham is helping develop new clay stabilizers that can work following acid treatment and are environmentally acceptable. Laboratory studies determined that a new Al-based clay stabilizer is very effective in mitigating fines migration. Coreflood tests showed that this new chemical, unlike previous Al-based stabilizers (hydroxy aluminum solutions), did not dissolve in acids. It worked well at high temperatures and proved to be as good as, or better than, commercial stabilizers. In addition, the new stabilizer is an inorganic-based, environmentally friendly fluid and does not have a bad odor.

When she completes her PhD, Ilham plans to teach at the University of Cairo in the Faculty of Engineering. While there are currently no female faculty members in the petroleum department at the University of Cairo, Ilham hopes to help other women obtain academic positions in petroleum-related fields.

Mayrina FIRDAYATI

Home Country
Indonesia

Degree
PhD in Civil and
Environmental Engineering

Expertise
Waste Water Treatment Systems

Research Focus
Re-Use of Grey Water
for Urban Agriculture

Host University
Technical University
of Hamburg-Harburg, Germany

Fellowship Awarded
2007



Mayrina Firdayati was born in Aceh, Indonesia and now lives in Bandung. She has three brothers and is married to an entrepreneur, and they have three sons.

May, as she is known, is researching the re-use of wastewater in urban agriculture or aquaculture. She is especially interested in the potential re-use of grey water – wastewater derived from showering or washing clothes and dishes.

With human populations increasing in all parts of the world, there is rising demand for water. There is also significantly more wastewater. In developing and emerging economies such as Indonesia, where water consumption is increasing along with the amount of wastewater, May's research is helping to extend the amount of arable land in urban settings and to provide new sources of water for agriculture.

One solution being viewed by May has the potential to help overcome the challenge of limited space in urban areas by increasing the amount of urban agriculture. She is looking at ways to treat grey water to remove potentially dangerous detergents and chemicals so that the water may be re-used for agricultural purposes in urban settings, particularly in populous urban areas such as Java Island that have problems with overcrowding and sanitation. Known as sustainable sanitation or resource-oriented sanitation, her research is intended to help poor people living in urban settings produce additional food.

May is studying for a PhD in civil and environmental engineering at Technical University of Hamburg-Harburg in Germany, a leading institution in the field of wastewater management, where she is researching water treatment systems that may be appropriate for use in Indonesia.

Following her studies, May plans to teach at the Institute of Technology Bandung in Indonesia.

Rabia HUNKY

Home Country
Libya

Degree
PhD in Petroleum Engineering

Expertise
Petroleum Engineering

Research Focus
Enhanced Heavy Oil Recovery

Host University
Missouri University of Science
and Technology, United States

Fellowship Awarded
2007



Rabia Hunky is married and has two children, both born in Rolla, Missouri while she was studying at the Missouri University of Science and Technology (MS&T) for her master's degree in petroleum engineering, which she received in December 2007. Her husband, a student in the Department of Applied and Environmental Biology at MS&T, is a great supporter and strongly believes in what she wants to accomplish.

Rabia is working toward her doctorate in petroleum engineering at MS&T, where she is studying a new technology using surfactant and alkaline chemicals to improve heavy oil recovery from reservoirs in western Missouri. This non-thermal technology for enhanced oil recovery (EOR) or improved oil recovery (IOR) can increase current heavy oil recovery by water flooding from 5 to 15 percent of original oil in place to between 20 and 30 percent at a lower cost and with reduced carbon dioxide emissions compared to thermal technologies such as cyclic steam stimulation or steam-assisted gravity drainage.

Rabia has studied the mechanisms responsible for the formation of water-in-oil and oil-in-water micro-emulsions, and reduction of interfacial tension at the oil/water interface. She has conducted sandpack core flooding tests to evaluate the performance of alkali-surfactant systems in heavy EOR under different conditions. She has also conducted a comprehensive literature review of surfactant and alkaline flooding in heavy oil.

In addition, she will be modeling these effects to predict her experimental results. Such applications have been well established in the United States and may be applied to some crude oil fields in Libya.

After completing her doctoral research, Rabia plans to apply for a post-doctoral position or teach in the Department of Petroleum Engineering at Al Fateh University in Tripoli, Libya.

Christianah Olakitan IJAGBEMI

Home Country
Nigeria

Degree
PhD in Environmental
Science and Engineering

Expertise
Environmental Science

Research Focus
Eco-Efficient Technology for
Soil and Water Remediation

Host University
Ewha Womans University,
Republic of Korea (South Korea)

Fellowship Awarded
2007



Christianah Ijagbemi was born in Nigeria and is married with four children.

After obtaining her PhD in Environmental Science and Engineering in 2010 from the Ewha Womans University in Seoul, Republic of Korea, she became a faculty member in the School of Engineering and Engineering Technology at Federal University of Technology Akure, Nigeria.

Christianah’s research focus is on green engineering technologies. She is currently involved in the development of an eco-efficient material for the treatment of toxic heavy metal ions in industrial effluents. She is studying the physicochemical surface properties of montmorillonitic smectite clay, a common natural resource, as a material for effective removal of heavy metal ions in industrial wastewater and metal-bearing sludge. This work is expected to be of significant benefit to the industrial sector, which is currently faced with strict environmental regulations on heavy-metal ions discharged into the environment. Progress in her research has been published in international peer reviewed journals.

Christianah plans to continue her teaching career at the Federal University of Technology Akure in Nigeria. Her career objective is to develop a teaching and research centre geared towards providing specific pollution remediation for the human environment. She is passionate about empowering women to achieve their goals and to reach their full potential in every area of life.

Laveeta JOSEPH

Home Country
India

Degree
PhD in Bioengineering

Expertise
Neuroengineering

Research Focus
Neural Electrophysiology

Host University
Georgia Institute of Technology,
United States

Fellowship Awarded
2007



Laveeta Joseph lived most of her life in Hyderabad, known as the pearl city of India. She owes her academic success to her parents and her husband, who has been extremely instrumental in helping her balance her personal and professional life.

During high school Laveeta was judged Best All-Rounder, Best Athlete and Most Cooperative Outgoing Student, and she received a gold medal for academic excellence in mathematics and computer science.

During her undergraduate years at Osmania University in Hyderabad, Laveeta consistently obtained top rank among biomedical engineering students and she received a certificate of excellence in 2004 for obtaining first rank in her graduating class. She recently completed her PhD in bioengineering at the Georgia Institute of Technology in the United States.

Laveeta’s primary research is in neural electrophysiology. Nerves transmit information through electrical activity that propagates along the nerve like traveling waves. For her PhD, Laveeta looked at blocking this propagation using high-frequency currents for clinical pathologies involving unwanted neural activity. She studied the effect of reversible conduction block induced by high-frequency waveforms on different nerves, specifically the differences in the response of myelinated and unmyelinated nerves at frequencies in the range of 5 to 50 kilohertz.

Preventing neural conduction in specific fibers can also be used as a method for achieving selective stimulation. Her work is helping to improve our understanding of techniques used to stimulate specific nerves and has wide applications in the fields of pain management and neural prostheses.

Laveeta plans to continue her research in the field of neuroscience before accepting a faculty position in her home country.

Elham MOHAMMED KHAIR**Home Country**
Sudan**Degree**
PhD in Petroleum Engineering**Expertise**
Petroleum Engineering**Research Focus**
Modeling of Hydraulic Fracturing**Host University**
China University of
Petroleum, China**Fellowship Awarded**
2007

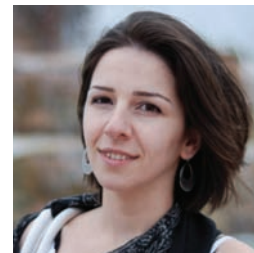
Elham Mohammed M. Khair was born and grew up in Khartoum, Sudan. Her family consists of three brothers and five sisters, and her parents strongly supported her academic aspirations.

After obtaining a diploma (first class) in petroleum engineering in 1995 from Sudan University of Science and Technology, Elham went on to graduate with a Bachelor of Engineering degree in 1999. She received a full scholarship for her master's degree in petroleum production engineering at China University of Petroleum in Beijing, which she obtained in 2003. She then returned to Sudan to work as a lecturer in the Department of Petroleum Engineering at Sudan University of Science and Technology. In 2007 she started her doctoral studies at China University of Petroleum.

In China Elham's research focuses on the modeling of hydraulic fracturing, in particular the possible use of hydraulic fracturing to control sand production from unconsolidated reservoirs. The production of oil sands has historically posed problems associated with poorly consolidated and unconsolidated formations, often with lost production due to formation failure and fine plugging of the production line or tools. Sand production may also cause environmental pollution due to the large amount of produced sand, which causes handling problems.

Elham is building a model for sand production in Sudan oil fields to design better sand control tools. She is attempting to reduce matrix velocity in reservoirs by selecting the optimum fracture fluid and the optimum proppant. Elham intends to use local Sudanese sand as a proppant and to use gum Arabic as a fracturing fluid instead of the conventional Guar gum. If successful, this will reduce the cost of the project.

After completing her PhD, Elham plans to return to work at the College of Petroleum Engineering and Technology in Sudan University of Science and Technology.

Paytsar MURADYAN**Home Country**
Armenia**Degree**
PhD in Atmospheric Sciences**Expertise**
Physics**Research Focus**
Atmospheric Profiling Using
Airborne Radio Signals**Host University**
Purdue University,
United States**Fellowship Awarded**
2007

Paytsar Muradyan was brought up in Armenia in a family of scientists and exposed to mathematics and physics at a young age. She has two sisters and a brother and believes that the family unit is the first and most important environmental influence. She and her husband, a doctoral student in physics at Purdue University in Indiana, United States, have one daughter.

As a doctoral student in atmospheric sciences at Purdue, Paytsar's research is focused on profiling the atmosphere with a Radio Occultation (RO) technique using an airborne GPS receiver on board a research aircraft.

In this technique the GPS radio signals are recorded at a moving receiver as it sets behind the horizon. The GPS signal is refracted passing through the atmosphere and its travel time is delayed due to variations of atmospheric refractivity. The magnitude of the signal's refraction depends on the temperature and concentration of water vapor in the atmosphere and provides an almost instantaneous depiction of the atmospheric state.

Because the relative position between the GPS satellite and the airborne receiver changes over time, a vertical scanning of successive layers of the atmosphere is accomplished. These high-vertical-resolution temperature and humidity measurements are useful for understanding the large-scale dynamics of weather systems and air-surface interactions.

Current meteorological observation systems under-sample humidity fields over oceans using low-vertical-resolution space-borne sounders, infrequent drop-sondes, and ship-launched radiosondes. Airborne RO has the potential to provide humidity data from the surface to the mid-troposphere, and may be a valuable tool for improving precise weather prediction globally and regionally.

Paytsar plans to teach at Yerevan State University in Armenia.

Rebecca NAKATUDDE

Home Country
Uganda

Degree
MSc in Medical Physics
Expertise Physics

Research Focus
3D Manual Missing Tissue
Compensator Cutter

Host University
University of the Witwatersrand,
South Africa

Fellowship Awarded
2007



Rebecca Nakatudde is Ugandan by birth and the third of seven children. During the 1979 - 1985 wars in Uganda her family fled the Luwero district where she was born and moved to the Mukono district, where she grew up. She is married with one girl and one boy.

Rebecca obtained her Bachelor of Science honors degree (second upper division) in 2000 in physics, mathematics and education at Makerere University in Kampala, Uganda, and in 2007 began work on her Master of Science degree in medical physics at the University of the Witwatersrand in Johannesburg, South Africa.

Medical physics is an applied branch of physics concerned with the application of concepts and methods of physics to the diagnosis and treatment of human disease. In her research, Rebecca is helping in the design and commissioning of a 3D manual missing tissue compensator cutter. Many cancer patients who require external beams in radiotherapy (such as breast cancer patients) present irregular surface topographies and tissue inhomogeneities during treatment, and this can lead to non-uniformity of the radiation dose in the treatment field. The use of missing tissue compensators during such treatments is therefore of great importance to achieve proper dose distribution. One-dimension and two-dimension missing tissue compensators can be used but they have limitations, while 3D compensators are the most effective but are currently fabricated using expensive automated systems. The objective of Rebecca's research is to commission a 3D manual missing tissue compensator cutter that can be used to cheaply and manually fabricate 3D missing tissue compensators that can be used during external beam radiotherapy to optimize radiation dosages in such irregular surface topographies.

When she obtains her master's degree, Rebecca intends to pursue a doctorate and eventually to return to Uganda to teach at Makerere University.

Maryia NUDNOVA

Home Country
Republic of Belarus

Degree
PhD in Plasma Physics

Expertise
Physics

Research Focus
3D Investigations of Pulsed
Discharge for Ultra-Fast
Plasma Control

Host University
The Ohio State University,
United States

Fellowship Awarded
2007

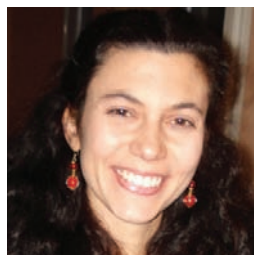


Maryia Nudnova was born in Minsk, capital of the Republic of Belarus, where at an early age she became interested in science. She eventually landed a job working in the Department of Physics and Cosmic Research at the Moscow Institute of Physics and Technology.

While studying for her PhD in plasma physics at The Ohio State University in the United States, Maryia has co-authored numerous academic papers and regularly attends international conferences. In her research on plasma physics, she works with nanosecond pulse discharges and does experimental investigations of streamer discharge and sliding DBD discharge.

In her current research Maryia is using three-dimensional numerical and experimental investigations of pulse discharges for ultra-fast plasma control of boundary layer separation in aerodynamic applications. When air flows over the wing of an aircraft, a thin layer of undisturbed air called the boundary layer flows smoothly across much of the wing's surface. At the separation point, however, the boundary layer breaks away from the surface of the wing, creating additional drag. This abrupt flow separation can have disastrous effects on the aerodynamic characteristics of an aircraft wing. Maryia is working to develop devices that can rapidly change the position of the separation point. If she is successful, her research will result in more efficient airplane wings.

After she obtains her PhD, Maryia plans to teach and to continue with her first love, research, at the Moscow Institute of Physics and Technology.

Maria Laura PEDANO**Home Country**
Argentina**Degree**
Post-Doctorate in Interdisciplinary
Chemical Sciences**Expertise**
Biosensors and Nanotechnology**Research Focus**
Using Biosensors to Detect
Chagas' Disease**Host University**
Northwestern University,
United States**Fellowship Awarded**
2007

Maria Laura Pedano was born in San Salvador de Jujuy in Argentina. She grew up in the bosom of a large family as the eldest of her two sisters and brother.

She attended the National University of Córdoba, where she obtained her bachelor's degree in chemical sciences in 2000 and her doctorate in 2006, and where she also worked as a teaching assistant throughout her studies.

In 2006 she won the Enrique Herrero Doucloux Award from the Argentinean Chemical Association for best doctoral thesis in physical chemistry. She was offered a post-doctoral position at Joseph Fourier University in Grenoble, France in 2007. In 2008 she was able to carry out post-doctoral research under Prof. Chad Mirkin, the most-cited scientist in nanotechnology, at Northwestern University in the United States.

Her post-doctoral research focused on developing DNA-based biosensors to detect Chagas' disease in its early stages. Her innovation was to use gapped metallic nanorods as Raman scattering "hot spots" and nanoelectrodes attached to microchips for simultaneous spectroscopic and electrical detection. These nanorods enabled her to study different ways to modify the gap with a probe sequence that allows selective binding of the analyte to achieve more sensitive detection limits. Her research is helping to develop biosensors with enough sensitivity to detect the presence of an infectious agent in the latency stage of Chagas' disease, which will improve the efficiency of therapeutic treatments and quality of life for patients. Chagas' disease affects 13 million people and causes 500,000 deaths annually.

She has returned to Argentina and is teaching at the National University of Córdoba. She has also been admitted to the National Council of Scientific and Technologic Research (CONICET) as Associated Researcher.

Sujata RAY**Home Country**
India**Degree**
Post-Doctorate in Earth Sciences**Expertise**
Civil and Environmental
Engineering**Research Focus**
Carbon Dioxide Storage
in Deep Saline Aquifers**Host University**
University of Cambridge,
United Kingdom**Fellowship Awarded**
2007

Sujata Ray was born and raised in Kolkata, India, where she met her husband as an undergraduate student. She loves mountains, particularly the Himalayas.

Sujata completed her PhD in the Department of Civil Engineering at Princeton University and worked as a post-doctoral researcher in the BP Institute at the University of Cambridge in the United Kingdom. She was then appointed assistant professor at the Indian Institute of Technology in Guwahati before joining the Indian Institute of Science Education and Research in Kolkata.

During her post-doctoral studies she worked on the sequestration of carbon dioxide in deep saline aquifers and the possibility of injecting carbon dioxide into the subsurface as a supercritical fluid. The capture and sequestration of carbon dioxide in underground aquifers is a possible means of mitigating climate change due to anthropogenic emissions. However, a risk assessment is necessary to determine whether the injected carbon dioxide will remain in the subsurface or if it will find its way out through fractures in the underground rock. Sujata conducted experiments and mathematical analysis to determine the possible flow rates of the injected fluid and the likelihood of its escape through fractures in the subsurface.

Sujata is interested in studying the potential impact of climate change in developing and emerging economies where few studies have been carried out to date. She plans to investigate the effect of climate change on water resources in India, where the source glaciers of its freshwater rivers are steadily receding. As India is vulnerable to fluctuations in its water resources, Sujata believes that further research in this area is key to helping the country adapt to a changing climate.

Sujata is now an assistant professor in the Department of Earth Sciences at the Indian Institute of Science Education and Research in Kolkata.

Maria Isabel ROCHA GASO

Home Country
Mexico

Degree
PhD in Bioelectronics Engineering

Expertise
Electronics Engineering

Research Focus
Surface Acoustic Wave
Microsensors for Biosensing

Host University
Polytechnic University
of Valencia, Spain

Fellowship Awarded
2007



Maria Isabel Rocha Gaso comes from a family of scientists. Her mother has a PhD in biology, her father is a nuclear physicist, and her younger brother is pursuing a PhD in cosmology at the University of California in the United States. Maribel, as everyone calls her, says family influence is probably the reason why she is extremely interested in science and research.

Maribel obtained her Diplome d'Etudes Approfondies (DEA) in June 2009 at the Polytechnic University of Valencia (UPV) in Spain, and she is currently working on her PhD thesis at the same university. Her work in bioelectronics at UPV is focusing on the application of surface acoustic wave (SAW) devices as biosensors.

SAW devices work with the perturbation of an acoustic wave as the detection mechanism. Biosensors are a subgroup of chemical sensors in which a biological base mechanism is used for detection of a specific analyte. Thus, biosensors require multidisciplinary knowledge in a diverse range of subjects such as physics, biochemistry, materials science and electronics.

These days, biosensors are generating a great deal of attention because they are specific, fast, reliable, easy to use and sensitive when it comes to measuring environmental values. It is expected that in the future the demand for this kind of device will increase, mostly in the medical and health industries.

When she finishes her studies, she plans to be a teacher at the National Autonomous University of Mexico.

Anna Petrovna SEMIENOVA

Home Country
Russia

Degree
Post-Doctorate in
Petroleum Engineering

Expertise
Petroleum Engineering

Research Focus
Mathematical Model
of Compositional Multi-
Segment Wells

Host University
Stanford University, United States

Fellowship Awarded
2007



Anna Semenova was born in a small mountain village in Russia but moved to Moscow after her father died. The oldest child in her family, she has one brother and one sister.

In 2001, she graduated from the Russian State Geological Prospecting University in Moscow with a Master of Science degree in applied mathematics in geophysics. In 2006 she obtained her PhD in mathematics and physics from the same institution. While still a student, Anna began working in 1998 as a researcher in the Laboratory of Geothermic Problems of her home university, and then as an assistant lecturer.

At the end of 2007 she joined the Department of Energy Resources Engineering at Stanford University in the United States as a postdoctoral scholar. At Stanford she is developing a compositional model for multi-segment wells. Her model is helpful for understanding processes that exist in oil, gas and water reservoirs and wells, particularly in the presence of multi-phase, multi-compositional fluid flow. Her research focus includes mathematical modeling of heat and mass transfer processes in production and injection wells, oil and gas reservoirs, drilling in permafrost areas, and applied geothermics.

Since oil and gas are the most important sources of energy in the modern world, and resources are limited, it is important to develop better extraction methods. Anna's work will lead to optimization of oil and gas production, decreasing expenses for oil and gas production, and development of new types of unconventional oil and gas reservoirs such as gas hydrates and heavy oil.

Her mathematical models are also applicable for modeling of geothermal wells, and they could be used for the development of other alternative sources of energy.

When she returns to her home country, Anna plans to teach at the Russian State Geological Prospecting University in Moscow.

Olga Ermak SHAMARDINA**Home Country**
Russia**Degree**
PhD in Polymer Physics**Expertise**
Computer Engineering**Research Focus**
Computer Models for High-Temperature Proton-Exchange Membrane Fuel Cells**Host University**
Centre for Solar Energy and Hydrogen Research, Baden-Württemberg, Germany and Institute of Energy Research IEF-3 – Fuel Cells Research Centre, Jülich, Germany**Fellowship Awarded**
2007

Olga Shamardina was born in Uzhhorod, Ukraine and with her two younger sisters spent her childhood in Elektrostal, a town near Moscow. Olga's mother graduated from Moscow State University and her father graduated from Moscow Engineering Physics Institute. She is married to a research associate whose specialization is high-energy physics and GRID-computing.

A PhD student at Moscow State University, Olga has completed a training program at the Centre for Solar Energy and Hydrogen Research Baden-Württemberg in Ulm, Germany and Institute of Energy Research in the Fuel Cells Research Centre in Jülich, Germany. Her research interests include statistical physics of macromolecules, computer simulations of polymer systems, proton exchange membrane fuel cells, numerical methods, algorithms and hydrogen energetics. She is studying fuel cell theory and creating computer models for high-temperature proton-exchange membrane (PEM) fuel cells.

Fuel cells are attracting increased attention within the scientific community as well as within industry. This is because fuel cell power generators are considered to be environmental friendly, with only water vapor emissions, and because the efficiency of fuel-cell-driven power plants is higher compared to power plants driven by combustion engines. As well, many fuel-cell systems are almost silent. High-temperature PEM fuel cells have certain advantages over conventional PEM fuel cells, including their tolerance to impurities in hydrogen fuel and unnecessary water management. At the same time, they still have several unsolved engineering problems, including a lack of models for high-temperature PEM fuel cells. Olga's computer model simulations may help our understanding of the processes occurring at different stages of the fuel cell operation and eventually may help overcome these engineering challenges.

Olga plans to continue teaching and researching at Moscow State University.

Banafsheh ZAHRAIE**Home Country**
Iran**Degree**
Post-Doctorate in Operation Optimization of Multi-Reservoir Systems**Expertise**
Water Resources Engineering and Management**Research Focus**
Evolutionary Computing in Water Engineering**Host University**
University of Tehran, Iran**Fellowship Awarded**
2007

Banafsheh Zahraie lives in Tehran, Iran. Her parents motivated and fully supported her educational aspirations. She is married and also receives a great deal of support from her husband.

Banafsheh received her undergraduate, graduate and doctoral degrees in civil engineering from the School of Civil and Environmental Engineering at Amirkabir University of Technology (Tehran Polytechnic). Since 2002 she has been teaching in the School of Civil Engineering at the University of Tehran. An expert in water resources planning and management, during the past 15 years she has been involved in more than 25 applied research projects related to water resources planning and management.

In 2007 Banafsheh began a one-year post-doctoral research program at the University of Tehran. She has developed a methodology for applying an Adaptive Management (AM) approach to reservoir operation management. For this work she used a Varying Chromosome Length Genetic Algorithm (VLGA) model. In the AM approach she developed, the initial solutions for each year of the planning horizon were selected based on the similarity in hydrologic characteristics of different years. Application of this methodology to three case studies in Iran has shown a significant improvement in reduction of computation efforts of the GA model. In her post-doctoral research, this model was further developed to be stochastic. Also, the search and selection methods for the initial solutions were developed to increase the convergence speed of the model.

After finishing her post-doctorate, Banafsheh began teaching in the School of Civil Engineering at the University of Tehran. She was promoted to associate professor in 2008. In 2009 she took a sabbatical leave as a visiting professor at the University of Illinois at Urbana-Champaign, where she developed a fast genetic algorithm model for shared memory parallel computing with applications for reservoir operation management.

FELLOWS 2006

Zakia ABIDI**Home Country**
Algeria**Degree**
PhD in Magnetic Resonance
Imaging**Expertise**
Bioengineering**Research Focus**
Development of Antennas
in Magnetic Resonance Imaging**Host University**
University of Paris Sud, France**Fellowship Awarded**
2006

Zakia Abidi is the fourth child in her family and the second girl. She is married to a professor of bioengineering with whom she has published a number of papers at international conferences, and they have one child.

Her PhD research on numerical modeling of surface antennas used in magnetic resonance imaging is in joint cooperation with the Medical Magnetic Resonance Research Unit at Paris XI University and the National Polytechnic School of Algiers (ENP). Her work is helping define ways to make medical images more perfect.

Using mathematical models of magnetic resonance medical imagery, Zakia hopes to come up with a more realistic way to deliver signals during the relaxation phase of MRI scanning. After conducting analytical calculations on the capacitive and inductive effects between a toric antenna and a spherical body, she became interested in numerical modeling utilizing physical and space data systems—the geometry of the body. She explores dimensions, geometrical form and electromagnetic characteristics of the reception antenna—the distance between the antenna and the body to be explored. Among the issues she is working to address, the problem of the signal/noise ratio as interpreted by curves and layout of the lines in an electromagnetic field is of pressing concern. The antenna that catches the signal and sends the image introduces this digital noise. Her work helps to show the share of influence of each electromagnetic and geometrical parameter of the system. She is building an experimental device that attempts to use different antenna shapes to compare experimental measurements with results obtained using numerical computations. These results will ultimately, she hopes, improve the quality of the image by optimizing physical and space data systems, thus reducing the digital noise.

Zakia plans to teach at the University of Sciences and Technology Houari Boumediene in Algiers. Her dream is to combine research and teaching.

Ifeyinwa Eucharia ACHUMBA**Home Country**
Nigeria**Degree**
PhD in Electronic
and Computer Engineering**Expertise**
Computer Engineering**Research Focus**
Virtual Laboratory and
Applied Artificial Intelligence**Host University**
University of Portsmouth,
United Kingdom**Fellowship Awarded**
2006

Ifeyinwa Eucharia Achumba is a tenured academic staff member in the Department of Electrical and Electronic Engineering at the Federal University of Technology, Owerri (FUTO) in Nigeria and a student member of the Institute of Electrical/ Electronic Engineers (IEEE).

At the University of Portsmouth in the United Kingdom, where she is studying for her PhD degree in electronic and computer engineering, her research focus is on the development of virtual laboratories and applied artificial intelligence, with preference for probabilistic graphical models and their applications in reasoning and learning.

Ifeyinwa's goals include becoming a professor of computer engineering. She hopes to contribute to producing graduate entrepreneurs and industry-ready graduates, and she is interested in promoting a workable industry/academia partnership in Nigeria. Ifeyinwa also contributes positively toward promoting and encouraging female enrolment and participation in science and engineering education and practice.

Marcia BRAGATO

Home Country
Brazil

Degree
Post-Doctorate in Metallurgical
and Materials Engineering

Expertise
Materials Engineering

Research Focus
Hazardous Waste
Treatment and Management

Host University
Northeastern University,
United States

Fellowship Awarded
2006



Marcia Bragato was born in a small Brazilian city, Arco-Iris, which means “rainbow.” An only child, she and her cousin were the first in her family to attend university. After moving to Sao Paulo in Brazil she became environmentally aware while witnessing first-hand the pollution in nearby Cubatao, which at that time was considered to be one of the most polluted cities in the world.

Marcia graduated from the University of Sao Paulo with her master’s degree in organic chemistry in 2000 and her PhD in materials engineering in 2006, then entered a post-doctoral program in metallurgical and materials engineering at Northeastern University in the United States.

She began her research career in a multidisciplinary group looking at hazardous waste treatment and management. She developed methods to remediate soil contaminated by hydrocarbons and metals using the conceptual limitation that these methods could not leave harmful residues or use harmful chemicals in the process. Her post-doctoral research focus was also on hazardous waste management. She looked at ways of developing low-cost techniques to transform waste in products into energy and other useful products. She also studied the use of green chemistry principles to develop less-harmful processes for producing materials (everything from chemicals to new industrial or consumer products). In addition, because gaseous emissions are a difficult-to-control byproduct of almost every waste treatment system, she investigated ways to better control biomass combustion emissions.

Marcia is now investigating ways to reduce or reuse residues at a government technological center, Instituto Federal de Ensino Superior do Espírito Santo (IFES) in Vitoria, Brazil. Vitoria has a strong mining and metallurgical industry and is suffering environmental impacts. She is also looking for a permanent position at colleges or universities located in Vitoria or nearby.

Ova CANDRA DEWI

Home Country
Indonesia

Degree
PhD in Environmental Science

Expertise
Solid Waste and
Urban Management

Research Focus
Municipal Solid
Waste Management

Host University
Hamburg University
of Technology, Germany

Fellowship Awarded
2006



Ova Candra Dewi is a scholar, planner, environmental activist, wife and mother.

Ova has been studying urban and environmental issues since she began her academic career at the University of Indonesia (UI). She received her undergraduate degree in architecture from the Faculty of Engineering Department of Architecture in 2003. From 2003 to 2007 she was a member of the junior teaching staff in the Department of Architecture.

Ova finished her master’s degree at Urban Management TU-Berlin, Germany in 2009. During her studies she did practical research concerning waste management with Berlin City Cleansing and GTZ southeast Asia division by conducting an impact assessment of the Clean Development Mechanism (CDM) of a waste management scheme in Semarang, Indonesia.

Following this work she is now focusing on solid waste management in developing countries, especially her home country, Indonesia. She is developing a low-carbon eco-city model specifically from the contribution of the waste sector, or the so-called Decision Support Tool on Integrated Waste Management System. An integrated study coupling various disciplines (waste management, urban management and environmental policy), in this study she is focusing on waste as a resource material, including waste-to-energy and the potential of waste in adapting to climate change.

Ova feels lucky to have another opportunity to continue her studies in this field, and she believes that there is the potential for her research to help in making a better world. She hopes to form a research group for women on the topic of municipal solid waste in Indonesia, and to create a waste museum for children. Moreover, she intends to arrange an introductory waste separation course for primary schools in Indonesia.

Carina COLOMBI**Home Country**
Argentina**Degree**
Post-Doctorate in Geology
and Paleontology**Expertise**
Geology**Research Focus**
Past Climate Change
in Continental Basins**Host University**
University of California
Davis, United States**Fellowship Awarded**
2006

Carina Colombi was born the youngest of three siblings (she has one sister and one brother) in Mendoza Province, Argentina. She says her family members always provided unconditional support and inspired her love of the Andes Mountains.

After earning an undergraduate degree in geology at San Juan University in Argentina, she graduated with a bachelor's degree in 2001 while earning a First Honor award and special distinction as the best student in the geology department. She obtained her PhD in geology in 2007.

After finishing her post-doctorate project with researchers at the University of California Davis, Carina joined the research staff at Consejo Nacional de Investigaciones Científicas y Técnicas de Argentina (CONICET). In addition, she is advising two PhD students and working to develop a small museum in San Juan province. Carina is embarking on an even more exciting challenge as the mother of an infant daughter who is already out enjoying geological fieldwork.

The focus of Carina's research is the sedimentology, stratigraphy, geochemistry and paleo-vertebrate and plant taphonomy of continental basins, about which she is attempting to interpret past environmental, ecological and climatic changes. Her research efforts have involved early-Mesozoic basins in South America. Little is known about the paleo-climatology and paleo-ecology of that part of Pangaea, the supercontinent that existed during the Paleozoic and Mesozoic eras about 250 million years ago, before the continents were separated into their current configuration. By comparing stable isotope values of the paleoatmosphere preserved in fossils, Carina is seeking to understand how past climatic changes might have consequences for life on Earth today.

Carina plans to continue teaching at the University of San Juan.

Alia DAMAYANTI**Home Country**
Indonesia**Degree**
PhD in Environmental Engineering**Expertise**
Environmental Engineering**Research Focus**
Wastewater Treatment**Host University**
Technological University
of Malaysia**Fellowship Awarded**
2006

Alia Damayanti was born in Jombang and grew up in Surabaya, Indonesia. The youngest in her family, she has two brothers and one sister. She lists her hobbies as reading and listening to music. Alia and her husband have one daughter.

Alia's parents supported her studies—her mother taught her to read when she was only five years old and maintained a rigorous study and work ethic. After graduating in 2000 with an undergraduate degree in environmental engineering from the Technology Institute of Sepuluh Nopember (ITS) in Surabaya, Alia obtained her master's degree in environmental engineering at ITS in 2003. In December 2006 she became a PhD student conducting full-time doctoral research at the Technological University Malaysia (UTM) in Johor Bahru, Malaysia.

Her research focus is on wastewater treatment. She has studied the feasibility of using water lettuce for the management of tofu wastewater, the environmental impacts of closing a landfill site, and the influence on tiger shrimp and milk fish of using mangrove density to reduce heavy metals in wastewater. She is currently interested in developing a Hybrid Membrane Bioreactor (MBR) for biotransformation of palm oil mill effluent (POME).

POME has highly organic wastewater (up to 40 gL⁻¹ compared to sewage which has 2 gL⁻¹) and it contributes significantly to the generation of wastewater in Indonesia and Malaysia. Membrane bioreactor technology is considered essential for treating POME, and systems based on membrane technology show high potential for eliminating many environmental problems. In addition, membrane bioreactor technology proved useful as an alternative treatment system for water recycling with up to 99 percent chemical oxygen demand (COD) removal efficiency.

When she completes her studies, Alia plans to return home to teach at the Technology Institute of Sepuluh Nopember in Surabaya, Indonesia.

María Verónica D'ANGELO

Home Country
Argentina

Degree
Post-Doctorate in Transport of Particles and Fibers in Porous Media

Expertise
Physics

Research Focus
Transport of Particles and Fibers in Porous and Fractured Media

Host University
University of Paris Sud II, France

Fellowship Awarded
2006



María Verónica D'Angelo was born in Buenos Aires, Argentina and grew up in Bolivia and Peru before returning with her family to Argentina, where she graduated from high school. Married with a child, she enjoys cooking and travelling (especially hiking and trekking) and fly fishing in the awesome Patagonia.

Now a full-time faculty member at the University of Buenos Aires, she also teaches in the Master of Reservoir Engineering (Instituto del Gas y del Petróleo-UBA). She is also a researcher of the National Council of Scientific and Technological Research in Argentina, and a member of the International Laboratory (LIA) Fluid Mechanics Laboratory (Argentina-France)

While pursuing her Licenciatura degree (similar to a master's degree) in physics at the University of Buenos Aires, she wrote her thesis on reaction-diffusion systems, focusing in particular on the coexistence of patterns in different toy models. She worked for two years on electro-deposition in planar cells under AC voltage, and her doctoral thesis, entitled "Flow of Macromolecular Solutions in Porous Structures," dealt with particular retention phenomena in porous media and the effect of the rheology of polymer solutions on flow in a 2D porous medium.

After receiving her PhD in physics in 2005 from the University of Buenos Aires, in 2006 María Verónica began post-doctoral research on the transport of particles and fibers in porous and fractured media in the Laboratory of Fluids in Automatic and Thermal Systems (FAST) at the University of Paris Sud II.

Working in the FAST laboratory, she studied the effect of structural features of fluid and media, and the properties of the pore surface on the pore-fluid interactions. She was also interested in the transport of contaminants in heterogeneous systems, and in the development and evaluation of remediation technologies.

Dyah Ekashanti Octorina DEWI

Home Country
Indonesia

Degree
PhD in Biomedical Engineering

Expertise
Image Processing and Analysis

Research Focus
3D Ultrasound Imaging

Host University
University of Groningen, The Netherlands

Fellowship Awarded
2006



Dyah Ekashanti Octorina Dewi was born and raised in Surabaya, Indonesia. She comes from a traditional Javanese family which retains strong cultural values, although education has always been a priority in her family.

Following high school Dyah studied informatics at STT Telkom in Bandung, where she obtained a bachelor's degree followed by a master's degree in electrical engineering from Bandung Institute of Technology (ITB). With full support from her parents she is now a doctoral student in biomedical engineering at the University of Groningen in The Netherlands, working on the development of an image analysis and visualization system to determine the 3D geometry of the spine of scoliotic patients.

Her interest in biomedical imaging applications was inspired by previous projects on osteoporosis screening and MRI phase unwrapping. In her current work she utilizes 3D ultrasound imaging of the spine of scoliotic patients to allow medical practitioners to follow scoliosis progression during treatment.

Scoliosis is a three-dimensional deformity of the spine. When the degree of spinal curvature increases to extreme levels it can significantly decrease quality of life. Because scoliosis progression requires frequent observation during treatment, ultrasound imaging is proposed for this to present a radiation-free observation with 3D representation of the spine.

In her research Dyah is concentrating on defining a new framework to generate 3D spinal features. This approach is expected to allow medical practitioners to follow the progression of scoliosis more frequently and accurately. Dyah hopes her research will help orthopedic surgeons monitoring the progression of scoliotic patients decide the best treatment.

When she finishes her studies, Dyah plans to apply for a teaching position at Bandung Institute of Technology in Indonesia.

Maria Jose FIGUEROA**Home Country**
Colombia**Degree**
PhD in Science Education**Expertise**
Science Assessment**Research Focus**
Science Assessment
of Students' Learning**Host University**
Stanford University,
United States**Fellowship Awarded**
2006

Born and raised in Bogotá, Colombia, Maria Figueroa obtained her undergraduate degree in biology from University of the Andes in 2000 and her master's degree in science education from Columbia University in New York, United States in 2004.

She then worked for five years with Pequeños Científicos, an inquiry-based science education program that trains teachers in methodologies for teaching science in public schools. She also taught a course in science education at the University of the Andes in Bogotá for several semesters.

Maria is pursuing her PhD in science education at Stanford University. Her research interest lies in science assessment of students' learning. In her dissertation she is assessing students' science achievement using different measures. Through this work, she hopes to understand the best methodologies to teach science and to inspire children in scientific realms.

Currently in Colombia, where she did her data collection, Maria is now teaching at the University of the Andes. She teaches a Foundations of Science, Technology, Engineer and Mathematics course, as well as an educational assessment course. She is also advising the Colombian Assessment Institute on how best to modify science assessment in her country.

Ibiyinka FUWAPE**Home Country**
Nigeria**Degree**
Post-Doctorate in Physics**Expertise**
Physics**Research Focus**
Mechanisms of Information
Encoding in Oscillatory
Sensory Cells**Host University**
Ohio University, United States**Fellowship Awarded**
2006

Ibiyinka Fuwape has a doctorate in physics and was the first female to obtain a first-class degree in physics from any university in her home country, Nigeria. Married with three children, she has three sisters and loves to bake and decorate cakes, sing, teach and spend time with her family.

After obtaining all her degrees from the University of Ibadan in Ibadan, Nigeria, she became a faculty member at The Federal University of Technology, Akure and served on many university committees.

Ibiyinka recently concluded post-doctoral research in physics at Ohio University in the United States, where she focused her research on oscillations and noise in information processing in sensory nervous systems using the electro-receptors of the paddlefish. The electro-receptors of some aquatic animals, including the paddlefish, sharks and rays, possess spontaneous active noisy quasi-periodic oscillations, but the function of the spontaneous oscillations in these aquatic animals is not yet understood. However, the morphology of these electro-receptors is similar to the senses of balance and sound in humans.

Ibiyinka's goal is to understand the mechanisms of information encoding in the oscillatory sensory cells she is studying. The results of her research will provide insight into the mechanisms of encoding information in the auditory and vestibular sensory receptors of vertebrates including human beings.

After concluding her post-doctoral studies Ibiyinka returned to her faculty position at The Federal University of Technology, Akure in Nigeria, where she is actively participating in mentoring young women in science.

Jane GORE

Home Country
Zimbabwe

Degree
Post-Doctorate in Seismology

Expertise
Geophysics

Research Focus
3D Mapping of Crustal Discontinuities Under the Zimbabwe Craton

Host University
University of the Witwatersrand, South Africa

Fellowship Awarded
2006



Jane Gore was born in Goromonzi, Zimbabwe and attended high school in the eastern city of Mutare. Her family includes one sister and four brothers.

Jane obtained her physics degree with honors from the University of Zimbabwe in 1994 and her master's degree in exploration geophysics in 1997. She obtained her PhD in seismology from the University of Zimbabwe and Carnegie Institution for Science in the United States in 2005.

Jane's post-doctoral research focus is on the crustal and uppermost mantle crustal structures of the Earth's surface in Zimbabwe. She is looking at the craton and Limpopo Belt using tele-seismic receiver function and Rayleigh surface wave analyses. The aims of her PhD research were to obtain a three-dimensional "map" of the depth and character of the Moho and any other major crustal discontinuities beneath the Limpopo Belt and the Zimbabwe craton. This map was intended to determine crustal and uppermost mantle velocities.

Mapping the deep crustal and uppermost mantle configuration of the Zimbabwe craton and its contact with the Northern Marginal Zone sheds light on the movements between the craton and the Northern Marginal Zone.

Jane also used Poisson's ratio to estimate the average rock composition of the crust beneath the different geologic terrains. This structural and compositional information may benefit the mining sector as this craton may be rich in kimberlite-borne diamonds. The full interpretation of the seismic data has the potential to reveal much about Archaean, Proterozoic and Phanerozoic tectonics in southern Zimbabwe and may help in our understanding of the evolution of the Earth.

Jane is currently working as a lead analyst at the Comprehensive Test Ban Treaty Organisation (CTBTO) in Vienna, Austria.

Ismudiati Puri HANDAYANI

Home Country
Indonesia

Degree
PhD in Optical Condensed Matter Physics

Expertise
Physics

Research Focus
Spin and Polarization Dynamics in Multiferroics and Frustrated Systems

Host University
University of Groningen, The Netherlands

Fellowship Awarded
2006



Ismudiati Puri Handayani was born a first child in Magelang, Indonesia. After spending her childhood in a small village, her mother, an elementary school principal in the region, sent her to the city for a better education.

After finishing high school she moved to Yogyakarta to study at Gadjah Mada University, where she earned a scholarship that enabled her to continue studying after her mother passed away. Upon finishing her undergraduate degree in physics in 1999, she moved to Bandung and began working as a physics teacher in Telkom Institute of Technology. In 2004 she obtained a master's degree at Groningen University in The Netherlands, where she is currently a PhD student in the Zernike Institute of Advanced Materials.

Working as a member of the Optical Condensed Matter Physics Group, Puri is seeking to understand the interaction of light with matter in complex oxide. Currently she is focusing on frustrated and multiferroic systems and on charge-orbital order systems. Her aim is to understand and control the state of these systems including magnetization and polarization under conditions of photoexcitation disturbance. In systems where the interplay between charge, spin, and lattice is strong, we may expect to understand the dynamics of each degree of freedom as well as the coupling between them by disturbing one of them. This property has triggered much scientific interest in the reasons behind the phenomena and its potential application for magneto-electric based devices. Puri is working to understand the fundamental aspects of these intriguing phenomena. To do this she deploys optical spectroscopy and, particularly, time-resolved spectroscopy.

Currently in the final stages of her PhD studies, Puri plans to teach at Telkom Institute of Technology in Bandung and to continue her work in optical condensed matter.

Chieze IBENECHÉ**Home Country**
Nigeria**Degree**
PhD in Physics**Expertise**
Biophysics**Research Focus**
Organization of Cytoplasm in Cells**Host University**
The University of Texas
at Austin, United States**Fellowship Awarded**
2006

Chieze Ibeneche was born in Lagos, Nigeria. She and her two brothers and two sisters spent much of their childhood in The Netherlands before returning to Nigeria, where she graduated from high school. She says this varied upbringing gave her an appreciation for other cultures, as well as for her own heritage.

Her father, an electrical engineer, encouraged her interest in science. As a child she played with microscopes, chemistry sets and circuit boards, and the family engaged in scientific discourse at the dinner table. She enrolled in physics after an online career search and received her Bachelor of Science degree in 2003 and her master's in physics in 2007, both from The University of Texas at Austin, where she is also enrolled in doctoral studies.

Her research focuses on the organization of cytoplasm in cells. Cytoplasm mediates important cellular functions such as intracellular transport, cell communication and cell motility. Using fission yeast as a model for human cells, Chieze has discovered that the cytoplasm of these cells undergoes a phase transition that may have important implications for cancer research.

Depending on external control parameters, the cytoplasm can be in a fluid-like state or, when grown in nutrient-deficient conditions, it can enter a solid-like state and may even be completely immobilized. She believes that in response to extreme conditions of nutrient deficiency the cell may reorganize its cytoplasm to place itself in a state of dormancy. The results of her experiments are of particular interest in the field of cancer research, since it suggests that cells may have a self-programmed mechanism to prevent them from completing a cycle – and this may be a way of controlling the rate of cell reproduction.

When she completes her studies in the United States, Chieze plans to teach at the African University of Science and Technology in Abuja, the capital of Nigeria.

Hilda ISMAIL**Home Country**
Indonesia**Degree**
PhD in Organic Chemistry**Expertise**
Chemistry**Research Focus**
Enzymatic Resolution
of Chiral Amines**Host University**
Delft University of Technology,
The Netherlands**Fellowship Awarded**
2006

Hilda Ismail was born and raised in Indonesia, where she obtained her undergraduate and graduate degrees in pharmacy from Gadjah Mada University. From 1993 to 2000 she taught organic chemistry and drug synthesis in the Department of Pharmacochimistry at Gadjah Mada University, and she is a member of the Indonesian Pharmacist Association.

During her undergraduate studies Hilda's research interest involved the production of erythromycin, and her master's thesis focused on isolated tracheal smooth muscle relaxation. In 2007 she completed her PhD at Delft University of Technology in The Netherlands, where her research focused on the enzymatic resolution of chiral amines.

Amines are organic compounds that contain a basic nitrogen atom with a lone pair, and they are derivatives of ammonia. Important amines include amino acids, biogenic amines, trimethylamine and aniline.

The term chiral refers to an object that is non-superposable on its mirror image. Human hands, for example, are generally recognized as examples of chirality – the left hand is a non-superposable mirror image of the right hand. No matter how the two hands are oriented, it is impossible for all the major features of both hands to coincide.

When used in the context of chemistry, chirality refers to two mirror images of a molecule that cannot be superposed onto each other. Hilda's work with enzymes to resolve chiral amines may have important applications in inorganic chemistry, organic chemistry, physical chemistry, biochemistry and supramolecular chemistry.

Hilda is now conducting research and teaching organic chemistry and organic synthesis in the Faculty of Pharmacy at the University of Gadjah Mada in Yogyakarta, Indonesia.

Lindsay LINZER

Home Country
South Africa

Degree
Post-Doctorate in Geophysics

Expertise
Geophysics

Research Focus
How Rock Fractures Around
Underground Excavations

Host University
University of the Witwatersrand,
South Africa

Fellowship Awarded
2006



Lindsay Linzer was born in Windhoek, Namibia as the eldest of four children. Her father worked as an exploration geologist and her mother trained as a nurse. Lindsay is married to an Austrian from South Africa who she thanks for her rhyming name.

A geophysicist with 15 years of experience, Lindsay is a proficient Delphi programmer with well-developed English-language technical reporting and research project management skills. She is also a guest lecturer in mining seismology in the School of Geosciences at the University of the Witwatersrand in Johannesburg, South Africa. Recently, Lindsay has been co-supervising MSc and PhD candidates in geophysics.

Lindsay's doctoral research was focused on developing a robust method to calculate from wave recordings how rock fractures around underground excavations. To achieve this, she wrote a computer program to compute a quantity called the seismic moment tensor. The program analyzes recordings of vibrations (seismic waves) generated when rock rips or tears apart as a result of mining-induced stresses. The main aim of this work was to gain insight into the source mechanisms of seismic events recorded underground, thus enabling mining engineers to design safer excavations. In 2003 her PhD thesis was awarded the Rocha Medal for outstanding doctoral thesis worldwide by the International Society for Rock Mechanics (ISRM). As well, she was awarded the Salamon Award for the best rock engineering paper authored by a member of the South African Institute of Rock Engineering (SANIRE).

In 2007, Lindsay co-founded a geophysical consultancy specializing in the interpretation of seismic reflection data recorded in the hard rock environment. She also works in the field with seismic acquisition crews, helping with preliminary data processing. In 2008 she was a finalist for the Shoprite-Checkers Woman of the Year science and technology award.

Erees Queen MACABEBE

Home Country
Philippines

Degree
PhD in Physics

Expertise
Photovoltaics

Research Focus
Solar Cells and
Photovoltaic Modules

Host University
Nelson Mandela Metropolitan
University, South Africa

Fellowship Awarded
2006



Erees Queen Macabebe, known as Reese, is the youngest of three children. She grew up in Iloilo City in the Philippines.

Reese studied at the Ateneo de Manila University, earning Bachelor of Science degrees in physics and computer engineering. While at the Ateneo she joined a scholar's organization where she visited public schools and gave classes in math and English. This outreach effort sparked her passion for teaching. She then became a full-time faculty member in the Department of Physics while pursuing her master's degree in physics education.

In 2006, Reese pursued her PhD in physics at Nelson Mandela Metropolitan University in South Africa. Her work focused on photovoltaic devices, particularly on performance parameters of solar cells and photovoltaic modules. Solar cells are prone to parasitic resistance that can degrade device performance, as can low-shunt resistance. Series resistance losses are largely due to bulk resistance of the semiconductor material, metallic contacts and interconnect.

Reese's research involved numerical simulation and optimization. Employing well-known solar cell models, she developed a method using Particle Swarm Optimization that allows rapid parameter extraction from current-voltage measurements taken under operating conditions and under standard testing conditions. These parameters provide information about device properties and can be related to its performance. Her photovoltaic research is valuable in device fabrication and analysis of performance losses, which also has potential in developing clean energy systems that can help reduce carbon dioxide emissions.

Reese completed her doctoral studies in 2009 and returned to the Philippines where she rejoined the School of Science and Engineering at Ateneo de Manila University. She is currently an assistant professor in the Department of Electronics, Computer and Communications Engineering.

Radhika MADHAVAN**Home Country**
India**Degree**
PhD in Bioengineering**Expertise**
Bioengineering**Research Focus**
How Learning Modifies Neuronal Connections in the Brain**Host University**
Georgia Institute of Technology, United States**Fellowship Awarded**
2006

Radhika Madhavan was born the second of two daughters in New Delhi, India. She did most of her schooling in Baroda, India and finished her undergraduate degree in electronics engineering from The Maharaja Sayajirao University of Baroda, securing two gold medals for academic excellence.

She followed up with a Master in Technology degree in biomedical engineering from the Indian Institute of Technology in Mumbai, where she worked on a project funded by the Government of India to design an artificial hand for below-elbow amputees. In 2007 she obtained her PhD in bioengineering at the Georgia Institute of Technology in the United States. Radhika then began a post-doctoral fellowship at the National Center for Biological Sciences, Tata Institute of Fundamental Research, in Bangalore, India.

In Bangalore, her research on learning and memory draws on engineering rules, enabling her to bridge the gap between engineering and biology. Exploring the relationship between structure and function in the brain, Radhika is helping develop techniques to measure large-scale individual synaptic weights in hippocampal circuits using electrophysiology and optical imaging techniques.

The ultimate goal of her project is to map a functional wiring diagram of the brain. Specifically, she is looking at how learning modifies neuronal connections in the brain, and attempting to better understand the rules of information coding in brain networks. Her work will help answer key questions about how the brain works, and it may enable us to devise new treatments for disorders in learning and memory.

After three years in India, Radhika is now pursuing her second post-doctoral fellowship at Harvard University in the United States. Her work deals with studying learning and memory in humans using electrophysiology and psychophysics tools.

Dewi MAIRIZA**Home Country**
Indonesia**Degree**
PhD in Computer Science**Expertise**
Software Engineering**Research Focus**
Investigating Conflicts Among Non-Functional Requirements**Host University**
University of Technology Sydney, Australia**Fellowship Awarded**
2006

Dewi Mairiza was born and grew up in Padang, Indonesia. She is married with one daughter, Amare, which means love. Her hobby is dancing, especially traditional West Sumatera dancing.

After graduating from high school in Padang, Dewi was invited to enroll in the computer science program in the Faculty of Computer Science at the University of Indonesia in Jakarta, where she obtained her bachelor's degree and graduated cum laude.

During this time she won an education scholarship from German Academic Exchange Service (DAAD) for a one-year period of study. She was then offered a position at the University of Indonesia and joined the computer science faculty as a junior lecturer. In 2005 she obtained her Master of Science degree, following which she continued to conduct research in the Centre of Artificial Intelligence (CENTRIA) at the Universidade Nova de Lisboa in Portugal. In 2008 she began studying for her doctorate in the Faculty of Engineering and Information Technology at the University of Technology Sydney, Australia.

Dewi's research is focused on investigating conflicts among Non-Functional Requirements (NFRs). NFRs are recognized as a critical factor to the success of software projects. They address the essential issue of the quality of the systems. One of the characteristics of NFRs is interacting, which means NFRs tend to interfere, conflict and contradict with one other. Unlike functional requirements, this inevitable conflict arises as a result of inherent contradiction among NFRs. Certain combinations of NFRs in the software system may affect the inescapable trade-offs.

Dewi's research will develop a framework to manage the conflicts among NFRs. Such a framework should be able to identify not only the existence of conflicts, but also the type and significance of conflicts, as well as the appropriate strategy to resolve the conflicts. Her research may benefit the software engineering research community as well as practitioners in the industry.

Olive Modestine MAKAM KOM

Home Country
Cameroon

Degree
PhD in Medical Physics

Expertise
Medical Physics
in Radiation Therapy

Research Focus
Radiotherapy and Treatment
Planning Systems

Host University
Saarland University
Hospital, Germany

Fellowship Awarded
2006



Olive Makam Kom was born the second child in a family of six in Bafoussam, Cameroon. She grew up with her grandmother in a small village where she attended primary and high school.

Olive moved to Dschang to attend university in 1997, and obtained her bachelor's degree in physics in 2001. At the University of Yaounde in Cameroon she earned her master's degree in physics in 2002. After teaching general physics for one year in high school, she moved to Douala to study in the Centre for Atomic Molecular Physics and Quantum Optics (CEPAMOQ) at the University of Douala, where she earned a master's degree in medical physics in 2005. CEPAMOQ is a centre of excellence affiliated with the International Centre of Theoretical Physics (ICTP) in Trieste, Italy. She is conducting part of her PhD research at the Saarland University Hospital in Germany.

Olive's research focus is on radiotherapy, one of the most important modes of cancer treatment. Radiotherapy involves radiation-based treatment using sophisticated technology. She is particularly interested in helping develop a quality management program for Treatment Planning Systems (TPS).

A TPS is a computer dedicated to planning the radiation dose received by a patient. Most accidental exposures occur due to improper planning or to lack of commissioning or quality assurance procedures. Commissioning (initial testing) means all procedures, data input and verification checks that are needed to get the system ready for clinical use. It is also essential to maintain an ongoing quality management program which must not impose an unrealistic commitment on resources and time. Quality assurance procedures can prevent treatment errors and exposure of staff and can help ensure accuracy in the radiation therapy process.

Olive plans to teach at the University of Douala and to work in clinical medical physics practices in Douala.

Nur Ulfa MAULIDEVI

Home Country
Indonesia

Degree
PhD in Electrical Engineering

Expertise
Artificial Intelligence as
an Imitation of Human
Cognition Systems

Research Focus
Multi-Agents in Collaborative
Knowledge Building

Host University
Institute of Technology
Bandung, Indonesia

Fellowship Awarded
2006



Nur Ulfa Maulidevi was born and raised in Kediri, a small town in an East Java province in Indonesia. Her parents encouraged their five daughters academically and supported Nur Ulfa in her decision to move to Bandung to study informatics engineering at the Institute of Technology Bandung (ITB).

After obtaining her undergraduate degree in informatics engineering, she joined the Informatics Engineering Department of ITB as a junior assistant. She married her husband after obtaining her master's degree, and her son was born a year later. She started pursuing her doctorate in August 2004, and received her PhD in electrical engineering in June 2008, one month after she delivered her second child, a girl.

Working in the Artificial Intelligence Lab at ITB, Nur Ulfa is developing an engineering model of collaborative knowledge building that imitates the human cognition process. Based on the academic disciplines of cognitive psychology and computational science, her research is aimed at finding mechanisms to solve complex problems using computer resources. In cognitive psychology, artificial intelligence is studied as a model of the human cognition process. In computation science, artificial intelligence developed to imitate human intelligence is intended to support next-generation computing. When distributed in several computer processors, collaborative knowledge-building produces a collaborative computation that can help solve complex problems such as airport scheduling, job-shop scheduling in industries, and traffic light controllers to minimize traffic jams. It can also be implemented in systems that are designed to help cognitively impaired persons. Her work is contributing to the design of multi-agents in collaborative knowledge building that imitate the human cognition process, in that each agent has reasoning and learning capabilities.

As a junior lecturer and researcher at ITB, Nur Ulfa hopes that she will help attract more women into informatics engineering.

Lena Dzifa MENSAH**Home Country**
Ghana**Degree**
PhD in Engineering and Management of Manufacturing Systems**Expertise**
Mechanical Engineering**Research Focus**
Moving up the Value Chain in Ghana**Host University**
Cranfield University,
United Kingdom**Fellowship Awarded**
2006

Lena Dzifa Mensah was born in Ghana to a family of six; of her three siblings, she is the second born. She has a degree in mechanical engineering and a master's in manufacturing engineering and management. She served as a teaching assistant for a year in Kwame Nkrumah University of Science and Technology in Ghana and also worked briefly for a construction company as a maintenance engineer.

In her first research project, Lena used Failure Modes and Effects Analysis (FMEA) methodology to investigate risks during new product introduction. Lena has worked with Hallmark Cards Inc in the UK to analyze and improve greeting card production processes, and with Marshall Amplification to develop a strategy to maintain production in the UK and reduce costs by improving the efficiency of their supply chain.

She is currently working on the topic "Moving Up the Value Chain in Ghana." The practice of moving up the value chain involves the physical transformation of raw materials into manufactured goods as well as improvements in the quality and safety of raw and manufactured goods, and the management of the afterlife of the product. Preliminary investigation in Ghana shows that the requisite knowledge and skills, institutional structures, resources and technology to move up the value chain, while incorporating the basic requirements for accessing global value chains (GVCs) is not evident. Hence, Lena aims to develop a roadmap for enhancing compliance of the Ghanaian food manufacturing sector with the basic requirements for accessing GVCs.

Lena believes that in the longer term a synergy between academia and industry will ensure that education, training and technology are tailored to the needs of the Ghanaian manufacturing industry.

Lena plans to teach in the Mechanical Engineering Department at Kwame Nkrumah University of Science & Technology.

Zohra MOKEDDEM**Home Country**
Algeria**Degree**
Post-Doctorate in Sedimentology and Climate Change**Expertise**
Paleoclimatology**Research Focus**
Sahara Advance Linked to Global Climate Change**Host University**
University of Columbia,
United States**Fellowship Awarded**
2006

Zohra Mokeddem was born in Algeria not far from the Mediterranean Sea. She continues to be fascinated by the coast and wants to improve her expertise in the coastal domain. After obtaining her undergraduate degree in Algiers as an engineer for coastal gestion and protection, she obtained her master's degree in coastal geomorphology as well as her doctorate in geology and sedimentology at the University of Caen in France. She is now pursuing a post-doctoral degree in sedimentology and climate change at Columbia University in New York.

Zohra is attempting to reconstruct the mechanisms of past climate change. Her main focus is on sedimentary records of climate change both on land and in the sea, including the role of ocean circulation and the rate and magnitude of past changes.

Past hydrological changes in Africa have been linked to various climatic processes. Dry and wet periods may be triggered by changes in the large-scale distribution of sea surface temperature. Ocean currents transport warm upper water to the north Atlantic and return cold, deep water to the south Atlantic. Several recent studies have shown that a reduction in the strength of ocean circulation, and in particular of the Atlantic meridional overturning circulation, may trigger arid events in North Africa.

Zohra is seeking to establish the natural progression of expansion and possibly retreat of desertified areas along the northern border of the Sahara Desert through a reconstruction of ocean circulation near the west coast of Africa. A comparison of these results to her current data acquired in the north Atlantic will provide a better context for an interpretation of more recent changes in the extension of the Sahara. Another expected result of her research is an improved assessment of the contributions to desertification by climate change and by unsustainable land use.

Zohra plans to pursue her academic career as a researcher and lecturer in her home country, Algeria.

Aicha MOUSSAOUI

Home Country
Algeria

Degree
PhD in Electronics and
Magnetic Resonance

Expertise
Bioengineering

Research Focus
Medical Image Processing

Host University
Centrale Graduate School,
Marseille, France

Fellowship Awarded
2006



Aicha Moussaoui received a master's degree in 1999 in electronics at National Polytechnic Institute in Algeria. She became a professor and researcher in the electronics department at that institution teaching on the subjects of microwaves, digital electronics (numeric) and microprocessors. She also held the position of head of academic affairs. In her research she was part of the signal and communications laboratory, where her main interest was and continues to be image processing and analysis.

In February 2006, on behalf of the Algerian National Polytechnic, Aicha received a secondment to pursue her doctorate degree at the Multidimensional Signals Laboratory, which is part of the Institute Fresnel at the Central Graduate School in Marseille, France.

Aicha's research involves developing a tool that would allow coronarographic examinations of arterial networks to determine relevant anatomic parameters such as narrowing, thickness or obstructions that characterize the state of the artery and help detect damage or the possible presence of atheroma plates. The results of her research will help doctors diagnose coronary diseases including stenosis and aneurysms, and will aid decision-making in such matters as whether to provide treatment with medicines or surgery.

When she finishes her studies in Marseille, Aicha plans return to Algeria to resume teaching at the National Polytechnic Institute.

Folasade Mayowa OLAJUYIGBE

Home Country
Nigeria

Degree
PhD in Applied Biochemistry

Expertise
Biocrystallography

Research Focus
Biocrystallographic Studies of
Drug-Resistant Mutants
of HIV Protease

Host University
University of Trieste, Italy

Fellowship Awarded
2006

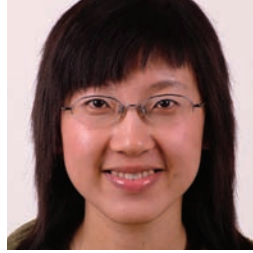


Folasade Mayowa Olajuyigbe obtained her PhD in applied biochemistry in 2009 as part of a sandwich program of the Centre of Excellence in Biocrystallography, Department of Chemical Science, University of Trieste, Italy and the Department of Biochemistry, Federal University of Technology, Akure, Nigeria.

Her PhD research focused on the long-term success of anti-retroviral therapies—drugs that are hindered by the emergence of viral strains that exhibit resistance to protease inhibitors. Using state-of-the-art X-ray crystallography techniques, Folasade investigated the molecular basis of drug resistance with ritonavir, a US Food and Drug Administration approved inhibitor, along with a newly designed small inhibitor, FP3, and an irreversible covalent binding HIV protease inhibitor, EPX. She presented the results of her PhD research at Trends in Enzymology 2008, an international conference held in Saint Malo, France, where she won Best Poster and Young Investigator awards. She recently published a paper in ACS Medicinal Chemistry on modification of HIV-1 protease through carbamylation, where implications of carbamylation process in vitro and in diseases are discussed.

Folasade is now a lecturer in the Department of Biochemistry at the Federal University of Technology, Akure in Nigeria, where she teaches both undergraduate and graduate courses and supervises research projects at both levels.

Her research interests include protein structure and function, especially for proteolytic enzymes of infectious organisms that are targets for drug design and discovery. She works on HIV-1 protease and enzymes from the malaria parasite, Plasmodium falciparum. Folasade uses methods and techniques in molecular biology, enzymology and X-ray crystallography to answer specific questions on active-site interaction that lead to specific binding and efficient catalysis which provide new and useful information for drug discovery and optimization.

Ran Qi**Home Country**
China**Degree**
PhD in Petroleum Engineering**Expertise**
Petroleum Engineering**Research Focus**
Modeling and Designing of Carbon Dioxide Storage in Aquifers**Host University**
Imperial College London,
United Kingdom**Fellowship Awarded**
2006

Ran Qi was born near the Shengli Oilfield, the second-largest oilfield in China. Her father is a professor of petroleum engineering at the University of Petroleum China (UPC), and she says that the strong influence of her family led to her interest in petroleum engineering.

Ran chose to study at the University of Petroleum (Beijing), one of the campuses of UPC, where she obtained her undergraduate degree with first-class honors in oil and gas storage and transportation engineering. She obtained her MSc in petroleum engineering at Imperial College London in 2005, and later that year began work on her PhD in petroleum engineering under the supervision of Professor Martin Blunt.

Ran's research interest focused on the simulation of geological carbon dioxide (CO₂) storage. It includes the modeling and designing of carbon dioxide storage in aquifers to maximize carbon dioxide storage and in oil reservoirs to maximize both carbon dioxide storage and oil recovery. Ran obtained her PhD in 2008.

Ran is currently working in an energy technology company in Aberdeen, UK as a reservoir simulation engineer, where she has worked on a variety of projects to provide simulation support to business units across Chevron, including history matching projects for mature oilfields, greenfield development, business development studies, experimental design and chemical/carbon dioxide EOR studies.

Hauwa Onize RAJI**Home Country**
Nigeria**Degree**
PhD in Offshore Engineering**Expertise**
Petroleum Engineering**Research Focus**
Strength and Fatigue Analysis Of Deep Water Offshore Platforms**Host University**
University of Strathclyde,
Glasgow, United Kingdom**Fellowship Awarded**
2006

Hauwa Onize Raji is an avid reader who loves visiting new places as well as listening to the music of the eighties and nineties. She has eight brothers and sisters and says it is always chaotic but fun when the family members get together.

A lecturer in the Department of Civil Engineering at Ahmadu Bello University in Zaria, Nigeria, Hauwa is currently studying offshore engineering at the University of Strathclyde in Glasgow, Scotland.

Her research is focused on studying the low-cycle fatigue behavior of floating, production, storage and offloading platforms (FPSOs). This is an important safety issue—in a number of instances damage has occurred in FPSOs due to low-cycle fatigue.

FPSO hulls are normally similar in configuration to that of conventional tankers, but several differences between tankers and FPSOs can have an impact on the fatigue design. One of these differences is that tankers operate at defined drafts on each voyage—either fully loaded or with ballast, with a cycle time of about 60 days.

FPSOs, however, operate at more frequently changing drafts, and their cycle time is every 10 to 14 days. This large draft variation can result in low-cycle fatigue which, when added to the high-cycle fatigue from wave loading, requires the development of a new fatigue analysis procedure and tools.

The goal of Hauwa's research is to develop tools to predict low-cycle fatigue and to identify critical locations where low cycle fatigue occurs, with a view to recommending design solutions to avoid damage and failure.

When she finishes her studies in Scotland, Hauwa plans to teach in the Department of Civil Engineering at Ahmadu Bello University, Zaria.

Irma Yolanda SANCHEZ CHAVEZ

Home Country
Mexico

Degree
PhD in Engineering Sciences

Expertise
Chemical Engineering

Research Focus
Systems to Deliver Insulin
to Diabetic Patients

Host University
The University of Texas
at Austin, United States

Fellowship Awarded
2006



Irma Yolanda Sanchez Chavez was born in Aguascalientes, a city in central Mexico, where she grew up with her parents, brother, sister and an extended family that included many cousins, uncles and aunts. She now lives in Monterrey with her husband.

After graduating from Tecnológico de Monterrey as a chemical engineer in 1993, Irma Yolanda went on to obtain her Master of Science degree in 1996 with a specialty in control engineering. She obtained her doctorate in engineering sciences in 2008. Since 2002 she has been a full-time professor in the Mechatronics and Automation Department at Tecnológico de Monterrey.

Irma Yolanda's research goal is to combine biomaterials, modeling and control engineering to propose closed-loop systems for the restitution of diminished or lost physiological functions. For her doctoral thesis she worked on systems to deliver insulin to diabetic patients based on two approaches.

In the first approach she used separate controller, actuator and sensor units, and in the second approach she used glucose-sensitive hydrogels as smart materials that integrate the controller, actuator and sensor-unit functions within a single device.

Engineering science has contributed to modern medicine through the development of better equipment for monitoring health conditions and for low-invasive surgical procedures. Automation engineering can enhance medical treatment through continuous administration of drugs in precise doses in response to patient requirements. Irma Yolanda's research efforts in this area are intended to improve quality of life and comfort for patients.

After completing her doctorate in January 2008, Irma Yolanda returned to Monterrey to continue teaching at Tecnológico de Monterrey.

Chavalmane Subbenaik SANMATHI

Home Country
India

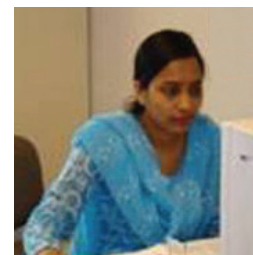
Degree
Post-Doctorate in
Polymer Chemistry

Expertise
Chemistry

Research Focus
Ceramic Dense Nano-Powders
of Thermoelectric Oxides

Host University
National Graduate School
of Engineering and
Research Center, France

Fellowship Awarded
2006



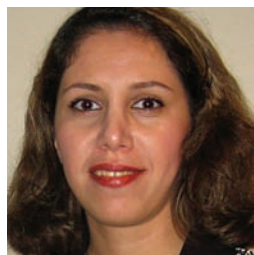
Chavalmane Sanmathi was born in India and received her undergraduate degree in physics, chemistry and mathematics in 1999 from Kuvempu University, Karnataka. She earned her graduate degree in industrial chemistry from that institution in 2001, along with her PhD in polymer chemistry in 2004.

As a post-doctoral fellow at the National Graduate School of Engineering and Research Center (ENSICAEN) and Crystallography and Materials Sciences Laboratory (CRISMAT) in Caen, France, Chavalmane is focusing her research on helping to find alternative and environmentally friendly energy sources.

Thermoelectric materials that offer the potential to convert waste heat energy into electrical energy are widely recognized as having promise for power generation and for cooling of electronic devices used in advanced technology. Various materials can be employed as thermoelectrics including TE-oxides, which are regarded as superior candidates because they are chemically and thermally stable at high temperatures and can be used without deterioration of their performance due to oxidation.

Chavalmane is working to resolve the two most important challenges in the area of TE-oxides—thermal conductivity and energy conversion efficiency—by synthesizing the nano-powders of selected cobaltites and manganites using the sol-gel method and hydrothermal processes. By varying the sizes of crystallites, she is hoping to devise a mechanism for controlling electrical and thermal conductivity. If successful, her work may lead to critical advances in a host of technological applications.

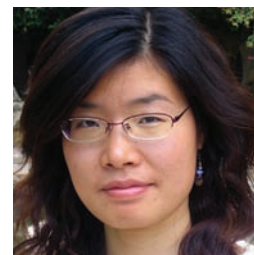
When she completes her post-doctorate studies, Chavalmane intends to return to teach at Kuvempu University in India. She feels that science is not only a career, but also a way of life, full of fun and excitement, and she believes that it is important for women entering scientific careers to receive the encouragement of family and friends.

Shirin SHARIFI KHOBDEH**Home Country**
Iran**Degree**
PhD in Chemical Engineering**Expertise**
Chemical Engineering**Research Focus**
Drop Deformation and Breakup
in Two-Phase Systems**Host University**
The Pennsylvania
State University, United States**Fellowship Awarded**
2006

Shirin Sharifi Khobdeh was born in Tehran, the capital city of Iran. She is married and has two younger brothers, both of whom are pursuing engineering careers. She says her parents fully supported her own career aspirations to be an engineer.

Shirin received her undergraduate degree in chemical engineering from Amirkabir University of Technology in Iran. She did her graduate studies at the Isfahan University of Technology, also in Iran, where she earned her master's degree and graduated with a grade point average of A. She then worked for a few years before joining the doctoral program in chemical engineering at The Pennsylvania State University (Penn State) in 2006.

Shirin is working on drop deformation and breakup in pressure-driven flows within viscoelastic two-phase systems. She is examining the effects of confinement geometry on deformation of viscoelastic drops, mechanisms of drop breakup and critical conditions for drop breakup where the drop and often the suspending fluid consist of a viscoelastic polymer solution. Her experimental observations of drop shape at various concentrations of the polymer solution are intended to provide insight into the role of elasticity in drop dynamics. As the strength of the imposed flow increases, large drops eventually become unstable and break up. Fluid elasticity has a significant effect on the breakup behavior of drops, and different modes of drop breakup may be observed depending on the polymer concentrations in the interior and exterior phases. Her research is finding that the critical capillary number for the onset of drop breakup is a decreasing function of drop size. The ability to predict drop deformation and breakup has important implications for a number of industrial applications including tertiary oil recovery processes; polymer processing operations; production of foams, cosmetics and various food products; motion of blood cells through vessels and pore-scale models for two-phase flow through porous media.

Pinyu WU**Home Country**
China**Degree**
PhD in Physics**Expertise**
Biopolymer Networks**Research Focus**
3D Thermal Noise Imaging**Host University**
The University of Texas
at Austin, United States**Fellowship Awarded**
2006

Pinyu Wu is the second of three daughters born to cotton farmers in a small village in central China. While most young girls in the area discontinued their education after middle school, Pinyu's parents worked hard on the farm to support their three daughters and thanks to their efforts all three have now graduated from college.

Pinyu obtained her Bachelor of Science degree in the Department of Modern Physics in 2003 at the University of Science and Technology of China in Hefei. She then entered The University of Texas at Austin in the United States where she graduated with her master's degree in physics in 2007 and where she has been a PhD candidate in physics since early 2008.

In Texas, Pinyu works with a biophysics group in the physics department. Her first project was measuring the non-conservative forces in optical tweezers. Optical tweezers, also called single beam gradient traps, are produced by a focused laser beam and are widely used by physicists and biologists to manipulate nanoparticles, as well as to measure the force generated in cellular processes. In this project, she developed a new method to calculate the force field in an optical trap without conventional assumptions. She applied this method to both experimental and simulated data. This work has been published in Physical Review Letters.

In the summer of 2008 she started a new project called three dimensional thermal noise imaging. Using an optically trapped nanoparticle as a probe, this imaging technique explores the 3D structure of biopolymers such as actin networks and microtubule networks. Force distribution in each network can also be mapped by studying the fluctuation of individual filaments.

Pinyu plans to graduate in December 2011 and is open to different research opportunities.

Min YU

Home Country
China

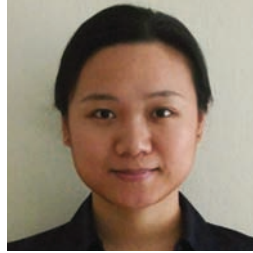
Degree
PhD in Computational
Condensed Matter Physics

Expertise
Physics

Research Focus
Electronic Structure
of Condensed Matter

Host University
University of Illinois at
Urbana-Champaign, United States

Fellowship Awarded
2006



Min Yu obtained her BS in physics from the University of Science and Technology of China in 2002. She is now pursuing her PhD in physics at the University of Illinois at Urbana-Champaign in the United States. Her research is focused on developing new theoretical methods to describe the electronic structure of solids, and on applying them to calculate the properties of crystalline solids, surfaces, interfaces and point defects.

The advent of powerful computers has enabled more and more atomic models to examine materials' properties. Min's work is based on the Density Functional Theory, a quantum mechanical theory which has achieved great success since the 1980s in predicting the electronic and optical properties of many-body systems in physics and chemistry, particularly in atoms, molecules and the condensed phases.

The Density Functional calculation gives excellent results for the ground state total energy of atomic systems. The obtained stable geometries, charge densities and phonon spectra are comparable to experimental results. However, the energy density distribution, unlike charge density distribution, is not experimentally measurable. It is, indeed, a gauge-dependent quantity.

Min's work proposes a method to decompose the total energy in a material into the contribution associated with each of the atoms. It is a useful method so that people can arrive at precise energies of material surfaces, interfaces or point defects by integrating the energy density distribution around the regions of interest. These methods have applications for metals and semiconductors, and are important both in physics and in materials science.

Mahnaz ZAKERI

Home Country
Iran

Degree
PhD in Mechanical Engineering

Expertise
Mechanical Engineering

Research Focus
Fracture Mechanics,
Composite Materials

Host University
Polytechnic University
of Milan, Italy

Fellowship Awarded
2006



Mahnaz Zakeri was born and raised in West Azarbayjan, Iran. Both she and her husband work in the mechanical engineering field.

After finishing high school, Mahnaz moved to Tehran, where she completed her bachelor's degree in aerospace engineering at Amirkabir University of Technology, and her master's degree in aerospace structures at Iran University of Science and Technology (IUST). Then she began doctoral studies in mechanical engineering at IUST, and in 2006 she went to Polytechnic University of Milan in Italy for a research period. She obtained her PhD in 2008.

During her doctoral studies Mahnaz was interested in the presence and propagation of cracks in structures, which are among the main causes of unexpected breakage. Because of the paramount importance of safety and reliability in many fields of engineering, the crack problem has been of interest to a large number of researchers.

The issue becomes more serious for brittle materials. The specification of stress field around the crack tip has an important role in prediction of fracture load in cracked specimens. Mahnaz worked to investigate the elastic stress field around the crack tips in pure mode I (or crack opening mode), pure mode II (or in-plane shear mode) and mixed mode I/II loading conditions. She was particularly interested in investigating the presence of T-stress and its role in the elastic stress field around a mode II crack tip using a photo-elasticity method, an optical technique used to visualize the stress field. Her thesis involved analytical solutions, laboratory experiments and some numerical modeling of the experimental specimens.

After completing her PhD studies, Mahnaz began working as a faculty member of the Mechanical Engineering Department at Urmia University in Iran.



Working group session at the Forum held in Paris in 2008.



Working group session at the Forum held in Paris in 2010.

FELLOWS 2005

Sumitha BHANDARKAR**Home Country**
India**Degree**
PhD in Computer Engineering**Expertise**
Network Protocols**Research Focus**
Transmission Control Protocol
in Emerging Networks**Host University**
Texas A&M University,
United States**Fellowship Awarded**
2005

Sumitha Bhandarkar was born and raised in Karnataka, India. Both her mother and her grandfather were teachers, so education was highly encouraged in her family. She and her two sisters acquired a love for learning and went on to pursue degrees in medicine and engineering. She is now married with one daughter and hopes to instill the thirst for knowledge in her daughter as well.

After completing her undergraduate degree in electronics and communication engineering, Sumitha worked for two years to support her ambition to continue higher education in the United States. She pursued her MS and PhD degrees in computer engineering at Texas A&M University, where she worked as a teaching and research assistant, published several papers, co-authored a Request For Comments memorandum and contributed a chapter to a book.

Sumitha's research at Texas A&M University focused on improving the performance of Transmission Control Protocol (TCP) in emerging networks. One of the core protocols of the Internet Protocol Suite, TCP provides reliable, ordered delivery of databytes. However, as the Internet evolves, several issues with TCP have come to light. Sumitha investigated these scalability issues, specifically in wireless networks, high-speed networks and networks with long-delay bandwidth products, and proposed solutions for improving their performance.

Sumitha now specializes in designing and implementing emerging telecommunications protocol stacks for use in future smart phones.

Camila Ribeiro CARDOSO ZIES**Home Country**
Brazil**Degree**
PhD in Mechanical Engineering**Expertise**
Mechanical Engineering**Research Focus**
Nanoparticle Transport
Through Porous Media**Host University**
Rice University,
United States**Fellowship Awarded**
2005

Camila Cardoso Zies was born in Rio de Janeiro, Brazil. Her parents were her biggest supporters and greatly influenced her and her younger sister, both of whom chose careers in science. She is married and has one child, a boy. Among her hobbies she lists painting, running and tango dancing along with languages—she speaks Portuguese, English, Spanish, French and some German.

After graduating in 2005 with a Bachelor of Science degree in mechanical engineering from Federal University of Rio de Janeiro, Camila went on to pursue a doctorate in mechanical engineering in the United States at Rice University in Houston, Texas.

At Rice her thesis topic is on the transport of nanoparticles through porous media. Camila is focusing her research on the study of the mobility of nanoparticles for oil field mapping and enhanced oil recovery (EOR).

The research literature of the last decade has demonstrated a vivid and growing interest in the study of nanoparticle transport, both through experimental and analytical approaches. All such analysis is restricted to certain situations, since the characterization and engineering of the physical and chemical properties of these particles are still a challenge. Nevertheless, the transport phenomenon in applications with nanoparticles is extremely promising.

Along with her research activities, Camila has been working as a teaching assistant and says that she is delighted with the opportunity to teach and share insights with her students.

When she finishes her degree at Rice, Camila plans to return to Brazil to teach at the university level.

Novi Ineke CEMPAKA WANGI

Home Country
Indonesia

Degree
PhD in Electrical Engineering

Expertise
Civil and Electrical Engineering

Research Focus
Wireless Telecommunication
Networking

Host University
Delft Institute of Technology,
The Netherlands

Fellowship Awarded
2005



Novi Ineke Cempaka Wangi was born and raised in a small town in Central Java, Indonesia. She moved to Bandung city in West Java while in high school and obtained her bachelor's degree at Bandung Institute of Technology. Married with two children, she has two older sisters and one younger brother.

In 2002 Novi went to The Netherlands to study at the Delft Institute of Technology, where she is now working to obtain her doctorate in electrical engineering.

At Delft, Novi's research topic is Federation of Personal Networks. It is envisaged that almost every artifact will eventually be equipped with digital computing, storage and communication capabilities.

At the same time, similar developments have taken place in communications technology. A range of wireless technologies that cover virtually the whole spectrum of potential user needs will reach the market in the coming decade. Further miniaturization and provision of self-powering capabilities to wireless sensors and actuators together with inexpensive processing devices are providing a basis to create environments that are smart and reactive.

A Personal Network (PN) is a person-centric network connecting various personal devices and artifacts regardless of geographical location. The resources that can become part of a PN will be very diverse. For example, one could think of computers, PDAs, phones, headsets, displays, cameras, Internet-enabled appliances, sensors and actuators. A PN is very much centered on the person and his or her needs. While improving the quality of life, this technology will accommodate future communication, which is more about adapting to the needs of individuals.

On completion of her studies, Novi plans to teach at Bandung Institute of Technology.

Maryam GOLABCHI

Home Country
Iran

Degree
PhD in Materials Science

Expertise
Chemical Engineering

Research Focus
Carbon Nanotubes and
Aluminum-Carbon Composites

Host University
Colorado School of Mines,
United States

Fellowship Awarded
2005



Maryam Golabchi was born and educated in Iran. Her five brothers are engineers and her sister is a teacher.

After graduating from high school Maryam became interested in chemical engineering and enrolled at Tehran Polytechnics University.

While pursuing her master's degree, she also began working as a process engineer at Namvaran, one of the best consulting engineering companies in Iran.

Three years later she decided to return to research and enrolled at Colorado School of Mines in the United States, where she began pursuing a doctorate in nanotechnology specializing in computational materials science. In Colorado her thesis is titled "Morphology and Mechanics of Graphene-Based Nanostructures: Atomic-Scale Simulations."

Maryam married an Iranian scientist in 2007 and God gifted her a baby boy in October 2008. She was babysitting while working on her thesis and investigating the feasibility of forming composites using computational techniques. Graphitic structures are often touted as the building blocks of nanotechnology due to their special mechanical and electrical properties. Graphene and carbon nanotubes can increase the toughness and hardness of aluminum, the most plentiful metal on Earth, which is remarkable for its low density and its ability to resist corrosion and erosion.

Maryam's work on aluminum reinforced with carbon nanocomposites may lead to numerous industrial applications including new high-performance alloys and composites for a variety of structural applications in the construction, fabrication, automotive and aerospace industries.

After completing her doctorate Maryam plans to return to Iran with her family to teach at the university level.

Nur HIDAYATI

Home Country
Indonesia

Degree
PhD in Chemical Engineering

Expertise
Chemical Engineering

Research Focus
Fuel Cell Science

Host University
Newcastle University,
United Kingdom

Fellowship Awarded
2005



Nur Hidayati is a lecturer in the department of chemical engineering at Muhammadiyah University in Surakarta, Indonesia. She and her husband have three children, one boy and two girls.

At Newcastle University in the United Kingdom where Nur is a PhD student in chemical engineering, her research focus is on direct ethanol fuel cell (DEFC) technology and particularly in proton exchange membrane fuel cells which can be fed directly by ethanol.

As a fuel of direct ethanol fuel cell technology, ethanol has some advantages over methanol. Ethanol is not nearly as poisonous, and it is a relatively safe and benign fuel that can be produced in an eco-friendly manner in large quantities by a fermentation and distillation process using grains or cellulose feed-stocks, making ethanol a renewable resource.

In addition, direct fuel ethanol is far easier to store and transport than hydrogen. As a result, ethanol offers a practical solution to the challenge of providing fuel cells on board vehicles and for remote or stationary applications.

Nur's research focuses on the study of ethanol electro-oxidation. She hopes to provide insights into catalyst design for direct ethanol fuel cell technology. Her research has the following three objectives: to examine alternative commercial or homemade electro-catalysts for ethanol oxidation, to evaluate new membrane materials that allow operation at higher temperatures, and to perform experimental tests on novel direct ethanol cells.

Upon completion of her studies, Nur plans to teach and to continue developing her research career at Muhammadiyah University in Surakarta.

Cecilia KORBER GONCALVES

Home Country
Brazil

Degree
MSc in Materials Engineering

Expertise
Sustainability

Research Focus
Pollutant Emissions
of Plastics Combustion

Host University
Northeastern University,
United States

Fellowship Awarded
2005



Cecilia Korber Goncalves was born and raised in Santo Andre, Sao Paulo, Brazil. Both she and her sister enjoyed the support of their family and were motivated to improve their qualifications, and both obtained graduate degrees in the environmental sciences.

Cecilia began taking chemistry courses in technical high school and she continued studying chemical engineering during her undergraduate years. In 2005 and 2006 she was a visiting scholar at Northeastern University in Boston, Massachusetts, after which she graduated in 2007 with a Master of Science degree in materials engineering at the University of Sao Paulo.

Cecilia's research focused on the pollutant emissions of plastics combustion, which are widely used in developed countries such as the US and Japan to "dispose" of solid waste. She also studied cogeneration of energy, an important subject with respect to climate change, energy efficiency and green technologies.

Specifically, she studied the poliaromatic hydrocarbon (PAH) emissions of polyethylene and polystyrene during several different conditions of pyrolysis and combustion. Her research findings were published in the respected ACS Journal of Energy and Fuels, and were presented at a symposium at the EPD Congress of the Minerals, Metals & Materials Society. As well, she delivered three other presentations in Brazilian congresses. Her work to determine which conditions have fewer emissions of soot and heavy PAH, some of which are known to be carcinogenic, could lead to lowered emissions of PAH.

Cecilia is working on project management at a respected pulp and paper company in Sao Paulo, and she has recently completed an MBA on sustainability at Fundação Getulio Vargas, a preeminent Brazilian school of administration.

Cecilia hopes to teach environmental science at a university in Brazil.

MEGAWATI

Home Country
Indonesia

Degree
MSc in Electrical Engineering

Expertise
Electronics and
Electrical Engineering

Research Focus
Groundwater Flow and
Petrophysical Analysis Using
Back-Propagation Network

Host University
Technical University of Denmark

Fellowship Awarded
2005



Megawati was born in Indonesia. She received her undergraduate degree in electrical engineering from the Bandung Institute of Technology (ITB) in 2002. Prior to that she studied computational intelligence and systems science at the Tokyo Institute of Technology in Japan, where she obtained a GPA of 3.9.

In Tokyo she developed a new neural network called Self-Organized Network Inspired by Immune Algorithm (SONIA) and applied it to pattern recognition and clustering analysis. One of her papers based on this work earned an Excellent Presentation Award at the First International Conference on Soft Computing and Intelligent Systems in 2002 in Tsukuba, Japan.

Megawati began studying for her MSc in electrical engineering at the Technical University of Denmark in 2005, where her research into signal processing in the oil and gas industry focused on groundwater flow and petrophysical analysis using the back-propagation network method, a mathematical model of underground water flow used to identify the permeability coefficients of rock formations and to predict such aspects as seepage rates.

Signal processing techniques and algorithms can help determine the presence of oil and gas deposits in rock layers. As well, they can help in seismic data analysis, in perforating operations and, particularly, in intelligent wells where downhole sensors made from optical fiber provide information about such things as water content in the oil. This information enables workers to make choke valve and injection sleeve changes. However, currently available optical fiber sensors are sensitive to changes in temperature and only work well under constant temperature conditions. Megawati's work may help overcome these challenges in signal processing techniques and algorithms.

Megawati plans to return to Indonesia to join the Bandung Institute of Technology as a member of the teaching staff.

Patricia MUÑOZ-ESCALONA

Home Country
Venezuela

Degree
PhD in Manufacturing Engineering

Expertise
Mechanical Engineering

Research Focus
Tool Wear and Workpiece
Surface Roughness

Host University
University of Bath, United Kingdom

Fellowship Awarded
2005



Patricia Muñoz-Escalona was born in Germany but has lived in Venezuela since she was four years old. Now married with two children, she obtained her undergraduate degree in materials engineering and her master's degree in mechanical engineering at the Simón Bolívar University in Caracas, Venezuela.

Patricia started a part-time PhD in manufacturing engineering at the University of Bath in England in 2005, and she graduated in July 2010. Since 1992 she has been lecturing on manufacturing processes (welding and machining) at Simón Bolívar University, where she recently became a full professor and where she is now supervising master's degree theses related to tool wear and surface roughness.

Patricia's research focus on the prediction of surface roughness prior to a machining process has attracted a great deal of attention, since the geometric structure of rough surfaces influences a multitude of physical phenomena such as contact resistance friction, wear and lubrication—all of which is relevant to many engineering applications.

The evaluation of surface quality based on surface roughness, which generally plays an important role in such things as wear resistance and ductility as well as tensile and fatigue strength for machined parts, cannot be neglected in design. To be able to select an appropriate combination of parameters that provide desired surface quality, it is important to ascertain the influence of different factors involved in the cutting process. These factors depend on the properties of the workpiece material, on the cutting tool, and on the cutting conditions and process phenomena.

Janine NUNES

Home Country
Trinidad and Tobago

Degree
PhD in Chemistry

Expertise
Chemistry

Research Focus
Particle Replication
in Non-Wetting Templates

Host University
University of North Carolina,
Chapel Hill, United States

Fellowship Awarded
2005



Janine Nunes was born in Trinidad and Tobago. She received her undergraduate and graduate degrees in chemistry at Morgan State University in Maryland in the United States, where she graduated in 2005 with a MSc.

Janine is interested in physical chemistry, particularly the characterization of novel polymeric materials as well as a number of interdisciplinary projects where physical chemistry can be applied. At Morgan State she was a teaching assistant and active at the board level in three student organizations—Student Affiliates of the American Chemical Society, National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, and Beta Kappa Chi National Scientific Honor Society.

While pursuing her PhD in chemistry at the University of North Carolina she focused on nanotechnology. She became interested in investigating a new technology designed to create well-defined nanoparticles of one size, shape and exact chemical composition. Designed for use in biomedical applications, this new approach to nanoparticle synthesis, named Particle Replication in Non-Wetting Templates (PRINT), not only affords absolute control over particle size, shape and chemical makeup, but also allows biomolecules to be incorporated into the particles during their creation.

PRINT utilizes a stamping mold made of a novel polymer that does not allow liquids to spread across its surface and this property, known as non-wetting, enables the mold to produce discrete particles with the exact shape and size of any feature etched in the polymer, in much the same way that a rubber stamp coated with ink recreates the design etched on the stamp's surface. The technology may eventually be useful in making nanoparticles intended as drug delivery vehicles and biocompatible nanoparticles containing anti-cancer and other drugs.

After completing her studies, Janine intends to continue working in the academic field both as a professor and as a researcher.

Princess NWANKWO BROWN

Home Country
Nigeria

Degree
PhD in Petroleum Engineering

Expertise
Petroleum Engineering

Research Focus
Condensate Reservoir Studies

Host University
The Pennsylvania State
University, United States

Fellowship Awarded
2005



Princess Nwankwo Brown comes from a family of teachers—both of her parents worked at some point in their careers at university faculties within and outside Nigeria. Princess is married with two children. Her hobbies are debating and writing.

After completing her Master of Science degree in petroleum engineering at the University of Ibadan in Nigeria in 2003, Princess became a lecturer there. Pursuing a PhD in petroleum engineering at The Pennsylvania State University in the United States, her research focuses on condensate reservoir studies using an Artificial Neural Network (ANN) model to predict the wax precipitation temperature from gas condensate fluids.

Most world oil reservoirs contain waxes, which are heavy molecular weight organic fractions containing C18–C36 (paraffinic) and C30–C60 (naphthenic) aromatics. The light fractions of petroleum are more expensive and therefore more desired in the petroleum industry. Waxes, which are petroleum byproducts, may crystallize at any stage if temperatures fall below the wax appearance temperature (or cloud point). Due to an increase in viscosity of the resulting fluid by several orders of magnitude, this often results in wellbore plugging and pipeline deposition, limiting the oil's ability to effectively flow to the surface.

Deposition of wax in the formation or production facilities may, and often does, lead to stoppages or blockages of free fluid flow, limiting efficient production rates. Minimizing disruptions to production and maximizing throughput efficiencies are a major challenge and are even more relevant as production shifts to cold off-shore locations. Her research addresses this challenge.

Princess was lecturing at the University of Ibadan in Nigeria before commencing her PhD program, and she hopes to return home and improve on her teaching and research skills after completion.

Dupe Nihinlola SAKA

Home Country
Nigeria

Degree
PhD in Environmental Science

Expertise
Flood Modeling, Remote Sensing and Fluid Dynamics

Research Focus
Flood Modeling in Niger Delta

Host University
Lancaster University,
United Kingdom

Fellowship Awarded
2005



Dupe Nihinlola Saka is the ninth child in a family of 25 in Nigeria. A registered surveyor, she is married with two children and enjoys travelling, meeting people and cooking.

Dupe obtained her Bachelor of Science (First Class) in 1998, and in 2002 she received a Master of Science (Distinction) from the Department of Surveying and Geoinformatics at the University of Lagos in Nigeria. In July 2003 she joined the University of Lagos as an assistant lecturer, and in 2005 she began pursuing her PhD in the Department of Environmental Science at Lancaster University in the United Kingdom.

Among her many academic achievements she counts the 1998 Vice Chancellor Prize for best overall performance, along with a National School Fund Prize for best all-round performance. In addition, she is the recipient of a University of Lagos Scholarship Award for best graduating student, and she received a Best Poster award in the first year of her PhD studies.

Dupe’s research focus includes remote sensing, geographical information systems and flood modelling in the Niger Delta. She is particularly interested in the investigation of flooding caused or induced by anthropogenic subsidence as a result of fluid (oil, gas and water) withdrawal. Her work involves developing a numerical model for flooding due to artificial reservoir (dam) impoundments by analyzing pre- and post-dam inflow of water and sediment (recharge from the River Niger and its tributaries) into the Niger Delta.

Due to concerns about rising sea levels and tidal forcing in the Niger Delta, she hopes to develop a predictive flood model for an early warning system that would help protect lives and save properties.

On completion of her studies, Dupe plans to return to the University of Lagos in her home country, Nigeria.

Xiuhua Si

Home Country
China

Degree
PhD in Aerospace Engineering

Expertise
Continuum Mechanics; Materials Science; Thermodynamics and Heat Transfer

Research Focus
Interface of Crystallines;
Mechanical Behavior of
Ferromagnetic Materials;
Reduce Fouling Deposition

Host University
Texas A&M University,
United States

Fellowship Awarded
2005



Xiuhua Si was born and raised in Shandong Province, China. The fourth of five children, three of whom have earned master’s degrees or higher, she is married with one son.

Xiuhua obtained her bachelor’s degree in environmental engineering and her master’s in chemical engineering at Dalian University of Technology in the small coastal city of Dalian, China, where she developed her research interest in several engineering fields. As a PhD student in aerospace engineering at Texas A&M University, where she graduated in 2005, she had a diverse range of research interests.

Currently teaching in Calvin College, Michigan, she is working on three different research projects.

Her first project is the theoretical study of surface tension on the interface of crystallines. Xiuhua and her colleagues have developed a model that allows them to predict the interfacial energy of metal and metal oxide interface, particularly for silicon and silicon dioxide interface, which is one of the most important materials in the semiconductor industry.

A second project involves the mechanical behavior of ferromagnetic materials under stress and electro-magnetic fields. Based on a theory she helped develop, she and her university colleagues are designing a single-crystal actuator. This will save time and energy along with the materials used to calibrate multi-crystalline actuators.

Her third project is to develop different physical methods to reduce fouling deposition and enhance heat transfer.

Carolina SOTO**Home Country**
Colombia**Degree**
PhD in Electrical Engineering**Expertise**
Electrical Engineering
and Signal Processing**Research Focus**
Hyper-Spectral Images**Host University**
University of California Irvine,
United States**Fellowship Awarded**
2005

Carolina Soto was born and raised in Bogota, Colombia. As the oldest in her family she wanted to set a good example for her three brothers and her sister, and that motivated her to become successful.

After graduating from electrical engineering she began working full time as a teacher at Javeriana University in Bogota. After obtaining a master's degree, she moved to California in 2005 to begin PhD studies in electrical engineering working with leading researchers on images with multiple spectral bands. Carolina and her husband are both studying at University of California, Irvine (UCI) in the United States.

Working in the Computer Vision Laboratory at UCI, Carolina is helping develop new algorithms and applications related to hyper-spectral images. Specifically, she has been working on the use of hyper-spectral images to analyze the human skin.

These hyper-spectral algorithms have been successfully used for decades in military applications, but the use of this technology in biomedical applications is still in its infancy. These algorithms and applications will eventually help detect cancer and other abnormalities of the skin using non-invasive methods such as the detection of changes in temperature or abnormalities of the vascular tissue.

Carolina hopes her work will contribute to the development of new techniques used in the diagnosis, treatment or prevention of disease.

Carolina actively encourages women to pursue technical careers and plans to go back to the Javeriana University in Bogota, Colombia to work as a teacher.

Margarita VARON**Home Country**
Colombia**Degree**
PhD in Optoelectronics**Expertise**
Electronics and
Electrical Engineering**Research Focus**
Hyperfrequency Signal Generation
by Optoelectronic Oscillators**Host University**
SUPAERO Institute of
Aeronautics and Space
Technology, France**Fellowship Awarded**
2005

Margarita Varón Durán was born in Cartagena, Colombia. After living for most of her life with her parents and sister, she obtained her undergraduate degree in electronics engineering at Javeriana University in Bogota, where she married her husband, an electrical engineer, in 2006.

Following her undergraduate degree, she travelled to Turin, Italy to obtain her master's degree in optoelectronics. Subsequently she returned to Colombia to work at the university and also in a telecommunications company.

In 2005 Margarita began studying for a PhD in optoelectronics at the SUPAERO Institute of Aeronautics and Space Technology in Toulouse, France, where she obtained her doctorate in 2008.

Margarita's research focus at SUPAERO was on optoelectronic oscillators, which are used in telecommunication systems to synchronize the transmission and reception of data.

Optoelectronic oscillators are the focus of a great deal of research around the world. The oscillator that Margarita proposed in her doctoral thesis was particularly interesting for its onboard systems components, and because it is small and lightweight it has numerous applications in airplanes, satellites, spacecraft and other vehicles.

Constructed with mostly optical components, these oscillators offer many advantages in addition to light weight and small size. For example, they are not expensive to build, and they have few problems with electronic interference.

Upon completion of her studies at SUPAERO Margarita returned to Colombia and began working at the National University of Colombia as a researcher and professor in the fields of electronics and telecommunications.



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The Faculty for the Future program, launched in 2004, awards fellowships to women from developing and emerging economies to pursue PhD or post-doctoral study in the physical sciences and related disciplines at top universities abroad.

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Faculty for the Future grants are in the range of USD 25,000 to 50,000 per year and may be renewed through to completion of studies subject to performance, self-evaluation, and recommendations from supervisors. Grant amounts are subject to actual tuition fees and costs of living in a given location.

All degrees noted are those funded, in whole or in part, by the Schlumberger Foundation Faculty for the Future program. Funding of MSc ended in 2007.

Three Faculty for the Future fellows—Lindsay Linzer (2006), Jane Gore (2006) and Nada El Tahir (2009)—are also members of AfricaArray, a program designed to promote, strengthen and maintain a workforce of highly trained African geoscientists and researchers for Africa's natural resource sector. The Schlumberger Foundation is proud to support this initiative.



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