

L'ORÉAL-UNESCO  
FOR WOMEN  
IN SCIENCE

*Changing the face  
of science*





FONDATION  
L'ORÉAL

Founded in 1998, the L'Oréal-UNESCO For Women in Science partnership was created to recognize and promote women in science. Its programs reward established women scientists whose outstanding achievements have contributed to the advancement of scientific knowledge and of its benefits to society, and provide support to promising young women scientists with worthy, viable projects. Over the past 15 years For Women in Science has expanded internationally to become truly global and has supported more than 1700 women from 108 countries.



Jill Farrant (South Africa), Phytology  
*L'Oréal-UNESCO Awards Laureate in 2012*

L'ORÉAL-UNESCO  
FOR WOMEN IN SCIENCE  
*A partnership  
for progress*

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The partnership between the L'Oréal Foundation and UNESCO is a match that is both innovative and natural. L'Oréal, founded by a scientist and whose products are based on scientific research, has helped women develop self-esteem for over a century, and has always sought to give back to the global community, particularly to the world's women. UNESCO, the United Nations Educational Scientific and Cultural Organization, promotes the creation and sharing of knowledge, particularly scientific knowledge, for a fairer, more inclusive and equitable world. This joining of forces between a multinational corporation and a UN agency points the way forward in our globalized world.





Sidrotun Naim, Molecular virology  
2012 UNESCO-L'Oréal Fellow from Indonesia



L'ORÉAL-UNESCO  
FOR WOMEN IN SCIENCE

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THE WORLD  
NEEDS SCIENCE,  
*Science  
needs Women*

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Science is key, perhaps the key, to meeting the enormous challenges facing the world today. Science is crucial to solving our ecological, economic and humanitarian problems. Our continued existence will depend on discovering ways to preserve our planet's fragile eco-systems. The list of challenges to overcome is long and varied, and science is essential to overcoming them.

With so much at stake, all of our planet's intellectual resources must be available to the scientific community – and women make up half of those resources. Traditionally women, if they were encouraged to study at all, were rarely oriented toward science. Great strides have been made in recent decades, yet still today far fewer women than men go on to obtain doctorates in science and to occupy leading positions in laboratories, universities and research institutions.



Adeyinka Gladys Falusi (Nigeria), Molecular genetics  
*L'Oréal-UNESCO Awards Laureate in 2001*



V. Narry Kim (Republic of Korea), Biochemistry  
*L'Oréal-UNESCO Awards Laureate in 2005*

THE WORLD  
NEEDS SCIENCE,  
*Science*  
*needs Women*

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By supporting young women researchers and promoting science as a career, the program aims to help ensure that innovative minds will provide the steady stream of talent essential to resolving the critical issues confronting humanity. In celebrating the achievements of accomplished women researchers, the L'Oréal-UNESCO For Women in Science program endeavors to help give them a public forum to speak out and reach out for science.



TELLING  
STATISTICS

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Under **30%** of the physicists, engineers and computer scientists in the world's knowledge based economies\* are women.<sup>1</sup>

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Only about **12%** of science decision-making positions in universities and the private sector in the world's knowledge-based economies\* are held by women.<sup>2</sup>

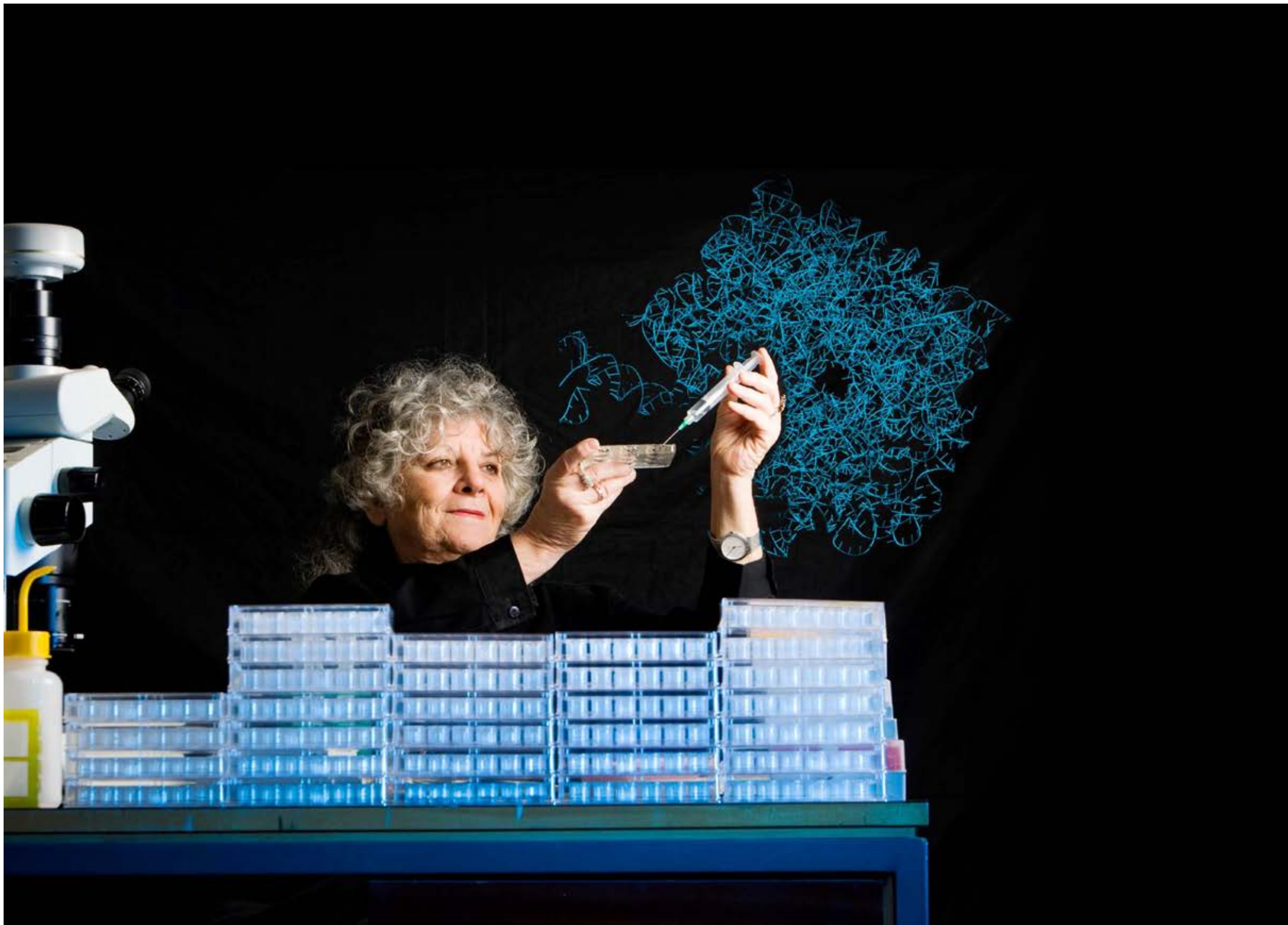
\* EU, USA, Brazil, South Africa, India, Korea and Indonesia

1. [www.ec.europa.eu/research/science-society/document\\_library/pdf\\_06/she\\_figures\\_2012\\_en.pdf](http://www.ec.europa.eu/research/science-society/document_library/pdf_06/she_figures_2012_en.pdf)  
2. [www.researchinformation.info/news/news\\_story.php?news\\_id=1018](http://www.researchinformation.info/news/news_story.php?news_id=1018)



Pardis Sabeti, Evolutionary genetics  
2004 Fellow from USA





Ada Yonath (Israel)  
*L'Oréal-UNESCO Awards Laureate in 2008*  
*Nobel Prize in Chemistry 2009*





Elaine Fuchs (USA), Cell biology  
*L'Oréal-UNESCO Awards Laureate in 2010*

INSPIRING  
*Role models*

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The L'Oréal-UNESCO partnership was formed to focus attention on the male/female imbalance in science not only by providing recognition and support to women researchers, but also to ensure that these same women are visible as role models to girls in their formative years. Gender stereotypes are formed early in life. By giving science a female face, the L'Oréal-UNESCO For Women in Science program strives to inspire today's young women to become tomorrow's researchers.





Khady Nani Dramé, Plant biotechnology  
2007 UNESCO-L'Oréal fellow from Senegal

Yonelle Dea Moukoubi, Agronomy  
2008 UNESCO-L'Oréal fellow from Gabon

L'ORÉAL-UNESCO  
FOR WOMEN IN SCIENCE

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ADVANCING  
WOMEN  
*who advance  
Science*

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L'ORÉAL-UNESCO  
FOR WOMEN IN SCIENCE  
*A program that supports women at  
different stages of their career.*

EVERY YEAR,  
*230 women distinguished worldwide :*  
*5 Laureates, 225 Fellows.*

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Since the beginning of the program, L'Oréal-UNESCO For Women in Science has honored 77 Laureates, including two who went on to win the Nobel Prize, and supported more than 1,652 Fellows who have made contributions in every field of scientific research. By the end of 2013, a total of 1,729 women scientists from over 100 countries will have benefitted from the program.

From conserving biodiversity to unlocking the secrets of genes, from finding cures for disease to investigating our physical world to exploring the cosmos, these remarkable women from every continent and working at every level of science are dedicating their lives to the advancement of knowledge and the betterment of humanity.



ADVANCING WOMEN  
*who advance Science*

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SCIENCE FOR OUR  
AGING POPULATION

An aging population is one of the most crucial issues facing the developed world and several Laureates have made outstanding contributions to addressing this challenge. As ever greater numbers of people live longer and longer, science and medicine are faced with finding solutions to ensure that they remain as healthy and able as possible with a dignified quality of life.

Professor Elizabeth Blackburn, 2008 Laureate for North America, and Professor Christine

Van Broeckhoven, 2006 Laureate for Europe, are among those whose findings have been of the highest significance. Professor Blackburn, who went on to win the Nobel Prize in Medicine, was recognized for her discovery of how chromosomes age. Professor Van Broeckhoven was honored for her groundbreaking research on Alzheimer's disease. The program is proud to have celebrated women whose pioneering investigations are laying the foundations for prolonging and improving lives.

SCIENCE FOR SAVING OUR PLANET AND  
PRESERVING BIODIVERSITY

With the survival of our species at risk, science is called upon to find ways for us to live in harmony with nature and reduce our ecological footprint. Over the years the program has recognized Laureates and supported Fellows whose research has led to innovations in producing more eco-friendly energy, in cleaning up oil and chemical spills, in sustainable farming and in wildlife conservation.

To name just four, Professor Johanna Levelt Sengers, 2003 Laureate for North America, was honored for her distinguished career in the study of environmentally safe hydro-electric power. Professor

Vivian Yam, 2011 Laureate for Asia/Pacific, was recognized for her pioneering research on materials with unique light absorption properties that may one day be used for harnessing solar energy. 2004 Fellow Ghinwa Naja of Lebanon was supported in her research on microorganisms capable of eliminating pollution-causing heavy metals. Namibia's Gladys Kahaka, 2012 Fellow, is using the latest techniques in biotechnology to study which genes are most important to the growth of certain endangered species in order to enable them to thrive in difficult conditions.



Elizabeth Blackburn (USA)  
L'Oréal-UNESCO Awards Laureate in 2008  
Nobel Prize in Medicine 2009



Lihadh Al-Gazali (United Arab Emirates), Clinical genetics  
*L'Oréal-UNESCO Awards Laureate in 2008*

## ADVANCING WOMEN *who advance Science*

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### SCIENCE FOR UNDERSTANDING THE HUMAN BODY

Some of the most pioneering work in advancing our knowledge of the human body includes key discoveries by two L'Oréal-UNESCO For Women in Science Laureates, Professor Tuneko Okazaki, 2000 Laureate for Asia and Professor Shirley Tilghman, 2002 Laureate for North America. Professor Okazaki was honored for her work in understanding how DNA replicates itself via her discovery of what is now known as the Okazaki fragment. Her name has entered scientific history for her remarkable achievement.

Professor Tilghman, one of the foremost geneticists of her generation who went on to become the first woman president of Princeton University, discovered how certain genes express themselves differently in the embryo depending on which parent transmitted them, a mechanism whose proper functioning is essential to normal embryonic development. Professor Bonnie Basler was named 2012 Laureate for North America for discovering how bacteria use chemicals to communicate with one another, thus opening new doors for treating infections.

### SCIENCE FOR SAVING LIVES

Saving lives is one of the most noble goals of science and one of its greatest gifts to humanity has been the alleviation of pain, suffering and early death. The program has lauded many women whose work has helped prevent, treat or cure disease. 2008 Laureate for Europe, Professor Ada Yonath, who later won the Nobel Prize in Chemistry, was named for pioneering research that led to a better understanding of how antibiotics function. Professors Philippa Marrack and Pamela Bjorkman, respectively 2004 and 2006 Laureates for North America, both made important advances in our understanding of the HIV virus. 2002 Laureate for Europe, Professor Mary Osborne's work on immunofluorescence microscopy has led to numerous applications such as advanced diagnostic techniques for tumors.

The investigation of plants and traditional techniques has played an essential role in recent developments in accessible medicines. Professor Ameenah Gurib-Fakim, 2007 Laureate for Africa, was recognized for launching the monumental task of cataloguing medicinal plant species in her home country of Mauritius.

Numerous Fellows have also been supported in their quest for finding sustainable medicines. 2005 Fellow Reema Faye Tayyem of Jordan was aided in her study of turmeric as a preventive treatment for colon cancer. 2009 Fellow Nonhlanhla Dlamani of South Africa is exploring the use of traditional African medicines in the treatment of Kaposi's sarcoma and 2011 Fellow Nilufar Mamadalieva of Uzbekistan is testing compounds extracted from plants native to Central Asia for their ability to inhibit cancer cell proliferation.





Lourdes J. Cruz (Philippines), Marine science  
*L'Oréal-UNESCO Awards Laureate in 2010*





Ameenah Gurib-Fakim (Mauritius), Organic chemistry/ Phytochemistry  
*L'Oréal-UNESCO Awards Laureate in 2007*

## ADVANCING WOMEN *who advance Science*

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### SCIENCE TO FEED THE WORLD'S GROWING POPULATION

Many Laureates and Fellows are committed to finding solutions to feeding the world's ever-increasing population. Professor Jill Farrant, 2012 Laureate for Africa, was honored for her discovery of how plants survive in extremely dry conditions and her work will contribute to developing food crops that can survive in drought-ridden climates. Professor Jennifer Thomson, 2004 Laureate for Africa, was recognized for her development of plants resistant to viral infections, droughts and other risks. Her team notably developed an experimental variety of corn that is resistant to a disease which has devastated crops in certain regions of Africa.

Khady Nani Dramé, a 2007 Fellow from Senegal, was awarded a fellowship for her research into drought-resistant strains of rice that can be grown in Africa in order to increase food reserves, help local farmers by providing a viable crop and reduce expensive grain imports from outside the continent. 2012 Fellow Sidrotum Naim of Indonesia is investigating the genetic make-up of a newly discovered virus that can kill up to 70% of a shrimp population, with devastating effects on food supplies and local economies. Jamaica's Marcia Roye, 2000 Fellow and, in 2011, the first winner of a new Special Fellowship given to a past winner one decade after her original award, made her reputation with her research on the gemini virus, an insect-borne virus that attacks food crops throughout the world.

ADVANCING WOMEN  
*who advance Science*

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SCIENCE FOR UNDERSTANDING OUR PHYSICAL  
WORLD AND OUR UNIVERSE

L'Oréal-UNESCO For Women in Science Laureates have made major contributions to our knowledge of the physical world—from studying the behavior of atomic particles to studying the composition of distant stars at the far reaches of the universe.

Professor Dame Athene Donald, 2009 Laureate for Europe, was honored for her breakthroughs in the physics of soft matter, discoveries essential to both fundamental research and applied technology. 2009 Laureate for Latin America, astrophysicist Professor Beatriz Barbuy, has made a key advance in understanding the chemical composition of the distant stars and their implications in galaxy formation. 2011 Laureate for

Europe, Professor Anne L'Huillier's research led to the development of an ultra-fast camera that can record the movement of electrons in attoseconds (a billionth of a billionth of a second), an unprecedented advance in our ability to study ultra-rapid atomic phenomena.

Working in a field which has significant applications for numerous industries including water treatment and energy production, the 2011 Laureate for Africa and the Arab States, Professor Faiza Al-Kharafi, has spent her distinguished career investigating the mechanisms underlying how and why metals corrode.



Beatriz Barbuy (Brazil), Astrophysics  
*L'Oréal-UNESCO Awards Laureate in 2009*





Christine Van Broeckhoven (Belgium), Molecular biology  
*L'Oréal-UNESCO Awards Laureate in 2006*



L'ORÉAL-UNESCO  
FOR WOMEN IN SCIENCE AWARDS  
*2013 Laureates*

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**PROFESSOR  
MARCIA BARBOSA**

*Federal University of Rio Grande do Sul,  
Porto Alegre, Brazil*



For discovering one of the peculiarities of water which may lead to better understanding of how earthquakes occur and how proteins fold which is important for the treatment of diseases.

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**PROFESSOR  
REIKO KURODA**

*Tokyo University of Science,  
Japan*



For discovering the functional importance of the difference between left handed and right handed molecules which has wide applications including research on neurodegenerative diseases such as Alzheimer's.

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**PROFESSOR  
PRATIBHA L. GAI**

*University of York,  
United Kingdom*



For ingeniously modifying her electron microscope so that she was able to observe chemical reactions occurring at surface atoms of catalysts which will help scientists in their development of new medicines or new energy sources.

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**PROFESSOR  
FRANCISCA NNEKA OKEKE**

*University of Nigeria, Nsukka,  
Nigeria*



For her significant contributions to the understanding of daily variations of the ion currents in the upper atmosphere which may further our understanding of climate change.

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**PROFESSOR  
DEBORAH S. JIN**

*JILA, National Institute of Standards and Technology,  
and University of Colorado, Boulder, USA*



For having been the first to cool down molecules so much that she can observe chemical reactions in slow motion which may help further understanding of molecular processes which are important for medicine and new energy sources.

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The Awards jury was chaired by Professor Ahmed Zewail, 1999 Nobel Prize in Chemistry, and Linus Pauling Chair Professor of Chemistry and Professor of Physics, California Institute of Technology.



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[www.facebook.com/forwomeninscience](https://www.facebook.com/forwomeninscience)

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L'ORÉAL-UNESCO  
FOR WOMEN  
IN SCIENCE

*Laureates & Fellows*  
*2013*





FOR WOMEN  
*in Science*

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2013

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The 2013 L'Oréal-UNESCO For Women in Science Awards Laureates and Fellows embody the conviction that science and women bring hope and foster discovery, innovation and excellence. Their commitment can inspire countless others in the quest to unlock the secrets of science, to cure disease, to explore the cosmos, and to conserve biodiversity. These advances in research are increasingly important in today's climate of economic uncertainty, as science can play an essential role in accelerating development and driving approaches that inspire progress.

On the following pages you will discover the profiles of these remarkable women in science.



FOR WOMEN  
*in Science*

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2013  
*L'Oréal-UNESCO*  
*Awards*

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AWARDS JURY IN PHYSICAL SCIENCES

PRESIDENT OF THE JURY

*Professor Ahmed ZEWAİL*  
Nobel Prize in Chemistry 1999  
California Institute of Technology  
USA

FOUNDING PRESIDENT OF  
THE AWARDS

*Professor Christian de DUVE*  
Nobel Prize in Medicine 1974  
Institut de Pathologie Cellulaire  
BELGIUM

*Professor Christian AMATORE*  
Chemistry Department  
Ecole Normale Supérieure de Paris  
FRANCE

*Professor Beatriz BARBUY*  
Institute of Astronomy  
Geophysics and Atmospheric  
Sciences University of São Paulo  
BRAZIL  
L'Oréal-UNESCO Laureate 2009

*Professor Margaret BRIMBLE*  
Chair of Organic and Medicinal  
Chemistry University of Auckland  
NEW ZEALAND  
L'Oréal-UNESCO Laureate 2007

*Professor Sylvio CANUTO*  
Institute of Physics  
University of São Paulo  
BRAZIL

*Professor Majed CHERGUI*  
Professor of Physics and Chemistry  
Swiss Federal Institute of Technology  
Honorary Professor, University of  
Lausanne  
SWITZERLAND

*Doctor Laurent GILBERT*  
Director, Worldwide Raw Materials  
Director Advanced Research, Physical  
and Chemical Sciences, L'Oréal  
FRANCE

*Professor Malik MAAZA*  
iThemba LABS - National Research  
Foundation of South Africa  
SOUTH AFRICA

*Professor Jehane RAGAI*  
Department of Chemistry, School of  
Sciences and Engineering  
The American University in Cairo  
EGYPT

*Professor H. Eugene STANLEY*  
University Professor and Director  
Centre for Polymer Studies  
Boston University  
USA

*Professor Mitchell WINNIK,*  
University Professor, Chemistry  
Department, Faculty of Arts and  
Science University of Toronto  
CANADA

*Professor Dongping ZHONG*  
Robert Smith Professor  
The Ohio State University  
USA

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Created in 1998, the L'Oréal-UNESCO Awards are presented every year to five women, one from each region (Africa and the Arab States, Asia-Pacific, Europe, Latin America, North America), in recognition to their contribution to the advancement of science. Scientists around the world are invited to submit candidates, and an international jury of eminent scientists presided in 2013 by Nobel Prize winner Ahmed Zewail makes the final selection.



FOR WOMEN  
*in Science*

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2013  
*Laureates*

2013 LAUREATE  
*Africa & the Arab States*

*Professor  
Francisca Nneka Okeke*

*Professor of Physics, University of Nigeria, Nsukka, Nigeria*

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*For her significant contributions to the understanding of daily variations of the ion currents in the upper atmosphere which may further our understanding of climate change.*

High above the Earth's surface – between 50km to 1,000km – is the ionosphere. The ionosphere is a very thick layer of charged particles, where free electrons exist in number sufficient to influence the transmission of electromagnetic waves at radio frequency. When these ions move in the Earth's magnetic field, current is induced as dynamo, which produces changes in the magnetic field on Earth's surface that affect the planet in a host of ways. Professor Francisca Okeke's research has resulted in new discoveries about the part of the ionosphere located above the equator.

#### HELPING TO UNDERSTAND CLIMATE CHANGE

Francisca Okeke has dedicated much of her career to studying the ionosphere and the "equatorial electrojet phenomenon." Energized by the sun, the electrojet is a river of electrical current that traverses the globe eastward around the dip equator and causes the magnetic field at the dip equator to vary almost five times more than anywhere else on the planet. (The dip or magnetic equator differs from the equator by a few degrees, as the Earth's magnetic north pole is different from what we generally think of as the north pole.)

Professor Okeke's research on how such solar activity in the ionosphere affects the Earth's magnetic field could lead to a better understanding of climate change and help pinpoint sources of dramatic phenomena like tsunamis and earthquakes.

#### GAZING SKYWARD

Childhood curiosity is at the root of Francisca Okeke's remarkable achievements and her passion for studying the heavens began long before she became a physicist. "As a little girl I was fascinated by the sky, why it was sometimes white and sometimes blue, why airplanes could fly instead of falling back to the Earth. Later, once I was in school, I found my vocation when I learned that the answers to these questions could be found in physics."

#### OF MEN AND MENTORS

When asked about entering and subsequently thriving in a field which remains dominated by men, Professor Okeke indicates that her own personal experience has been better than that of most women. "My late father, a mathematician and educator, was a great mentor and he began teaching me higher mathematics at a young age. When I graduated in 1980 there were thirty undergrads in physics and only two of us were women. Fortunately my astrophysicist husband also gave me lots of inspiration and encouragement, too."

Others of her generation did not fare as well. "At the time, society approved of women who possessed what were thought of as typically female characteristics – among others, passivity, emotionality, intuition and receptiveness."

Little wonder, then, that she considers this award "a challenge that encourages me to work harder, particularly in providing the leadership to young women scientists I need to encourage them to forge ahead."







2013 LAUREATE  
*North America*

*Professor  
Deborah S. Jin*

*Fellow of JILA, a joint institute of the National Institute of Standards & Technology (NIST) and the University of Colorado  
NIST Fellow and physicist  
Professor Adjunct, Physics Department, University of Colorado, Boulder, USA*

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*For having been the first to cool down molecules so much that she can observe chemical reactions in slow motion which may help further understanding of molecular processes which are important for medicine and new energy sources.*

Professor Deborah Jin studies what happens when molecules are cooled to near absolute zero, the lowest possible temperature. First, however, she and her team at the University of Colorado had to invent a method for performing this very difficult task. The point of cooling molecules to such low temperatures is that the colder they are, the slower they move. In fact, they slow down enough for researchers to actually see what goes on during chemical reactions.

By succeeding in cooling molecules to the point where she could observe their behavior, Professor Jin made a major discovery and solved a problem that had challenged scientists for years.

#### THE POTENTIAL TO TRANSFORM SOCIETY

As Professor Jin notes, the possible future applications for her work are legion. “Finding ways to use new knowledge coming from this field could potentially transform society. The study of ultra-cold molecules could lead to new precision-measurement tools, new methods for quantum computing and help us better understand materials that are essential to technology.”

#### GROWING UP WITH SCIENCE

Professor Jin’s childhood would seem tailor-made for a budding scientist. “I was surrounded by science. I grew up in Florida in an area called the ‘Space Coast’

because of its proximity to the Kennedy Space Center. And both of my parents were scientists!” Professor Jin says that, since her mother was an engineer with a Master’s degree in physics, she never saw anything unusual about a woman scientist.

She notes that today’s women scientists face a problem that has grown since the days when there were few women in the profession: “Being married to another scientist, one challenge is finding jobs in the same location. In my case, this was resolved by luck, as well as a willingness to make compromises. We were fortunate to find jobs at JILA, where there was a desire to address the ‘two-body problem’.”

#### THE THRILL — AND THE FUN — OF SCIENCE

A summer spent working in a physics lab at NASA’s Goddard Space Flight Center was the tipping point for her choice of career. The experience allowed her to see the connections between physics and everyday life and, as she explains, “Being in the lab was great because you got to play with all sorts of fun toys.”

Despite all of the hard work and long hours that led to her outstanding achievements, it is easy to see that the fun is still there.

“It’s so exciting when you first observe something or when things come together in the experiment and you realize that you’re on the brink of creating something really new.”



2013 LAUREATE  
*Latin America*

*Professor  
Marcia Barbosa*

*Professor and Director of the Physics Institute,  
Federal University of Rio Grande do Sul, Porto Alegre, Brazil*

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*For discovering one of the peculiarities of water which may lead to better understanding of how earthquakes occur and how proteins fold which is important for the treatment of diseases.*

On the microscopic level, water can behave in unusual and unexpected ways – scientists call these strange behaviors anomalies. As water covers nearly three-quarters of the Earth's surface and makes up over half of the human body, pinpointing exactly what happens and why when it does the unexpected is key to advancing knowledge in nearly every field of science.

Professor Marcia Barbosa discovered one of the ways in which water behaves peculiarly and her findings could have an enormous impact on our understanding of a host of natural phenomena, ranging from earthquakes to human proteins.

**WATER IS LIFE**

Identifying the anomalous behavior of water under different pressures and temperatures is a fundamental step toward understanding how biological systems work, in other words, understanding life itself. Proteins are the building blocks of all living things and the way they are shaped is determined by the behavior of the water that surrounds them. Learning more about this protein shaping process is essential to knowing how to manipulate them, with medicine to cure disease for example.

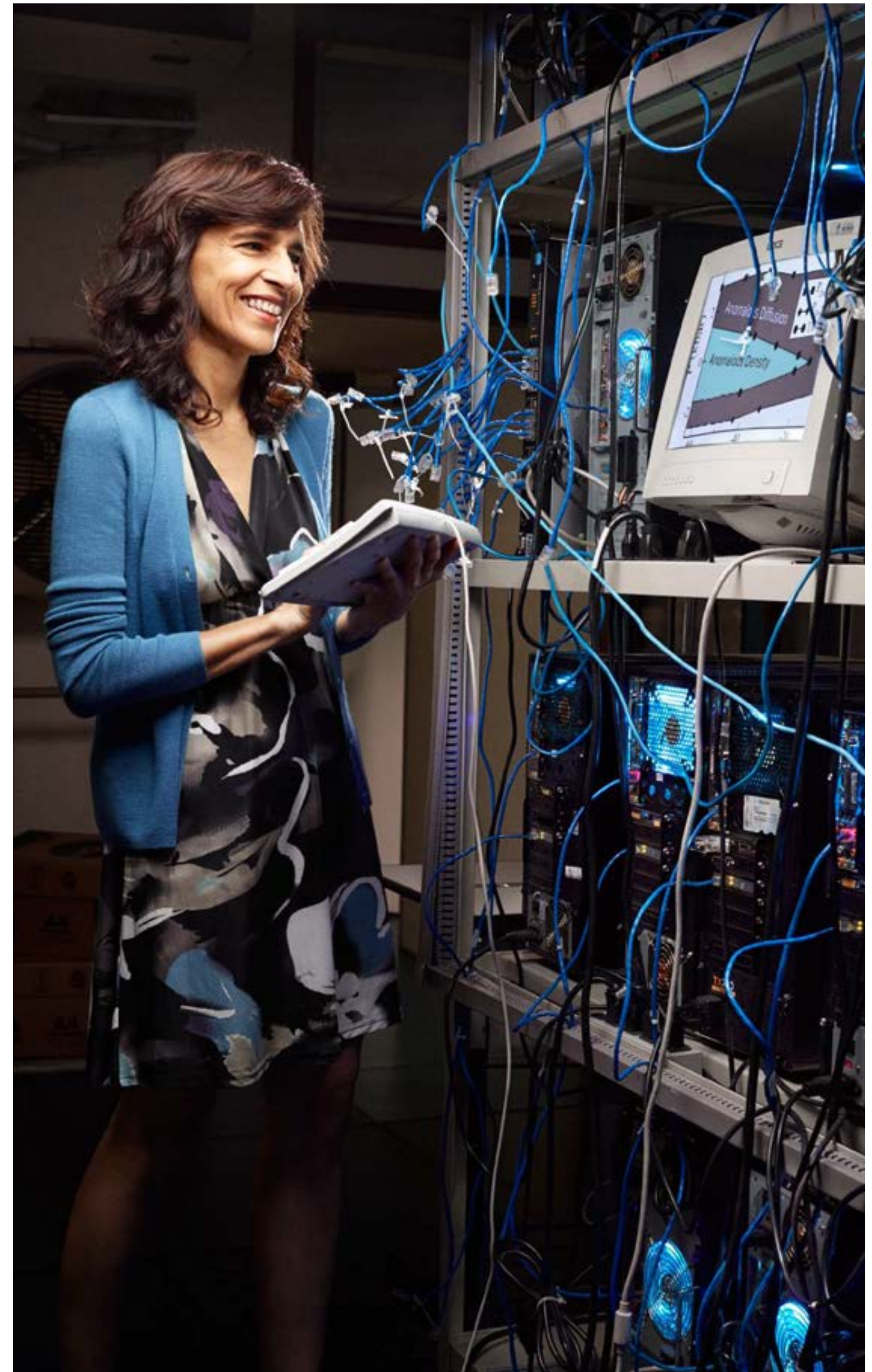
**MORE ENERGY, CLEANER ENERGY**

Among an extremely wide range of other potential applications, the work being done in Professor Barbosa's group could also help solve what she considers the world's most pressing problem: energy. "The increasing numbers of people with access to industrial products and technologies will lead to vastly greater energy consumption. New resources for energy and new ways to obtain traditional forms of energy are urgent," she says. In particular, the study of water anomalies could lead to advances in the production of biofuels, particularly from crops.

**AN ACTIVIST FOR GENDER EQUALITY**

Passionate about the need for more women in science, Professor Barbosa has been involved with gender issues for nearly twenty years. "As a minority in science, we have to make ourselves visible, identify obstacles, and work together to overcome them," she notes. She served as the chairperson of the International Union of Pure and Applied Physics Working Group on Women in Physics and in 2009 she was awarded the American Physical Society's Nicholson Medal for her work on behalf of women in science.

Regarding whether women bring something different to her profession, Marcia Barbosa says with a smile: "One characteristic that I do appreciate while working with other female scientists is the ease of contact, that sometimes by exploring a wide range of possibilities it is easier to identify the solution to a problem."







2013 LAUREATE  
*Asia-Pacific*

*Professor  
Reiko Kuroda*

*Professor, Research Institute for Science and Technology  
Tokyo University of Science  
Japan*

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*For discovering the functional importance of the difference between left-handed and right-handed molecules which has wide applications including research on neurodegenerative diseases such as Alzheimer's.*

The scientific word for Professor Reiko Kuroda's specialty is chirality, a word that simply means handedness. All types of living and non-living things, even the smallest components of our bodies, exhibit chirality, in other words, they are either right-handed or left-handed.

#### **HELPING TO UNDERSTAND THE ORIGIN OF LIFE**

One of the foremost scientists in her field, Professor Kuroda invented several novel instruments for investigating the chirality of molecules -- determining whether they are right-handed or left-handed or revealing the structures of chiral molecules -- and the effects of such handedness on a variety of physical and biological systems. Notably, she was the first to invent a device for measuring chirality in solid matter at a time when existing instruments could only measure liquids.

Today she is using her inventions to study how certain proteins, including those implicated in Alzheimer's disease, adopt a particular structure. Her basic research into chirality at the molecular level, whether biological or non-biological, has important implications for manufacturing drugs and agricultural chemicals, as well as for the study of gene-determining animal body asymmetry, such as snail coiling.

The ultimate reasons for such handedness still remain a mystery that, for very compelling reasons, Professor Kuroda hopes to help solve. "When, why and how the handedness of the biological world occurred is one of the essential keys to investigating the origin of life on this planet."

#### **BRIDGING THE GAP BETWEEN SCIENCE AND THE PUBLIC**

In addition to her groundbreaking research, Reiko Kuroda is also an activist for science. During her term as Vice-President of the International Council for Science she helped launch a program entitled Future Earth and travelled the world to raise awareness of environmental issues and humanitarian concerns. In a related cause, she is deeply concerned by the public's overall lack of scientific knowledge and awareness. At the University of Tokyo she set up the Science Interpreter Training Course, to "nurture citizens with scientific literacy and scientists with social literacy."

#### **CHALLENGING GENDER STEREOTYPES**

With regard to the obstacles facing women in science that she herself encountered, Professor Kuroda takes a lighthearted view of what must have been a discouraging situation.

"My biggest challenge was quite simply to obtain a position that would enable me to carry out research. In my day it was almost impossible for a woman to be given a university post in Japan unless she was very well-connected or very lucky. Even my Ph.D. supervisor told me that the best thing for women is to get married. So I went to England!"

Luckily for science, Reiko Kuroda was a young woman who would not give up easily.



2013 LAUREATE  
*Europe*

*Professor  
Pratibha L. Gai*

*Professor and Chair of Electron Microscopy and Director,  
The York JEOL Nanocentre, Departments of Chemistry and Physics,  
University of York, United Kingdom*

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*For ingeniously modifying her electron microscope so that she was able to observe chemical reactions occurring at surface atoms of catalysts which will help scientists in their development of new medicines or new energy sources.*

Finding ways to see what cannot be seen with the naked eye constitutes some of the most groundbreaking achievements in the annals of science. From 16th century optical microscopes to 21st century electron microscopes, advances in our ability to view previously invisible processes of nature have opened up floodgates of new knowledge.

Professor Pratibha Gai is among the relatively few scientists in history who can lay claim to such a key advancement. Thanks to her truly ingenious modifications to electron microscopes, her work enables us to actually see chemical processes at the atomic level that were once completely mysterious.

**SEEING THE FUTURE**

Her fundamental research promises a plethora of potential applications for an immense range of scientific, technological and economic solutions. In a departure from usual practice, she also researches end-uses for her findings and has gone back and forth from universities to private industry on two continents. Currently working with both the public and private sectors, she is collaborating with firms that will transform her findings into technology and products ranging from eco-friendly paints to more efficient agriculture to new medicines, materials and energy sources.

**"I WAS ACCEPTED AS A PROPER SCIENTIST."**

Originally from India, the young Pratibha Gai's studies took her far from her family at a time when most

women in her country led more sheltered lives and were encouraged to stay close to home. Determined to follow a different path, she worked hard in school and became such a brilliant student that she was eventually accepted at Cambridge University. There she fulfilled her long-cherished dream: a PhD in Physics from the university's famed Cavendish Laboratory and became one of the first women from India to do so. The university still holds an important place in her heart. "Being thousands of miles away from home was daunting in many ways, but at Cambridge I was accepted as a proper scientist."

**MORE SCIENCE AND MORE WOMEN IN SCIENCE**

Professor Gai sees an urgent need to raise public awareness of the crucial role science can play in solving the challenges facing our planet. "Our society has not done enough to increase scientific literacy among the general public," she states. "We don't invest in the long-term scientific goals we need to because the public often doesn't recognise the importance of them."

She has given her time to increasing scientific literacy and she has also worked for another cause she champions: Bringing more women into science.

"I believe that women scientists bring new perspectives to science as well as to the workplace itself. And, after all, we make up 50% of the population and more women in science can only mean more benefits to the world."





FOR WOMEN  
*in Science*

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2013  
UNESCO-L'ORÉAL  
*International  
Fellowships*

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*Ali Zaid*  
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The UNESCO-L'Oréal International Fellowship program was created in 2000 to encourage promising women at the doctoral or postdoctoral level. Fifteen International Fellows, three from each UNESCO region, are chosen to continue their research in prestigious institutions outside their home country. The fellows gain important experience and build networks they can share with others on returning home.

Launched in 2011, a Special Fellowship '...in the footsteps of Marie Curie' is awarded annually to a former International Fellow who, since receiving her fellowship 10 years ago, has demonstrated excellence and determination in the pursuit of her career in research.



FOR WOMEN  
*in Science*

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2013 SPECIAL  
FELLOWSHIP  
“... *in the footsteps  
of Marie Curie*”

2013 SPECIAL FELLOWSHIP  
“... in the footsteps of Marie Curie”

DEVI STUART-FOX

*L'Oréal-UNESCO Special Fellow 2013 "... in the footsteps of Marie Curie"*  
*UNESCO-L'Oréal International Fellow 2003*

*Senior Lecturer and ARC Australian Research Fellow  
Department of Zoology, University of Melbourne, Australia*

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*In the ten years since Devi Stuart-Fox was awarded a UNESCO-L'Oréal For Women in Science International Fellowship, this brilliant evolutionary biologist has made groundbreaking discoveries and numerous contributions to understanding the role that colors play in animal communication. This year's Special Fellow hopes that her work may one day help shed light on how the brain processes information coming from our senses.*



#### COLORS IN THE WILD

“There’s so much beauty and diversity in nature—especially so many weird and wonderful colors!” Since her earliest childhood in Australia, Dr Devi Stuart-Fox has been captivated by the stunning array of hues and shades displayed in the fur, feathers and skins of the animal world. Visual pleasure, however, is not their primary purpose. Colors play a significant role in how species survive, adapt, evolve and split off—the very phenomenon which creates diversity—and in how animals communicate with one another.

Devi’s research has a two-fold purpose. The first is studying how and why the diversity of animal colors and behaviors evolved. The second is exploring animal cognition—how the brain reacts to information coming from the senses, such as color, and then commands the body to respond in the appropriate way. Her hope is that her work “will give people a greater appreciation of the wonders and richness of nature”.

#### A CAREER OF FASCINATING DISCOVERIES

It seems only natural that a scientist studying the role of color in the lives of animals would focus on animals that actually change color, such as certain varieties of lizard and ocean creatures such as octopus and squid.

Among Devi’s many major contributions to her field, perhaps one of the most well-known is her having overturned a long-held idea about chameleons. It had always been thought that their capacity to change color had evolved to facilitate camouflage. Devi and her team discovered that this ability to change color, although it does help them hide from predators, originally evolved to aid chameleons in communicating with one another. Indeed, color pattern complexity drives sexual rather than natural selection. Using highly sophisticated computer models that allow her to study the way animals actually see, as well as much time spent observing their behavior in their natural habitats, she has made a number of such discoveries and answered numerous questions that confounded previous generations of scientists.

Devi has travelled the world to observe all sorts of shade-shifting animals. By her own admission, her first love is lizards. She has been in awe of by these reptiles as far back as she can remember. Hence her advice to her students: “I always tell them to study what they really love. It makes you a passionate researcher.” As proof that her counsel is wise, she goes on to add, “Who would have thought there was a career in studying lizard behavior?”







FOR WOMEN  
*in Science*

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2013  
*International  
Fellows*



2013  
*Fellows*



ARGENTINA  
*Florencia Linero*

*Postdoctoral researcher in virology; PhD in Biochemistry*

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*“One of the biggest issues for women in this profession is being a scientist and a mother at the same time. High-level science requires a great deal of time, effort and travel that make childcare quite a challenge.”*

Florencia Linero aims to develop an improved approach to preventing and curing Argentinean hemorrhagic fever, a serious health problem among agricultural workers caused by the Junin virus, which is transmitted by aerosolized body fluids or infected rodents. Current medicines have limited effectiveness and, if left untreated, the virus causes death in up to one in three cases. Florencia will conduct research to find a more efficient treatment for the virus via a novel form of nanobody medical technology, which makes use of antibody fragments rather than entire antibodies to fight diseases.

FIELD OF RESEARCH:  
*Virology*

CURRENT INSTITUTION:  
*Laboratory of Virology, University of Buenos Aires,  
Argentina*

HOST INSTITUTION:  
*Department of Molecular Biomedical Research,  
University of Ghent, Belgium*



BANGLADESH  
*Kanika Mitra*

*Postdoctoral researcher; PhD in Food and Nutrition*

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*“There are still barriers to women in science, but I believe that they can be overcome by confidence, a positive attitude and ensuring that you gain all the knowledge and learning possible in a specific field.”*

More than a quarter of the Bangladeshi people are undernourished, yet much of the country’s fresh produce goes to waste because basic processing and preservation techniques are not available. Kanika Mitra’s research will initially focus on preserving the nutrients in the Arum plant during storage. Arum is cheap to grow, rich in calcium and iron and frequently used as a source of food during droughts. Subsequently she will attempt to apply her findings to preserving blueberries and strawberries in order to make them viable crops for farmers, as well as to ensure that these nutrient-rich fruits are more readily available to her country’s growing population.

FIELD OF RESEARCH:  
*Food Science*

CURRENT INSTITUTION:  
*Institute of Food Science & Technology,  
Bangladesh Council of Scientific and Industrial  
Research, Dhaka, Bangladesh.*

HOST INSTITUTION:  
*Food Science and Technology Department, School  
of Chemical Engineering, University of New South  
Wales, Sydney, Australia.*



CAMEROON  
*Marie Florence Ngo Ngwe*

*PhD student in Plant Biotechnology*

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*“As mothers or potential mothers, women scientists may perhaps have a special sensitivity to problems that directly affect the quality of human life.”*

Marie Florence Ngo Ngwe’s project is designed both to preserve biodiversity and to help ensure food security for her fellow West Africans. Yams are among the main sources of nutrition in the region and their extended storage capacity makes them invaluable in times of food scarcity. As indigenous forests—the habitats of wild yam species—are being destroyed to make space for crops, and farmers grow only a limited number of domestic species, genetic diversity is gradually being eroded. Marie Florence will first investigate the genetic make-up of a variety of wild and domestic yam species to determine which ones provide the best seed plants. Subsequently, she aims to create a seed bank that will preserve the DNA of species against risk of extinction and provide farmers with a source of genetically diverse seeds.

FIELD OF RESEARCH:  
*Plant Biotechnology*

CURRENT INSTITUTION:  
*Institute of Agricultural Research for Development  
and University of Yaoundé, Cameroon*

HOST INSTITUTION:  
*Institute of Plant Biology Research, University of  
Montreal, Canada*





COLOMBIA  
*Lina Gallego*

*PhD student in Biological Sciences*



CUBA  
*Ariana Barbera*

*PhD Student in Biotechnology*

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*“Fighting for the inclusion of women in science and technology is crucial not only to attaining the highest standards of research, it is also essential for economic development.”*

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*“My biggest challenge has been being a good mother to my son while at the same time pursuing a career in science. I’m fortunate to have a husband who is supportive and understanding.”*

Breast cancer accounts for some 30% of all cancers diagnosed in women in developed countries and about 16% of all cancer deaths. Yet breast cancer is not a single disease with a single treatment. There are four main forms of the disease each with a different genetic profile. Lina Gallego’s research is part of a major study designed to determine which types of treatment prior to surgery are the most effective for each type of breast cancer. Lina will investigate the distribution of these four profiles among Latin American breast cancer patients and then use the profiles as predictive and prognostic tools for treatment. Lina’s work will be particularly important to the study because the occurrence of breast cancer varies considerably between ethnic groups and Latin America’s diverse genetic ancestry offers particularly fertile ground for such research.

FIELD OF RESEARCH:  
*Cancer Genomics*

CURRENT INSTITUTION:  
*Laboratory of Genome Structure and Function,  
University of Tokyo, Japan*

HOST INSTITUTION:  
*Laboratory of Molecular and Cellular Therapy,  
Leloir Institute, Buenos Aires, Argentina*

Autoimmune diseases—diseases that occur when the body “attacks” itself—include more than 80 chronic inflammatory illnesses that collectively affect 5% to 8% of the worldwide population, 78% of whom are women, and—for reasons unknown – their prevalence and incidence are rising. Ariana Barbera will investigate the role of T-cells in the body’s immune system in the hopes of finding new forms of treatment for these illnesses. Most current treatments have serious or even fatal side effects and leave patients unable to fight infection. Ariana’s work will focus on determining whether certain peptides can be used to enhance the performance of the immune system’s disease-fighting T-cells while selectively eliminating its disease-causing T-cells.

FIELD OF RESEARCH:  
*Immunology*

CURRENT INSTITUTION:  
*Department of Proteomics, Center for Genetic  
Engineering and Biotechnology, Havana*

HOST INSTITUTION:  
*Department of Infectious Diseases and Immunology,  
Utrecht University, The Netherlands*



USA  
*Allison Louthan*

*PhD student in Ecology*

*“Rather than simply integrating women scientists into the existing male-dominated environment, we should think about how the presence of more women could have a positive impact on science.”*

Allison’s Louthan’s project addresses a critical aspect of conserving biodiversity in the face of climate change: How species will shift their distributional limits—the geographical ranges where they can survive—as climate change takes place. Science has made great progress in predicting how species will move in response to climate change, but still has a poor sense of how such moves might be affected by interactions with other plant and animal species. Allison’s work will explore where and when interactions with other species are critical drivers of geographic limits, and when these interactions are less critical for predicting territorial shifts. She hopes to increase our knowledge of where we need to conserve communities of species in concert and, conversely, where we can focus on conserving individual species.

FIELD OF RESEARCH:  
*Ecology*

CURRENT INSTITUTION:  
*University of Wyoming, USA*

HOST INSTITUTION:  
*Mpala Research Centre Nanyuki, Kenya*

2013  
*Fellows*



GHANA  
*Anita Takura*

*PhD student in Agricultural Sciences*

*“Where I come from, most people perceive a woman in science as someone who stays in school too long, wasting her time learning about things that have nothing to do with running a home and taking care of children!”*

Ghana, like many developing countries, faces the dual challenge of modernizing farming practices in order to provide adequate food supplies for a growing population while simultaneously ensuring that these new agricultural methods do not harm the environment. Anita Takura will conduct extensive research in northern Ghana to judge the effectiveness of new farming methods in terms of food productivity, especially with regard to small farmers, and to determine their impact on the surrounding eco-systems. Few rigorous studies have been done in this arena, and the information compiled and analyzed by Anita will be of vital importance in helping governments and donor organizations create conditions for sustainable, eco-friendly agriculture.

FIELD OF RESEARCH:  
*Agricultural and Environmental Science*

CURRENT INSTITUTION:  
*ACDI/VOCA, ADVANCE project, Accra, Ghana*

HOST INSTITUTION:  
*School of Biosciences, University of Nottingham, United Kingdom*





INDONESIA  
*Sri Fatmawati*

*Lecturer and postdoctoral researcher; PhD in Agricultural Science*

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*“Science is so important in our world today that the opportunity to learn science should be considered a human right for every girl and boy, everywhere on our planet.”*

Sri Fatmawati's postgraduate research has centered on the scientific analysis of plants that have been used for centuries in jamu, Indonesia's traditional herbal medicine. She is now interested in exploring the medicinal possibilities of her home country's rich marine diversity to extend her study to marine species from the Indo-Pacific Ocean. More specifically, she will look at sponges. Once she has isolated and purified the molecules in sponges that may have medicinal potential, she will test their biological activity *in vitro* to see if they demonstrate anti-microbial, anti-inflammatory or anti-tumor properties. Her work could open doors to new forms of treatment for diseases such as malaria, cancer and Alzheimer's.

FIELD OF RESEARCH:  
*Natural Products Chemistry*

CURRENT INSTITUTION:  
*Department of Chemistry; Sepuluh Nopember  
Institute of Technology; Surabaya  
Indonesia*

HOST INSTITUTION:  
*Institute of Natural Products Chemistry; National  
Center for Scientific Research (CNRS), Gif-sur-Yvette,  
France*



ITALY  
*Marina Faiella*

*Postdoctoral researcher in biochemistry and biotechnology; PhD in Chemistry*

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*“There is something we women in science still need to work on: Self-esteem. We must have the confidence to say ‘I can do it’ no matter what obstacles the world puts in our way.”*

Marina Faiella's project is focused on creating artificial proteins that could be used to produce hydrogen. If simple and efficient methods of production and utilization can be developed, hydrogen gas has the potential to become a limitless source of clean energy. One such method--which scientists hope one day to duplicate--is found in nature, in a class of proteins called hydrogenases. Although recent years have seen a variety of breakthroughs in comprehending the structure and function of these enzymes, fundamental questions about their mechanisms remain unanswered. Through her study, Marina hopes to answer some of these questions and make discoveries that can lead the way to the use of hydrogen as a plentiful, inexpensive, eco-friendly fuel source.

FIELD OF RESEARCH:  
*Biochemistry and Biotechnology*

CURRENT INSTITUTION:  
*Department of Biotechnology; Delft University of  
Technology;  
The Netherlands*

HOST INSTITUTION:  
*Department of Chemistry and Biochemistry; Arizona  
State University, Tempe, USA*



ISRAEL  
*Osnat Penn*

*Postdoctoral researcher, PhD in Computational Biology*

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*“Society’s attitudes toward women in science still need to evolve. When I go to conferences abroad colleagues often ask, ‘Who’s taking care of your kids while you’re away?’ Needless to say, my husband has never been asked that question.”*

Autism is known to have a hereditary component but scientists have had difficulty identifying the precise genetic causes. Computational biologist Osnat Penn plans to tackle this challenge by analyzing massive quantities of data obtained through genome sequencing. She will use cutting-edge computer programs to compare the genomes of autism sufferers, their unaffected parents and thousands of unaffected people from populations around the world. The goal is to identify the specific areas where the autism variation occurs in the human genome. Her research is designed to help enable prenatal screening and early diagnosis of autism in children and could one day contribute to creating treatments for the disorder.

FIELD OF RESEARCH:  
*Computational Biology*

CURRENT INSTITUTION:  
*Department of Cell Research and Immunology, Tel-Aviv University, Israel*

HOST INSTITUTION:  
*Department of Genome Sciences, University of Washington, Seattle, USA*



LEBANON  
*Laure El Chamy*

*Researcher and assistant professor in Molecular Biology; PhD in Molecular Biology*

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*“I’m lucky to be working in an environment with accomplished women scientists who set very high targets. When faced with challenges, I can look at them and say to myself, ‘If they did it, I can do it, too!’ ”*

A marvel of nature, the immune system recognizes illness-causing bacteria, viruses, damaged cells and other “enemies” and initiates a cascade of rapid responses that eliminates them with stunning effectiveness. Yet in some cases the immune system overreacts and also destroys “friendly” cells that the body needs to function properly, which can result in cancer or chronic inflammatory diseases such as lupus and arthritis. Using fruit flies, Laure El Chamy aims to pinpoint certain of the genes that are activated when the immune system deploys its cascade of responses. By deepening our understanding of the system’s precise mechanisms, Laure’s research is designed to shed light on how we might one day promote the immune response so that the body can combat disease without also attacking cells that are essential for its proper functioning.

FIELD OF RESEARCH:  
*Molecular Biology*

CURRENT INSTITUTION:  
*Faculty of Sciences, Saint Joseph University, Beirut, Lebanon*

HOST INSTITUTION:  
*Institute of Molecular and Cell Biology; National Center for Scientific Research (CNRS), Strasbourg, France*



2013  
*Fellows*



MONGOLIA  
*Enkhmaa Davaasambuu*

*Clinician and researcher; PhD in Reproductive Health*



MOROCCO  
*Naima Abattouy*

*Postdoctoral researcher; PhD in Biology*

*“This fellowship will enable me to broaden my knowledge as a researcher and a clinician in a world-renowned medical center with state-of-the-art screening, diagnostic and treatment options.”*

*“Female scientists are not only important for science. In traditional male-dominated societies, they provide living proof that women are just as capable as men.”*

Enkhmaa Davaasambuu is a reproductive health specialist who will study why certain women have a greater risk of developing hypertension and preeclampsia during pregnancy than others. She will also investigate why women who develop these conditions during pregnancy are twice as likely to suffer from cardiovascular disease as they age. One aim of Enkhmaa’s research is to contribute to lowering the mortality rate for women and children during pregnancy and childbirth. The second is to gain a better understanding of the timing and nature of cardiovascular disease risk as it emerges after a hypertensive pregnancy in order to create new screening methods and preventive treatments.

FIELD OF RESEARCH:  
*Maternal Health*

CURRENT INSTITUTION:  
*National Centre for Maternal and Child Health,  
Ulaanbaatar, Mongolia*

HOST INSTITUTION:  
*The Women’s Heart Center, Cedars-Sinai Heart  
Institute, Los Angeles, California, USA*

Leishmaniasis, a parasitic disease transmitted by sand flies, is endemic in 88 countries and nearly 2 million new cases are reported annually. One form of the illness causes disfiguring skin lesions and another attacks the liver and can be fatal if left untreated. The rural population of Naima Abattouy’s native Morocco is particularly affected by leishmaniasis, with women and children disproportionately afflicted and outbreaks becoming more numerous every year. Naima will study the sand fly carrier in the laboratory and conduct field research in her country to determine the environmental and lifestyle factors that facilitate the spread of the disease. Naima’s findings will be key to health authorities throughout the world and potentially protect millions from suffering and death.

FIELD OF RESEARCH:  
*Biology*

CURRENT INSTITUTION:  
*Abdelmalek Essaadi University, Faculty of Science,  
Tetouan, Morocco*

HOST INSTITUTION:  
*Department of Parasitology, University of Granada,  
Spain*

2013  
*Fellows*



NIGERIA  
*Eucharia Oluchi Nwaichi*

*Lecturer and Postdoctoral researcher; PhD in Biochemistry*

*“Along with access to facilities and equipment, this fellowship also exposes my research to constructive criticism that will increase my chances of a positive outcome.”*

The Niger Delta region of Nigeria is threatened with severe pollution from petroleum and other industrial contamination that leaves precious agricultural land unfit for use. Highly toxic chemicals risk entering the food chain with subsequent catastrophic effects on human health. Eucharia Nwaichi will study the potential use of living plants in providing a viable solution to this problem. Plants can rid the soil of pollutants either by transforming them into less harmful substances or by binding them inside their own tissues. Eucharia will assess the suitability of two local plant species for cleaning up polluted land in the Niger Delta so that it can be used for much-needed food crops.

FIELD OF RESEARCH:  
*Environment and Toxicology*

CURRENT INSTITUTION:  
*University of Port Harcourt, Nigeria*

HOST INSTITUTION:  
*Laboratory of Molecular and Environmental Microbiology, Institute of Agrophysics, Lublin, Poland*



SUDAN  
*Sahwa Adil Nourein*

*Medical doctor and PhD student in Immunology*

*“Women in science face many of the same challenges faced by women in every field: Dedication is the only way to overcome these obstacles!”*

Losing a baby before birth is a heart-wrenching experience for over 3 million women across the world every year. This experience is even more traumatic when it is repeated with subsequent pregnancies. Such recurrent stillbirths are often linked to auto-immune conditions and Sahwa Adil Nourein hopes to shed light on this phenomenon by studying the link between stillbirth and Systemic Lupus Erythematosus (SLE), an autoimmune disease suspected to be among the possible causes. She aims to determine whether the high incidence of stillbirths in Sudan is directly linked to SLE and she will conduct a comparative study of Swedish and Sudanese women suffering from the same condition in order to determine whether ethnicity is a factor. The ultimate goal of Sahwa's research is to find treatments for pregnant women that will improve their chances of having a healthy baby.

FIELD OF RESEARCH:  
*Clinical immunology*

CURRENT INSTITUTION:  
*Faculty of Medicine, University of Khartoum, Sudan*

HOST INSTITUTION:  
*Department of Immunology, Genetics and Pathology, Uppsala University, Sweden*



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