FOR WOMEN
IN SCIENCE

United Nations
Educational, Scientific and
Cultural Organization

L'ORÉAL
FONDATION
D'ENTREPRISE

WE SUPPORT WOMEN WHO MOVE SCIENCE FORWARD

2012 edition

iving the young generations the chance to achieve excellence.

Each year, the "For Women in Science" programme gives me the opportunity of seeing how young researchers are driven by the same fervour and motivation that inspired me when I started out. When I began my career, choosing to study science was rather like taking religious orders. The excitement of the challenge ahead, the discipline of research, and the experience of the rare joy of discovery took up all my energies and all my time.

Today this commitment is no longer being made in the same context. Our young people are working in a society that has scant regard for science, and is increasingly suspicious of its applications. They are facing a crisis in which budget restrictions and bureaucratic complications stifle the freedom of researchers on a daily basis. This is particularly true for women, who have always been the poor relations of the scientific world, and even truer for women who are working in emerging countries.

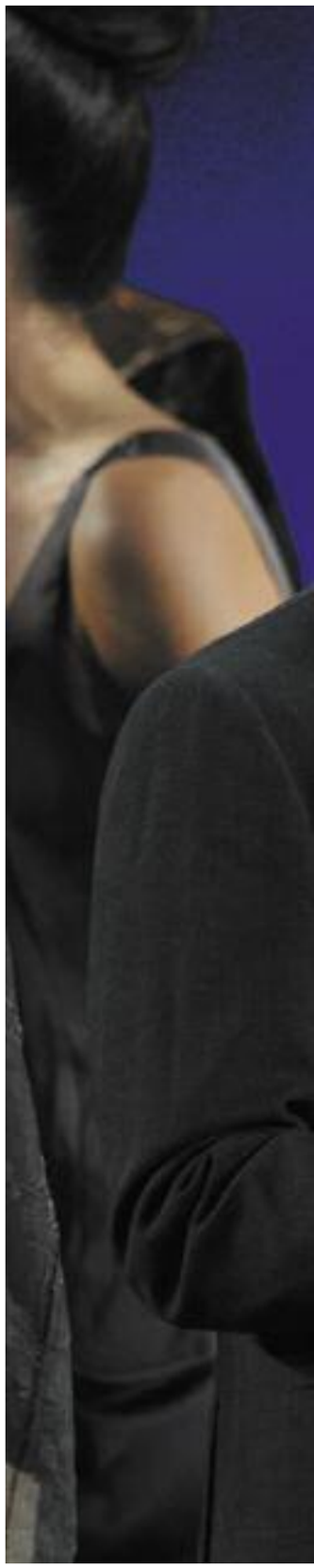
Today more than ever, it is important to point out that scientific research is a path of excellence in which there must be no question of letting standards slip. It is essential to have fair salaries, the necessary budgets, and genuine prospects for the future. No one is born a researcher, it is something that you become, and our young people's ability to explore the unknown is the capital of our future generations. Speaking as a scientist of long standing, there is one thing I cannot overemphasise: "Don't be afraid to set your sights very high, and whenever possible, be guided by your curiosity rather than being hemmed in by a fixed programme."

The award laureates, the fellows, and the research that we recognize each year demonstrate that this path is possible, and that it is rich in discoveries. The eminent scientists on our juries, and the partners L'Oréal and UNESCO, are thus pointing the way forward, in our current uncertain times, to a future which is being written with young people, women and science.

Professor Christian DE DUVE

Nobel Prize in Medicine 1974
Founding President of the L'Oréal-UNESCO Awards

WE SUPPORT WOMEN WHO **MOVE SCIENCE FORWARD**



Women constitute just a small proportion of scientists worldwide. We do not have the right to deprive half of humanity of its full potential, and to waste talent by allowing young women to turn away from science education and scientific careers, not because of their personal choices but because of discriminatory stereotypes.

The L'Oréal Foundation and UNESCO have been working together for the past 14 years to bring visibility and support to the work of exceptional women scientists who help scientific knowledge progress and serve as models for younger generations. The United Nations Conference on Sustainable Development (Rio +20), which will be held in June 2012, will have to respond to the global challenge of creating a green economy, and inclusive and equitable societies. By offering innovative and transdisciplinary solutions that serve humanity, science is the key to this response.

It is crucial that we all come together behind this common goal. On the occasion of the 2012 L'Oréal-UNESCO Awards and Fellowships, let's send a message to the world: sustainable development needs science, and science needs women!

Irina BOKOVA
Director General of UNESCO

For Women in Science began with an indisputable, inescapable truth: since science has always been at the heart of L'Oréal's activities, we found the lack of women in high-level research positions not only shockingly unjust, but also detrimental to science itself. Something had to be done. To this end, we undertook a pioneering effort to support and encourage outstanding women scientists with a system of awards and fellowships established in partnership with UNESCO.

The only programme of its kind in the world, For Women in Science accompanies women throughout their careers, setting in motion for each of them a virtuous circle of self-confidence and success. Furthermore, in certain countries, it helps advance the cause of freedom and underscores women's contribution to society. In 14 years, For Women in Science has already identified nearly 1,300 exceptional women scientists in 106 countries, and has been a turning point in many of their lives.

Today this initiative is a prime example of our company's commitment to corporate social responsibility and ethics. Yet the programme has always been more than that for us: it also serves are the inspiration for our involvement in other projects of this kind. I am proud to have worked for this noble cause and to leave it as a legacy to my successors.

Sir Lindsay OWEN-JONES
Chairman of the L'Oréal Corporate Foundation

Sir Lindsay OWEN-JONES and Irina BOKOVA at the For Women in Science Award ceremony.

FOR WOMEN IN SCIENCE
EACH YEAR A GLOBAL PROGRAM

CONSECRATE
SCIENTIFIC EXCELLENCE & ROLE MODELS

5 INTERNATIONAL AWARDS Created in 1998, the L'Oréal-UNESCO Awards have been presented every year to five women, one from each region (Africa and the Arab States, Asia-Pacific, Europe, Latin America, North America), in recognition of their contribution to the advancement of science. Scientists around the world are invited to submit candidates, and an international jury of eminent scientists presided by Nobel Prize winners makes the final selection. The Awards are presented in Life Sciences and Physical Sciences in alternating years.

RECOGNIZE
COMMITMENT AND ACHIEVEMENT AT MID-CAREER

1 INTERNATIONAL SPECIAL FELLOWSHIP '... in the footsteps of Marie Curie' Created in 2011, the Special Fellowship 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.

ENCOURAGE
PROMISING YOUNG SCIENTISTS & INTERNATIONAL EXCHANGES

15 INTERNATIONAL FELLOWSHIPS The UNESCO-L'Oréal International Fellowship program was created in 2000 to encourage promising women who are working in the life sciences 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.

20 REGIONAL & 180 NATIONAL FELLOWSHIPS In response to local needs, the L'Oréal-UNESCO For Women in Science program also provides fellowships to promising young women researchers in various branches of the sciences at the national and regional levels. Two Regional Fellowship programs have been developed in Sub-Saharan Africa and in the Arab States, while National Fellowship programs are now in place in 47 countries.

CONSECRATE SCIENTIFIC EXCELLENCE **INTERNATIONAL AWARDS**

'If mankind is to survive, we need all the good ideas from all the brains, regardless of sex. And in all areas of activity, including science.'

Günter BLOBEL
Nobel Prize in Medicine 1999
President of the L'Oréal-UNESCO Awards Jury in Life Sciences

Members of the L'Oréal-UNESCO Awards Jury in Life Sciences during the 2012 Awards deliberation in Paris

The President of the Jury
Günter Blobel

The 2012 L'Oréal-UNESCO For Women in Science Laureates were chosen because their work caused a 'paradigmatic shift': the Laureates, whose research covers a wide spectrum of biological sciences, have all uncovered new ways of looking at old problems. They all share a passion for knowledge and a quest for excellence.

Jill Farrant works with 'resurrection plants' which survive in extremely dry conditions. Although they appear to be dead, they fully revive as soon as they receive water. The genes responsible for that survival may be very important for eventually cultivating plants in very arid conditions and help us with feeding a burgeoning world population.

Epilepsy causes seizures. By pioneering the study of genetics in epilepsy and identifying the first involved genes, **Ingrid Scheffer** has opened new avenues for diagnosis and therapy of this devastating disease.

Frances Ashcroft's work represents a breakthrough in diabetes research. She has uncovered a protein that explains for the first time the relationship between glucose and insulin secretion, a discovery that has already had a dramatic impact on the lives of those diabetes patients who have a genetic defect in this protein.

Rotavirus infections kill over half-a-million children in developing countries every year. **Susana López** studies how rotaviruses infect cells. Her insights have provided important new tools for diagnosis and treatment.

Although bacteria live as single cells, **Bonnie Bassler** has discovered how they communicate with each other, enabling them to act together. These insights could be crucial for developing new antibiotics against infections.

As President of this Jury, I'm proud to introduce you to these five exceptional scientists.

Günter BLOBEL
Nobel Prize in Medicine 1999
President of the L'Oréal-UNESCO Awards Jury in Life Sciences

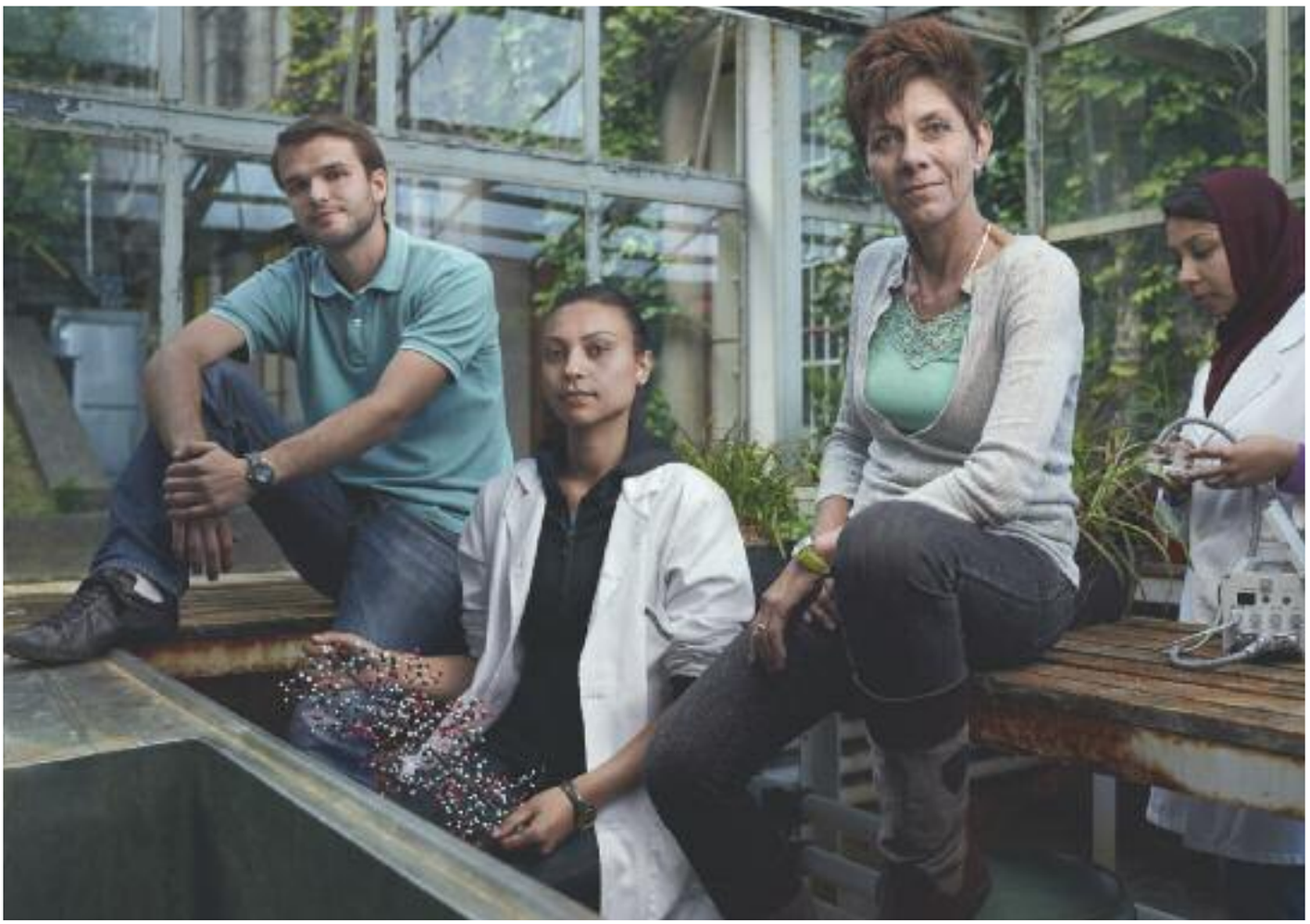
LAUREATE FOR AFRICA AND ARAB STATES

Research Chair in Plant Molecular Physiology,
Department of Molecular and Cell Biology, University of Cape Town
SOUTH AFRICA

'For discovering how plants survive under dry conditions.'

Pr. JILL FARRANT

Jill Farrant, professor of molecular and cell biology at the University of Cape Town, South Africa, is the world's leading expert on resurrection plants, which 'come back to life' from a desiccated, seemingly dead state when they are rehydrated. Professor Farrant is investigating the ability of many species of these plants to survive without water for long periods of time from a number of angles, from the molecular, biochemical and ultrastructural to the whole-plant ecophysiological, using a unique comparative approach and working with many different species of resurrection plants and a variety of tissues. The ultimate goal is to find applications that will lead to the development of drought-tolerant crops to nourish populations in arid, drought-prone climates, notably in Africa, and her research may have medicinal applications as well.



BACK TO LIFE

As spring turned to summer in South Africa in late 2011, Professor Farrant was enthusiastically watching the reaction of a plant she had recently discovered that is the only one known to transition into a drought-tolerant state when the dry season arrives. 'It's starting to switch on the right genes,' she said, adding, 'To look at the signals involved is awesome.' She speaks about the resurrection plants she studies – which have the fascinating ability to revive from a dried-out, seemingly dead state to full, green life when given water – almost with affection. 'They have a special place in my life,' she admitted. In fact, these plants carry a certain symbolism for Jill Farrant.

Like the plants that are the subject of her research, she has undergone something of a resurrection. Three years ago, she suffered a head injury that brought her within an hour of death. Coming back to life after that traumatic experience has been a mighty struggle – not least because she has since lost her senses of taste and smell – but one that has enabled her to find a new balance between her work and private life. Her goal now is 'to be able to live on a day-to-day basis with happiness and serenity and passion for whatever I do, be it my work or people or my hobbies.'

Key figures

51.7%
of the South African labor force are women.
(2001 Census)

33%
of researchers in South Africa are women.
(National Advisory Council on Innovation, 2006)

Millions of hectares
of food crops in Africa have been lost to drought in the past decade.
(Reuters, 25/08/2010)

750,000 people
were at risk of dying from drought-induced famine in East Africa in 2011.
(United Nations Food and Agriculture Organization, 5/09/2011)

'I would love to find a solution to world problems like food security. That would be a big thing for me. But you get there slowly, step by step.'

AN EARLY PASSION FOR NATURE

Professor Farrant's desire to be a scientist and her interest in resurrection plants both stem from her childhood on the family farm. 'I spent a lot of time on the farm on my own,' she says, 'and my passion for nature started there.' When she was nine years old and an avid birdwatcher, she was sitting one day in a favourite place called the Flat Rocks and noticed that what had seemed to be a dead plant on a rock had come alive again after it rained. She still has the diary in which she noted the experience: 'The ded [sic] plant on the rocks was alive but Dad wouldn't believe me.'

A memorable trip to the Solomon Islands when she was 18 convinced her that she should become a marine biologist. Later, she was inspired by her professors and role models Patricia Berjak and Norman Pammenter, a husband and wife team at the University of KwaZulu Natal, 'my guiding lights, who have dedicated their whole life to science' and with whom she still sometimes collaborates. 'Science was always a passion,' adds Jill Farrant, 'and it just evolved.'

Later, the memory of the dead plant's revival when she was a child inspired her to focus her research on resurrection plants when she returned to South Africa from the United States, where she had been studying for a year. Nelson Mandela had just been released from prison, and she had been offered a job at the University of Cape Town. She wanted to be part of the new South Africa. 'I knew I could make a difference,' she said. 'It's really important to educate people so they can make informed decisions. That's why I came back.'

FIVE YEARS TO DROUGHT-RESISTANT MAIZE?

While the holy grail of her research is to make possible the development of drought-resistant crops, some of these plants may also have 'very promising medicinal uses' that she is not yet prepared to talk about. How long might it be before these dreams become reality? 'How long is a piece of string?' she asks. 'It's not just about finding a whole set of genes that seemingly are required for drought tolerance. You've got to look at the whole plant physiology in order to understand what protective processes are involved and how these, in turn, are regulated at the molecular level.' That said, she thinks that pre-commercial production of drought-tolerant maize varieties might be possible in five years. 'But you never know,' she cautioned.

WACKY IDEAS AND LATERAL THINKING

Professor Farrant, who describes herself as a spiritual person who delights in understanding God's creation and who often communicates with Him in nature, is so passionate about every aspect of her work, from basic research to teaching, that she has trouble choosing one that interests her more than others. 'I am fascinated with the applications,' she said. 'I would like to understand what plants are doing, how they do it, what their signalling molecules are, how they talk to each other. I would, of course, love to find a solution to world problems like food security. That would be a big thing for me. But you get there slowly, step by step.'

One of her gifts, she believes, is to have 'wacky ideas' that lead her into new areas. This kind of lateral thinking is something that she appreciates about working and brainstorming with other women. She also channels her creative streak into writing poetry and songs, and recently bought herself a piano and plans to teach herself how to play.

LAUREATE FOR ASIA-PACIFIC

Chair of Paediatric Neurology Research
Florey Neuroscience Institutes, Departments of Medicine and Pediatrics
University of Melbourne,
AUSTRALIA

'For identifying genes involved in some forms of epilepsy.'

Pr. INGRID SCHEFFER

Ingrid Scheffer, a paediatric neurologist and professor at the University of Melbourne, is helping to transform the diagnosis and treatment of epilepsy, a brain disorder characterized by seizures and other symptoms that can be extremely disruptive to the lives of the 50 million people affected by it. She has described several new forms of epilepsy and her research group was the first to uncover a gene for epilepsy and subsequently, many of the genes now known to be implicated. These revolutionary findings, which have already improved diagnosis and treatments for many patients and may lead to the development of new therapies, can also be used for genetic counselling. Professor Scheffer's goal is to 'make a major difference to patients and families through science'.

THE DOCTOR AS DETECTIVE

Ingrid Scheffer sees herself as a sort of detective. She collects clues from patients, their families, imaging and brainwave investigations, as well as specialists in a range of scientific disciplines, and then fingers the culprits: the various causes of epilepsy, the most common brain disorder affecting children. In all, around 50 million people worldwide have epilepsy, and they experience seizures of many types that vary in severity and length, often seriously impairing a person's ability to lead a normal life. One of Professor Scheffer's strengths is that she studies epilepsy from two vantage points, as a paediatrician who regularly sees and treats patients, and as a scientific researcher. These two distinct but highly complementary roles have contributed to the extraordinary success she has had in uncovering the genetic origins of many types of epilepsy. For the Laureate from Australia, seeing patients in the clinic and doing research in the lab go hand in hand, feeding into and informing each other. 'You have to look at patients and see what scientific questions they might be asking or answering,' she says, 'and then you take that back to a research setting and think about how you can try to answer that question.' Success in understanding the underlying science means being able to help the patient directly. 'You can see that you are really making a difference to their lives.'

That has already happened as a result of her work on Dravet syndrome, for example, a severe form of epilepsy that starts at the age of about six months. Ingrid Scheffer and her colleagues were the first to show that sodium channel genes caused febrile seizures. This led to a Belgian discovery that sodium channel gene mutations caused Dravet syndrome, later confirmed by Ingrid Scheffer and her collaborative group. This genetic information has already impacted on a selection

Key figures

45%
of the total Australian work force are women.
(Australian Bureau of Statistics, July 2011)

22%
of full-time professionals in all levels of science, engineering and technology in Australia are women.
(Kate Ellis, Minister for the Status of Women, 20 July 2011)

7%
of Australian Academy of Sciences members are women.
(Women in Science Enquiry Network 2009)

40 different types
of epilepsy seizure have been identified.
(UK Epilepsy Society 2011)

50 million people
worldwide have epilepsy.
(US Epilepsy Foundation 2011)

of the best treatments and genetic counselling for families. 'Whilst we can't fix those mutations – I hope one day we will be able to – we know that if you have that diagnosis, certain drugs work, while others might make you worse. We've already seen that my research has had a lot of applications, and the field is only in its infancy.'

'One of the beauties of science is that I can make a difference to a patient I see today, that doesn't touch the rest of the world, but my science does.'

NEW THINKING FOR AN OLD DISEASE

During her career Professor Scheffer has often had to buck accepted wisdom about epilepsy. When she was training at the Great Ormond Street Hospital for Sick Children in London, where she did her first research projects, and was about to embark on her epilepsy training in Melbourne, she told her mentor that she was thinking about doing her PhD in genetics of epilepsy. 'You'll never get anywhere with that,' he said. 'To his credit,' says Ingrid Scheffer, '10 years later he sent me an e-mail saying he was wrong. We've made a big difference to people's understanding of genetics and epilepsy. People now recognize that it often has a genetic component.'

In Melbourne, she works closely and happily with Professor Samuel Berkovic, with whom she runs a research group. 'He is my mentor and my friend and the biggest influence in my life academically,' she says.

Although she has won major international awards, recognition has been slow to come in her own country. 'Overseas there's no question that I am recognized in my own right as a leader, but in Australia it's been a real issue.' Other people who have influenced Professor Scheffer's choice of a career in medicine and research were her mother, a nurse educator, and her disabled brother, who died when he was 20 and she was 18. 'His illness impacted greatly on my life, so I think that helps me understand more what the families I look after are going through.'

ENJOYING THE JOURNEY

Today, Ingrid Scheffer wears many hats: paediatric neurologist, head of a hospital children's department, researcher, professor and international lecturer. She jokes that all these activities leave her only from 'midnight to 3am' to enjoy her hobbies: reading, baking, travelling and spending time with her husband and sons, especially walking the dogs and going out to dinner with her two sons, the great pride of her life. One has decided to follow in his mother's footsteps as a physician-scientist and is already studying medicine.

Professor Scheffer admits to having great fun with her work, feels very privileged to work with such wonderful families and colleagues, and has a few words of advice for budding scientists: think outside the box, take your time and enjoy the journey.

LAUREATE FOR EUROPE

Royal Society Research Professor, Department of Physiology, Anatomy and Genetics, and Fellow of Trinity College, University of Oxford
UNITED KINGDOM

'For advancing our understanding of insulin secretion and of neonatal diabetes.'

Pr. FRANCES ASHCROFT

In 1984, Frances Ashcroft discovered a protein (a tiny pore called an ion channel) that acted as the link between blood-glucose levels and insulin secretion. As a result, people with a rare inherited form of diabetes can now relieve their symptoms simply by taking an existing drug in pill form, rather than by daily insulin injections. The drug has improved their blood glucose control and so reduced the risk of diabetic complications, such as blindness and kidney disease. She is now studying why 25% of patients with this disease also have neurological problems, and continues to explore what goes wrong with insulin secretion in type 2 diabetes, which affects 336 million people worldwide.

THE EXHILARATION OF DISCOVERY

Science has always been an all-consuming passion for Frances Ashcroft. 'To make a discovery, to know that you are the person who's seen something for the very first time, is the most exciting thing in the world', she says. 'It is really extraordinarily exhilarating. When that's happened to you once or twice, you are hooked for life. And that exhilaration sustains you throughout the long years of work in the lab.'

Frances Ashcroft insists that credit be shared with the many lab members and colleagues she has worked with over the years. 'Science is a team effort', she says, 'and no-one walks alone'. Nevertheless, she alone was responsible for the discovery that made it all possible 25 years ago, when she found the ion channel that is the missing link between glucose and insulin secretion. Glucose stimulates insulin release by closing this channel (a tiny pore in the cell membrane). Another breakthrough came in 1995, when Professor Ashcroft and others elucidated the DNA sequence that codes for the channel. This enabled them to screen the DNA of people with diabetes for mutations (variants) in the channel genes. Then in 2003, her friend and colleague, Professor Andrew Hattersley, found a mutation in the channel gene in a patient with a rare inherited form of diabetes that develops within the first few months of life. Ashcroft's team showed the mutant channel was no longer closed

Key figures

45%
of the total UK work force are women.

12.3%
of people working in science and engineering in the UK are women.

37%
of researchers in the UK are women

(UK Statistics Guide 2010 on Women in Science, Engineering, Technology and the Built Environment)

366 million
people worldwide have diabetes.
(International Diabetes Federation 09/2011)

4.6 million
deaths are caused each year by diabetes, and will double between 2005 and 2030.
(WHO 08/2011)

'To make a discovery is extraordinarily exhilarating. If you are lucky enough for that to happen to you, you are hooked for life.'

by glucose, thus explaining the patient's diabetes. Importantly, they also found that the channel could still be closed by sulphonylurea drugs. At that time, people born with diabetes were treated with insulin injections, as their symptoms suggested they had an unusually early-onset form of type 1 diabetes (a disease in which the beta-cells are destroyed by the body itself and life-long insulin is essential). The work of the Ashcroft and Hattersley teams suggested that instead such patients could be treated with sulphonylurea drugs, which by shutting their open channels would stimulate insulin secretion from their own beta-cells. Over 90 percent of people with neonatal diabetes have now switched to sulphonylureas. This has resulted in improved blood glucose control and a better quality of life for hundreds of patients.

A PILL THAT CHANGES LIVES

Meeting some of the people her work has helped has been very special for her. 'It's been an incredibly rewarding and emotional experience', she says. 'I do science out of curiosity – from a desire to find out how things work. If you work in a medically related field, as I do, you always hope that your work might ultimately benefit patients, but you never imagine that will happen in your own lifetime. I have been incredibly lucky that it has done so.'

ASK QUESTIONS!

Professor Ashcroft's career as a scientist had its roots in an idyllic childhood in rural Dorset, on the southwest coast of England, where she 'roamed wild around the woods and fields'. Her interest in natural history was piqued by the enchanting moment – still fresh in her mind – when she came upon beautiful bright-pink orchids growing wild in the fields. A girl who later scolded her for picking them ended up becoming her best friend, and they spent their schooldays hunting for wild orchids, bird watching and sailing (still favourite activities). 'We inspired each other,' says Professor Ashcroft.

At school, she took an interest in biology and chemistry (physics was not an option, 'because it was a girl's school'). Studying at Cambridge University later was a 'liberation' because her tendency to ask questions constantly was encouraged rather than frowned upon. 'Suddenly, this was where I belonged.' She received enthusiastic support from her PhD supervisor, John Treherne, a scientist who wrote novels and other books, setting an example for Frances Ashcroft: her own bestselling book for the general reader, *Life at the Extremes* (published in 2001), investigates how life forms survive in extreme conditions.

Professor Ashcroft has not lost the great sense of curiosity that first drew her into the world of nature and science. When she was one of many people asked to write about an individual from any time period she would like to dine with, she was shocked that the other respondents chose famous people from the past. 'I want to have dinner with people from the future,' she says, 'who can tell me what goes wrong in type 2 diabetes and what's happening in the future.'

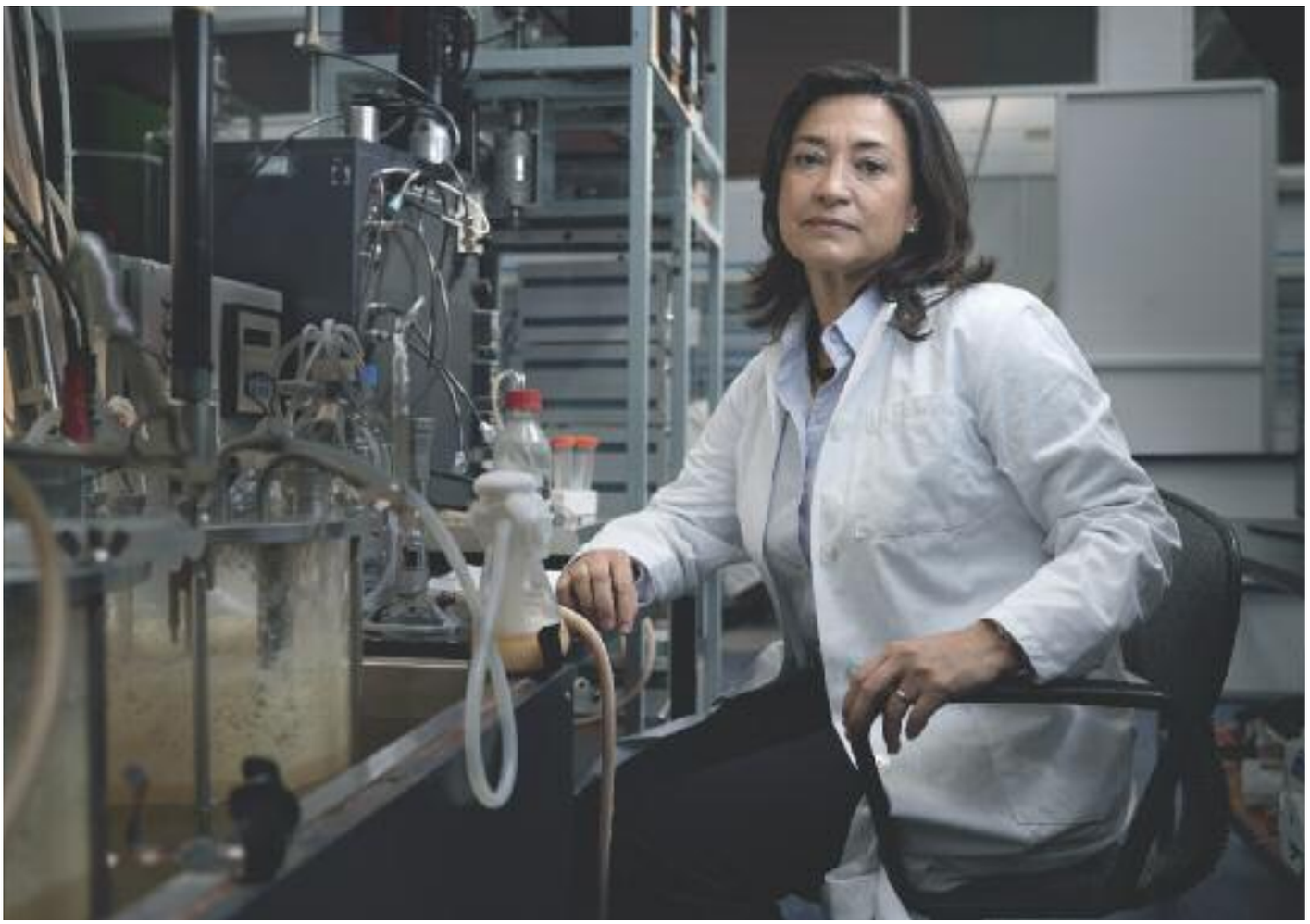
LAUREATE FOR LATIN AMERICA

Developmental Genetics and Molecular Physiology Department,
Institute of Biotechnology, National University of Mexico,
Campus Morelos, Cuernavaca
MEXICO

'For her studies on rotaviruses that cause the death of 600,000 children each year.'

Pr. SUSANA LOPEZ

Since 1986, Susana López, a professor at the National University of Mexico, has been spearheading the scientific assault on a universal problem, a rotavirus that attacks nearly every child on earth under the age of five causing severe intestinal diseases. It is responsible for the death of some 600,000 children a year in developing countries and makes 2 million more seriously ill every year. With her colleagues, she has examined the workings of the rotavirus from a wide variety of angles, including the way it spreads in human populations, the immune response to it and its replication cycle. Along the way they have developed new diagnostic tests, isolated several new rotavirus strains and contributed to efforts to find a vaccine.



THE WORLD IS HER LAB

Even as a 7-year-old girl, Susana López could not contain her curiosity about the natural world. As a child she was fascinated by flies, ants and even lizards. This scientific bent stood her in good stead when it was time to choose a path in life. Becoming a scientist was an obvious choice.

Today, the little girl who enjoyed experimenting is still doing research, but in a far more disciplined and meaningful way. The ultimate goal of her work is to help children all over the world by cracking the code of the highly infectious and often deadly rotavirus, which affects millions of children. While a vaccine now exists, the war has not yet been won in developing countries, where it kills about 600,000 children every year.

'This is a very democratic virus,' she says, 'in the sense that children get sick from it the same in Finland as in Africa.' The problem in developing countries, she explains, is that it is difficult to get sick children, who quickly become severely dehydrated, to a doctor or hospital on time for rehydration, without which they may die.

TRACKING A VIRUS

Susana López's research goal is to understand how the rotavirus infects human cells. 'We are trying to learn the tricks the virus uses to conquer the cell,' she says, explaining that viruses are like parasites, which cannot replicate outside of the host cell, which they usually kill or weaken.

Key figures

36%
of the total Mexican work force are women.
(International Labor Office EAPEP 2011)

31.6%
of researchers in Mexico are women.
(UNESCO Institute for Statistics 2009)

24%
of the members of the Mexican Academy of Sciences are women
(Mexican Academy of Sciences 2010)

Over 2 million children
worldwide, each year, are hospitalized and nearly 600,000 die from rotavirus infection.
(World Health Organization 10/2011)

85% of fatalities
occurred in South Asia and sub-Saharan Africa.
(Centers for Disease Control and Prevention 04/29/2011)

'I am very proud, because we were able to show that we can do excellent basic science in Mexico.'

The immune system cannot attack the invader, as it would with bacteria, without harming the cell, and anything a drug does to prevent the replication of the virus may also hurt the host cells.

This knowledge could lead to the eventual development of an antiviral drug that would control the infection, a notoriously difficult task. So far, antivirals are available only to prevent the replication of very specific viruses, such as HIV, herpes, and influenza A and B.

Professor López can't predict how long it might take to develop such a drug, but in any case, that is not her job as a basic researcher, a profession she loves. 'I like working in science because you are always learning new things. Even after 30 years of working with this virus, we're still learning new things every day. There are new technological and methodological approaches we can use, so it's always fun.'

RIGOR AND CREATIVITY

Part of the fun for her is the creativity required for her research. 'You need to be rigorous because you need to be constant, to pursue one idea, but you also need to be creative,' she says. 'That's the only way you can make science. If you don't want to repeat yourself, you need to imagine new things all the time.' She especially enjoys bouncing ideas off others to come up with new ideas, a process she calls 'borrowing brains'. When she was young, there was little encouragement for students to follow careers in the sciences in her all-girl high school, but she did have some talented biology and chemistry teachers who inspired her to continue as well as her parents, who ran a pharmacy. Originally she planned to become a physician, but soon realized she would rather work on discovering the origins of illnesses in the lab.

Professor López has had no problems combining a career and family life, since she and her husband, biochemist Carlos Arias Ortiz, shared equally the responsibility of raising their son and daughter, who are now in their twenties. When she is not working, she loves to relax with Latin American novels or thrillers, cook Indian and Mexican food, especially historical recipes, and practice photography.

As a woman living in Mexico, Susana López sees herself as a double minority in the world of science. Her dearest wish is to serve as an example for others, to show 'that you can be whoever you want to be wherever you are, as long as you work hard. I am very proud, because we were able to show that we can do excellent basic science in Mexico.'

LAUREATE FOR NORTH AMERICA

Howard Hughes Medical Institute Investigator,
Squibb Professor, Department of Molecular Biology
Princeton University
USA

'For understanding chemical communication between bacteria and opening new doors for treating infections.'

Pr. BONNIE BASSLER

Bonnie Bassler has devoted herself to studying the revolutionary notion that bacteria are not simply tiny individual organisms working on their own for better (helping us digest food, for example) or for worse (causing disease). In fact, as she discovered, they are ineffective on their own and must work as coordinated 'armies' to be able to be successful at both keeping us healthy and making us sick. It would be impossible for groups of bacteria to act in unison, however, if they did not communicate with each other. Bassler has shown that bacteria 'talk' using chemicals as their words. These startling discoveries may someday lead to the development of new antibiotics that interfere with bacterial conversations as well as many other applications, such as infection-resistant surgical implants.

N LOVE WITH INVISIBLE 'CRITTERS'

Like the bacteria she studies, Bonnie Bassler is a great communicator. The ebullient Princeton professor is also something of an accidental scientist. Encouraged by her mother to follow her dream when she was in college, she set out to be a veterinarian, but gave that up when she realized she 'couldn't handle the gore'. Casting around for a new direction while studying biology at the University of California, Davis, she volunteered to work in a lab.

'I didn't even know how to hold a pipette,' she says. She was miffed that she was put to work on a bacterial project rather than what she considered a more important cancer project, but then, 'I just fell in love with those critters,' she exclaims, 'you could do and learn so much with these simple creatures.' Her fate was sealed later on when she was studying biochemistry at Johns Hopkins in Baltimore, and happened to attend an extremely rare lecture given by geneticist Mike Silverman.

His talk about the collective behaviour of glow-in-the-dark marine bacteria – which only light up when they are in a group - fascinated her. Never one to pass up an opportunity to follow her instinct, she ran up to the podium and announced, 'You have to let me be your postdoc!' And he did! Silverman became her 'amazing, generous' mentor. 'I was a biochemist and had never done any genetics. He taught it all to me and then he gave me the whole project to start my own lab.'

Key figures

45%
of the total US work force are women. (US Bureau of Labor Statistics, October 2011)

45%
of life sciences researchers in industry and academia in the US are women. (National Science Foundation, 2006)

14.8%
of full professors in the life sciences in the US are women. (Committee on Science, Engineering, and Public Policy, 2007)

1250 grams
of bacteria live in the gut and on the skin of every human body. (New Scientist, March 6, 2010)

100 trillion
microbial cells live in our healthy bodies, 10 times more than the number of human cells. (Nature, March 4, 2010)

'The world thinks science is so dog-eat-dog and boring and hard and asocial, but nothing could be further from the truth.'

Bonnie Bassler continued her work on bacterial communication after being hired by Princeton, but found herself up against the major roadblock of a lack of funding for her research. While the Office of Naval Research and the National Science Foundation provided some money, the National Institutes of Health, the main U.S. funding agency for biomedical and health-related research, consistently turned down her grant requests. 'This work on bacteria talking to each other was really fringe science,' she says. 'For 400 years, people thought that bacteria were primitive asocial organisms that only act as individuals, and then some young woman comes along and says they are actually working as highly orchestrated, synchronized groups; it takes a while for that idea to percolate.' She wonders if the fact that she is a woman could partially explain why her work was not taken seriously for so long. Supported by Princeton and small grants, however, she persisted in the face of discouragement and continued to publish papers on her work. 'Princeton bet on a dark horse and they stuck with me,' she says. What kept her going was her immense enjoyment of her work. 'I was having a blast in the lab! I would go in there and talk with the grad students and postdocs about their experiments, and I'd get jazzed up and think, this is what I love doing!'

FRINGE SCIENCE GOES MAINSTREAM

The rejection letters stopped coming in 2002, when Bassler was awarded the MacArthur Foundation 'genius grant', which caused the funding agencies to sit up and take notice of the importance of her work. 'It was an amazing validation for me and for my group, because I didn't even try for that award. It helped my whole field.' She adds: 'That's how a field gets started from nothing. It always starts with a crazy idea.'
Hundreds of labs are now working on the subject, which is far from being considered fringe science 20 years after she began working on it. Its potential importance to humanity is enormous, since bacterial resistance to antibiotics is a global problem. She believes that molecules that interfere with bacterial communication will form the basis of a new class of antibacterial agents, and they could be introduced for human use in 10 to 15 years' time if all goes well. The communication abilities of bacteria could also be manipulated to make useful industrial products such as coatings that keep microbes off areas that need to stay clean like work surfaces and pipes, or infection-resistant replacement knees and heart valves. Enhancing communication in beneficial bacteria could also be used to get bacteria to act as machines to manufacture medicines more cheaply and easily.

A DAILY ADVENTURE AT THE FOREFRONT OF SCIENCE

Today, after all the years of struggling for validation, Bassler is enjoying the fruits of her success. Married to a 'totally cool husband who's my biggest fan', she has a life full of activity – hiking, canoeing, bird watching, cooking, reading, travelling, teaching aerobics – but what she really loves is going to work in the lab with her 15 students.
'We're having fun, we are at the forefront, we're respectful of each other, we care about each other, and we all share everything. I am so proud of the wonderful people who come to work on this project. The world thinks science is so dog-eat-dog and boring and hard and asocial, but nothing could be further from the truth. My lab is on this thrilling adventure, and that's what it feels like every day, an adventure. It's the most amazing career possible.'

RECOGNIZE COMMITMENT AT MID-CAREER **INTERNATIONAL SPECIAL FELLOWSHIP**

'...in the footsteps of Marie Curie'

'International Fellows are expected to go abroad to learn new techniques and bring them back to their country. Mounira Hmani, who was named an International Fellow 10 years ago, did exactly that and did it successfully, developing a remarkable level of excellence and publishing in leading international journals. She is not only a perfect justification for our program, but almost a paradigm of the way it should be done.'

MOUNIRA HMANI-AIFA

TUNISIA

UNESCO-L'Oréal International Fellow 2002
L'Oréal-UNESCO Special Fellow 2012

Associate Professor in Human Molecular Genetics at the Faculty of Sciences, and Scientific Researcher at the Centre of Biotechnology, Sfax

When Mounira Hmani-Aifa of Tunisia won the International Fellowship in 2002, she used it to do postdoctoral research in human genetics at the Faculty of Health Science in Linköping, Sweden. Back in Tunisia, she continues to study the genetic origins of hereditary deafness in the laboratory directed by Professor Hammadi Ayadi. In addition, as a part of a bilateral project between Tunisian and Swedish teams, she started a new genetic study on posterior microphthalmia, a rare hereditary disorder affecting the eyes.

RESEARCH THAT HELPS FAMILIES

Having recruited some Tunisian families in collaboration with ophthalmologists and otolaryngologists, she succeeded in discovering some of the genes responsible, making possible genetic counselling for affected families. Mounira plans to use her 2012 Special Fellowship to further investigate an interesting lead turned up by her research concerning a possible link between one of the genes she discovered and glaucoma. 'Once we understand how the gene intervenes,' she says, 'maybe someday it will lead to treatments.'

THE CHALLENGE: DOING IT ALL

The Special Fellowship rewards excellence and perseverance in the career of a former International Fellow, and Mounira has shown a singular determination in pursuing her work while maintaining the balance of her family life. Married 'to an understanding scientist,' the molecular biology professor Mohamed Sami Aifa, with four children, she holds a full-time teaching job at the Faculty of Sciences, yet still manages to continue her research and publish frequently in prestigious scientific journals, and also to participate in sports, socialize, read (on religion, culture and philosophy) and even join an association for women's rights, La Femme Libre. 'I want to do everything!' she says. She is hoping that, under the new government in Tunisia, researchers will no longer be required to teach full time, allowing her more time for lab work. She does not see any special difficulty in being a female scientist in her country, where she notes that more women than men have PhDs in science. 'My problems – family life, pregnancy, children - are the same as those of my French and Swedish friends,' she says.

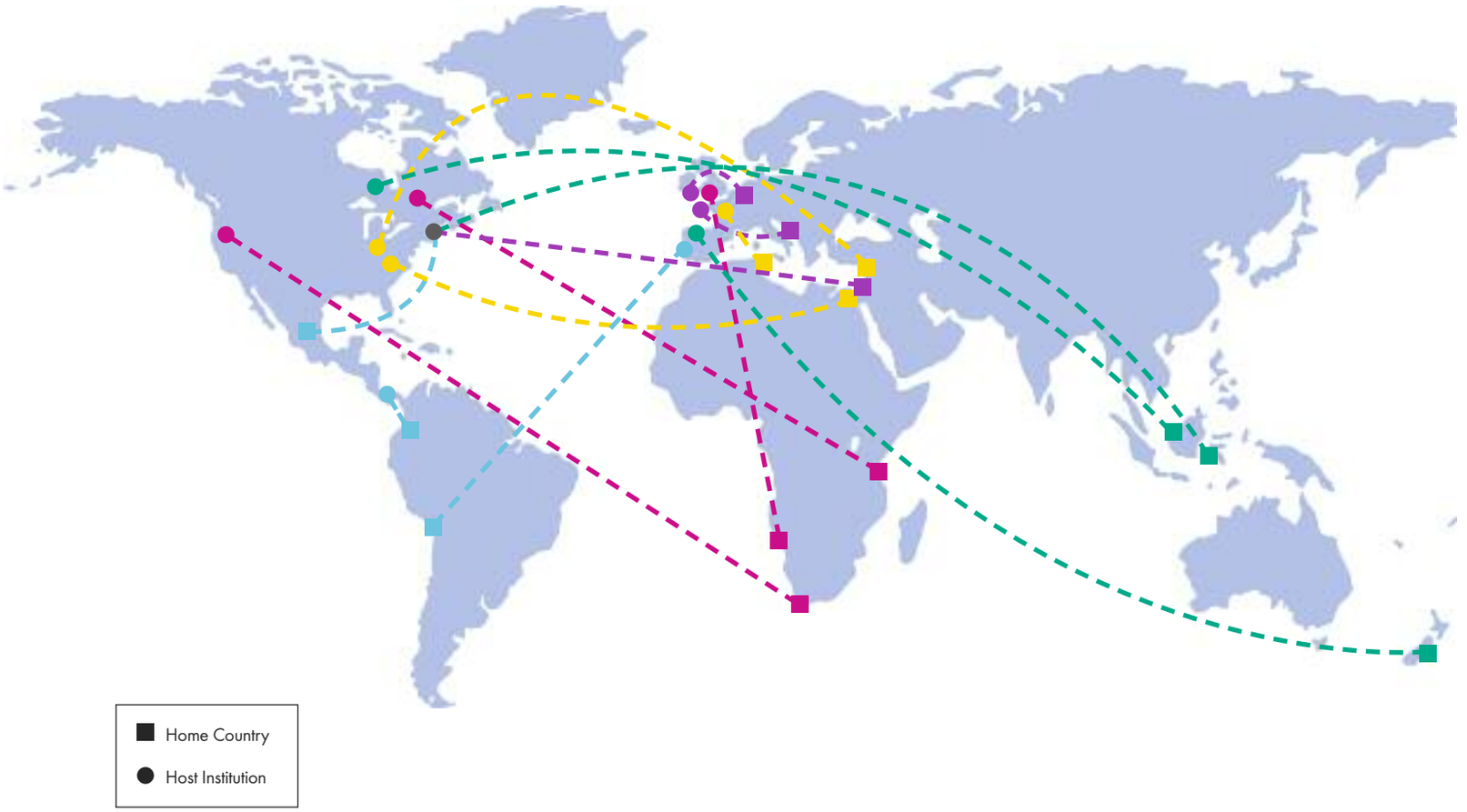
INSPIRED 'TO BE THE BEST'

Mounira credits her parents for her successful career and particularly her late father: 'The challenge he gave us was to be optimistic and hopeful. He told us we were capable of doing whatever we wanted to do.' Confronted with a choice between going to work as a teacher to help the family or continuing her studies, her father told her: 'Don't think about money. We don't want you to work now; we want you to be the best!' Although as a teenager she was interested in going into cancerology, Mounira ultimately chose genetics instead. 'In 1997, it was an exciting new field,' she points out, 'and I was interested in how we could help families with hereditary diseases.'

ENCOURAGE YOUNG SCIENTISTS **INTERNATIONAL FELLOWSHIPS**

The 15 UNESCO-L'Oréal International Fellows for 2012 were chosen for the excellence and feasibility of their proposed projects and for the potential impact of their research on the lives of human beings or the environment. Two of the fellows come from countries represented for the first time this year, Bolivia and Namibia.

Among a wide range of research topics in the domains of health, environmental protection and the potential pharmaceutical uses of indigenous plants, one major research trend that stands out this year is the emerging field of glycobiology, which holds out hope for the development of new antibiotics unlikely to encounter problems of resistance.



AFRICA

KENYA

PEGGOTY
MUTAI

Medicinal Chemistry

PhD student in Chemistry, University of Nairobi, and University of Cape Town, South Africa

HOST INSTITUTION
Institute of Parasitology, McGill University, Quebec, Canada

Peggoty aims to exploit the untapped potential of local plants to find new treatments for parasitic worms responsible for the ill-health of millions of people in the developing world.

NAMIBIA

GLADYS
KAHAKA

Biotechnology/Biochemistry

PhD in Plant Sciences, Department of Chemistry and Biochemistry, University of Namibia

HOST INSTITUTION
Department of Plant Sciences, University of Nottingham, United Kingdom

Gladys plans to exploit recent developments in transcriptomic biotechnology (genechip) to study three endangered species from the animal and vegetal worlds (cheetah, ximenia tree, devil's claw).

SOUTH AFRICA

JOHANNIE MARIA
SPAAN

Wildlife Biology

PhD student in Zoology/Ecology, University of Pretoria, South Africa

HOST INSTITUTIONS
College of Veterinary Medicine, Oregon State University, and University of Georgia, USA

Johannie will employ a non-invasive approach to study the effect of environment, stress and demography on the ability of African buffalo to resist parasitic infections and diseases.

ARAB STATES

EGYPT

AZIZA HASSAN
KAMEL

Virology

PhD in Biology, National Research Center, Cairo, Egypt

HOST INSTITUTION

Center for Predictive Medicine for Biodefense & Emerging Infectious Diseases, University of Louisville, Kentucky, USA

Aziza wants to develop a monitoring tool for emerging strains of the H5N1 avian influenza virus which is responsible for decimating poultry stock across the world, and which poses an important threat to human health.

LEBANON

DANA
BAZZOUN

Cell and Molecular Biology

PhD student in Cell and Molecular Biology, American University of Beirut, Lebanon

HOST INSTITUTION

Department of Basic Medical Sciences, Purdue University, Indiana, USA

Through the study of the mechanisms involved in tumour formation, Dana hopes to open the way for new diagnostic tools for breast cancer detection and prevention.

TUNISIA

EMNA
HARIGUA

Molecular Biology and Bioinformatics

PhD student in Molecular Biology, Pasteur Institute, Tunis, Tunisia

HOST INSTITUTION

Structural Bioinformatics Unit, Pasteur Institute, Paris, France

Emna's research project focuses on the urgent need to find new treatments for leishmaniasis, a parasitic disease that affects 12 million people worldwide and causes some 60,000 deaths every year.

ASIA & THE PACIFIC

INDONESIA

SIDROTUN
NAIM

Molecular Virology

PhD student in Environmental Science, Bandung Institute of Technology, Indonesia/Department of Soil, Water and Environmental Science, University of Arizona, Tucson, USA

HOST INSTITUTION

Department of Microbiology & Molecular Genetics, Harvard Medical School, Boston, USA

Sidrotun will investigate the structure and function of the genetic makeup of IMNV, a newly discovered virus in Indonesia that can kill up to 70% of a shrimp population, with devastating economic effects.

NEW ZEALAND

ZOË
HILTON

Marine Biology

PhD in Biological Sciences, Cawthron Institute, Nelson, New Zealand

HOST INSTITUTION

Catalan Institute for Food and Agricultural Research and Technology (IRTA), San Carlos de la Ràpita, Tarragona, Spain

The survival of the remarkable flat oyster has been endangered by over-fishing, pollution, disease and climate change. Zoë is studying the environment and nutrition necessary to ensure successful captive oyster production.

SINGAPORE

PATRICIA MIANG LON
NG

Protein Engineering

PhD in Cell and Molecular Biology, Singapore Immunology Network, Agency for Science, Technology and Research (A*STAR), Singapore

HOST INSTITUTION

Donnelly Centre for Cellular and Biomolecular Research, University of Toronto, Canada

Patricia's research focusses on the challenge of re-engineering antibodies, the body's main arm against infection, so that they become more effective in fighting disease.

EUROPE & NORTH AMERICA

ISRAEL

NAAMA
GEVA-ZATORSKY

Molecular and Systems Biology

PhD in Systems Biology,
Weizmann Institute of Science, Rehovot, Israel

HOST INSTITUTION
Harvard Medical School, Department of Microbiology and Molecular Genetics, Boston, USA

Naama's research explores the medical potential of intestinal microflora, a microscopic ecosystem that every one of us harbours inside our bodies.

The NETHERLANDS

ELZA
VAN DEEL

Cardiology and Molecular Genetics

PhD in Cardiology and Molecular Genetics, Department of Cell Biology and Genetics, Erasmus Medical Centre, Rotterdam, The Netherlands

HOST INSTITUTION
National Heart and Lung Institute,
Imperial College, London, United Kingdom

Elza will investigate the causes of hereditary heart disease by looking at the multiple roles of a single protein, fibulin-4, using a diversity of disciplines to unravel the mysteries of this disorder.

SLOVENIA

VITA
MAJCE

Molecular Microbiology and Chemistry

PhD in Chemistry, University of Ljubljana, Slovenia

HOST INSTITUTION
School of Life Sciences, University of Warwick, United Kingdom

Vita will be focusing on the challenge of drug resistance in bacteria, in the hope of contributing to the creation of new antibacterial medicines.

LATIN AMERICA & THE CARIBBEAN

BOLIVIA

KATHRIN
BARBOZA MARQUEZ

Behavioural Ecology

PhD student in Biology, Menéndez Pelayo International University, Spain

HOST INSTITUTION
National Natural Sciences Museum,
Madrid, Spain

Bats play an extremely important role in the ecosystem by controlling insect pests and Kathrin's research project will help to increase our knowledge of the environmental services that bats provide to the human population in different habitats.

COLOMBIA

GIOMAR HELENA
BORRERO-PÉREZ

Marine Biology

PhD in Biology, Colombian Marine Natural History Museum, Marine and Coastal Research Institute, Santa Marta, Colombia

HOST INSTITUTION
Naos Marine Laboratory, Smithsonian Tropical Research Institute, Balboa, Panama

Giomar's project focuses on the genetics and ecology of the 'chocolate chip' sea cucumber, a commercially important marine animal faced with decimation by over-fishing.

MEXICO

DORA
MEDINA

Bioengineering

PhD in Chemical Engineering and Biotechnology, National Polytechnic Institute, Mexico City, Mexico

HOST INSTITUTION
Massachusetts Institute of Technology (MIT), Cambridge, USA

Combining rheology and tribology studies of new biomaterials, Dora's quest to find the perfect bio-engineered material to protect or replace the knee joint could lead to greater comfort and mobility for many patients suffering from diseases such as osteoarthritis.

FOR WOMEN IN SCIENCE
A PROGRAM OF SUPPORT SINCE 1998

14 years of existence

1292 scientists supported

72 L'Oréal-UNESCO Award Laureates

2 Nobel prizes won by former Laureates

106 countries represented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The L'Oréal Corporate Foundation, created in 2007, pursues the goal of making the world a better place each day. Drawing on the Group's values and professional expertise, the L'Oréal Foundation aims to reinforce and perpetuate the Group's commitment to responsible citizenship. As the second largest corporate foundation in France, the L'Oréal Foundation is active in three main areas: supporting scientific research and the role of women in science, helping vulnerable people regain self-esteem and social reintegration, and fostering access to education.

UNESCO

Since its creation in 1945, UNESCO has pursued its mission of promoting science at the service of sustainable development and peace. It focuses on policy development and building capacities in science, technology and innovation and promoting and strengthening science education and engineering. UNESCO fosters the sustainable management of freshwater, oceans and terrestrial resources, the protection of biodiversity, and using the power of science to cope with climate change and natural hazards. The Organization also works to eliminate all forms of discrimination and to promote equality between men and women, especially in scientific research.

FOR WOMEN
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