SUMMER 2015

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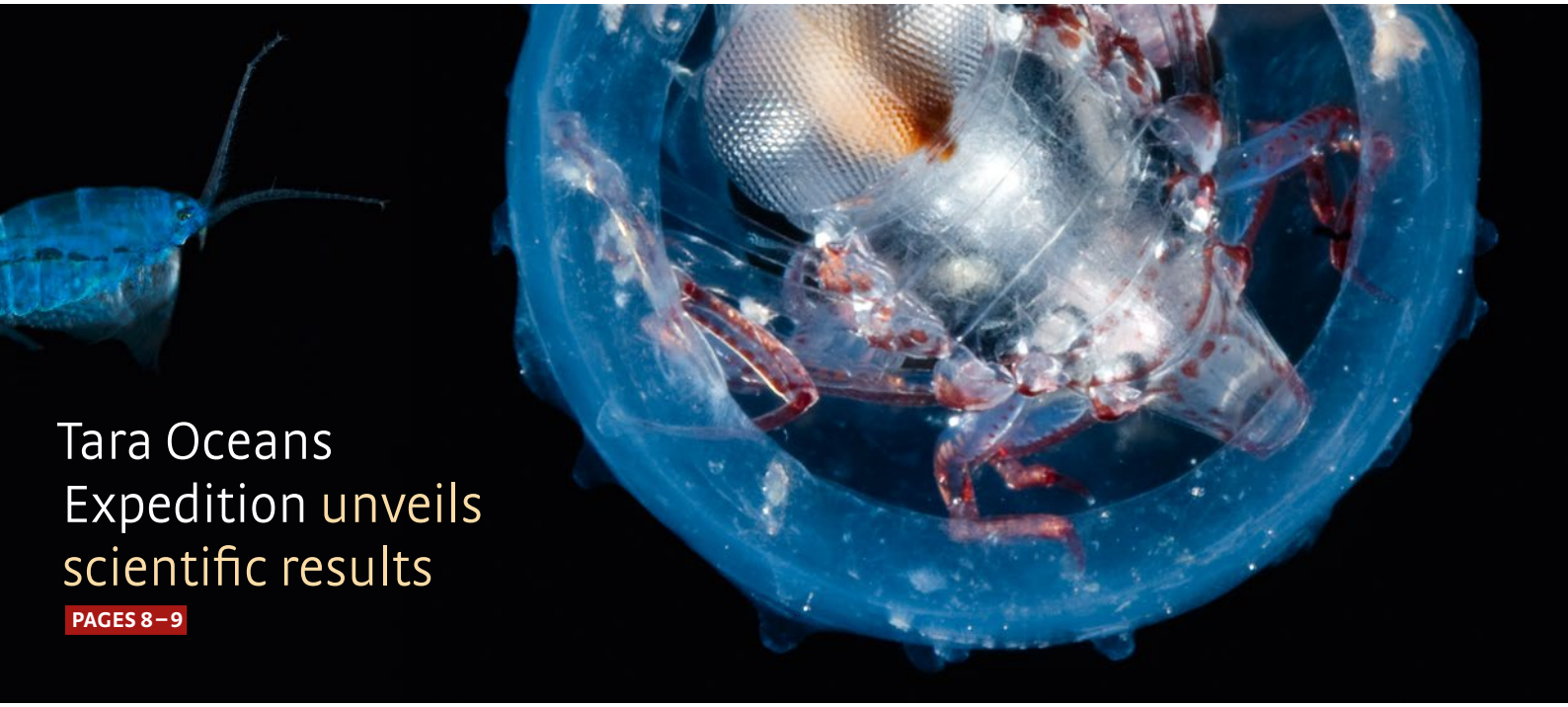
EMBO encounters



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EMBO MEMBER

EMBO excellence in life sciences

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EMBO Gold Medallists meet in Singapore

The EMBO Gold Medallist Symposium 2015 took place at the Biopolis in Singapore over three days from 11–13 May. More than 450 scientists and researchers converged on the Matrix Building's Breakthrough & Discovery Theatrette to hear talks from previous winners of the EMBO Gold Medal. The event was jointly organized by LKCMedicine and A*STAR.

Left to right: Christof Niehrs, Erwin Wagner, Richard Treisman, Jiří Friml, James Briscoe, Sophie Martin, Matthew Freeman, Carl-Henrik Heldin, Dirk Görlich

LKCMedicine Vice-Dean for Research Professor Philip Ingham FRS and Maria Leptin, Director of EMBO, welcomed participants to the event. "By bringing together experts from a wide range of scientific disciplines, the symposium's programme breaks away from the traditional thematic approach," said Ingham in his opening remarks. He also highlighted that the meeting was a great opportunity for students to hear first hand from the medallists about the challenges they have faced on the way to making their discoveries. "We are about to hear talks from scientists who have made outstanding contributions to the life sciences and I am excited to learn about the progress they have made in their research," said Leptin. She also outlined EMBO's path toward international cooperation and scientific exchange in the life sciences and the importance of the organization's relationship with Singapore as a role model for further activities (see box: Promoting scientific exchange).

The EMBO Gold Medal award was started almost 30 years ago and acknowledges young scientists for their outstanding contributions to the life sciences. The event featured scientific talks from Gold Medallists from the last four decades, including a presentation from the 1990 Gold Medal winner Professor Erwin Wagner from the Spanish National Cancer Research Centre (CNIO). Wagner is currently Director of the newly founded BBVA Foundation – CNIO Cancer Cell Biology Programme as well as Head of the Genes, Development and Disease Group at the CNIO. Professor Wagner spoke on the first day of the meeting about the transcription factor AP-1, a protein complex that is involved in processes as diverse as inflammation, metabolism and cancer. In his presentation, he demonstrated the biomedical relevance of powerful mouse genetic models for common human diseases, spanning the inflammatory skin disease psoriasis, to bone health, and cancer cachexia, a complex wasting disease that affects the majority of individuals with end stage cancer.

Professor Paolo Sassone-Corsi, who also spoke at the first Gold Medallist Symposium that was held in 2009, was one of the speakers on the second day. Director of the Centre for Epigenetics and Metabolism at the School of Medicine at the University of California, Irvine, Professor Sassone-Corsi discussed his work on elucidating the relationship between epigenetics, circadian rhythms and metabolism. One of the major interests of his research group is looking at how the mechanisms of signal transduction are able to modulate nuclear functions and, in particular, gene expression, chromatin remodeling and epigenetic control.

Plant research was also part of the agenda for the symposium. Jiří Friml from the Institute of Science & Technology in Austria received the EMBO Gold Medal in 2012 for defining how the plant hormone auxin functions to regulate plant development. He picked up on this theme in his talk on the third day which described the mechanisms of polarity and patterning that plants use to control plant growth and development.

Other speakers included 1995 Gold Medal winner Professor Richard Treisman from The Francis Crick Institute, who talked about recent progress in understanding the dynamics of the cytoskeleton, specifically changes to G-actin, and the regulation of transcription; 2001 Gold Medallist Professor Matthew Freeman from the University of Oxford, who talked about the control of signalling between cells by rhomboid-like proteins; and the 2014 Gold Medal winner Associate Professor Sophie Martin from the University of Lausanne. Martin has been working for the past 15 years to understand cellular polarity, in particular the way in which the spatial organization of cells contributes to cell size and cell division. Her recent award acknowledged work to understand the molecular events that define the organization and development of the cell.

Presentations by EMBO Gold Medallists were interspersed by talks from former and current EMBO Young Investigators, including A*STAR Institute of Molecular & Cell Biology Research Director Professor Robert Robinson, A*STAR Institute of Medical Biology Senior Principal Investigator Associate Professor Bruno Reversade and A*STAR Singapore Immunology Network Senior Principal Investigator Assistant Professor Florent Ghinoux.

Reversade discussed his work on the discovery of a gene responsible for a self-healing skin cancer that they had recently found in a Tunisian family. "Over five generations, 27 family members have been affected by this gene, leading to the conclusion that self-healing cancers can be hereditary. Because this gene functions in immunity, we anticipate that it could be harnessed for cancer immunotherapy."

The meeting concluded with remarks from LKCMedicine Dean Professor James Best. He emphasized that with its research-intensive parent universities from the United Kingdom and Singapore, it is fitting that LKCMedicine provides a bridge between activities in Europe and Singapore and that it is co-sponsor of the EMBO Gold Medallist Symposium. "These past few days, we have been very privileged to hear from some of Europe's and the world's outstanding life scientists," he said. "They shared their discoveries and their passion for science. While it's been under the umbrella of molecular biology, I think there's been great variety in the presentations, some great links between the talks, and considerable insight into disease processes."

From left to right: Jai Sohan, Ambassador of the Republic of Singapore in Germany, Maria Leptin, Director EMBO, Lim Chuan Poh, Chairman of the Agency for Science, Technology and Research (A*STAR), Singapore, and Gerrit van Meer, President of the EMBC, at the signing ceremony of the cooperation agreement.

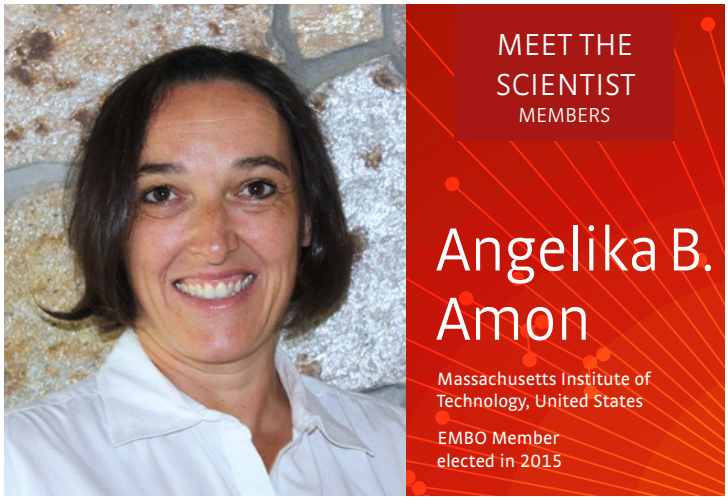
Promoting scientific exchange

The Government of Singapore, the European Molecular Biology Organization (EMBO) and its intergovernmental funding body, the European Molecular Biology Conference (EMBC), recently signed a Cooperation Agreement to strengthen scientific interaction and collaborative research between Singapore and Europe. This milestone agreement marks the first time a non-European nation has become an EMBC Associate Member State.

"Our cooperation agreement with Singapore is a great example of what can be achieved to meet the needs of our joint communities. Indeed it is a role model for the type of successful collaboration that we are trying to spread to other parts of the globe," remarked Maria Leptin, Director of EMBO.

Mr Lim Chuan Poh, Chairman of the Agency for Science, Technology and Research (A*STAR), who signed the agreement on behalf of the Singapore Government, said, "Singapore has benefitted greatly from the partnership with one of Europe's foremost organizations in the life sciences. We are excited to continue the momentum of our collaborations and drive more impactful and innovative healthcare outcomes together with Europe as the first non-European EMBC Associate Member State."

The agreement allows Singapore scientists to participate in EMBO training programmes and activities. It also provides support for EMBO workshops and lectures to take place in Singapore. "Cooperation between researchers should not be constrained by national or international borders," said Leptin. "Science depends on building and nurturing a diverse international community and we want to be global in our outlook. EMBO sees the cross-country cooperation that has allowed it to be successful in Europe as a platform for further international cooperation."



What is your most significant scientific contribution?
My laboratory has contributed to two scientific areas. Our work has helped shape our understanding of how a key cell cycle transition, the mitosis to G1 transition, is regulated and how it is integrated with cell cycle events such as spindle position and anaphase onset. My group also provided some of the foundation for understanding how aneuploidy – an incorrect karyotype and a cause of numerous human diseases, foremost cancer – affects cells.

Why is yeast still the right organism?
When addressing a question in budding yeast, the single rate-limiting factor is your brain. You can do any experiment on yeast and do it with great precision. So why use any other more limiting system? If you can ask the question in yeast you should do so. There is no better system.

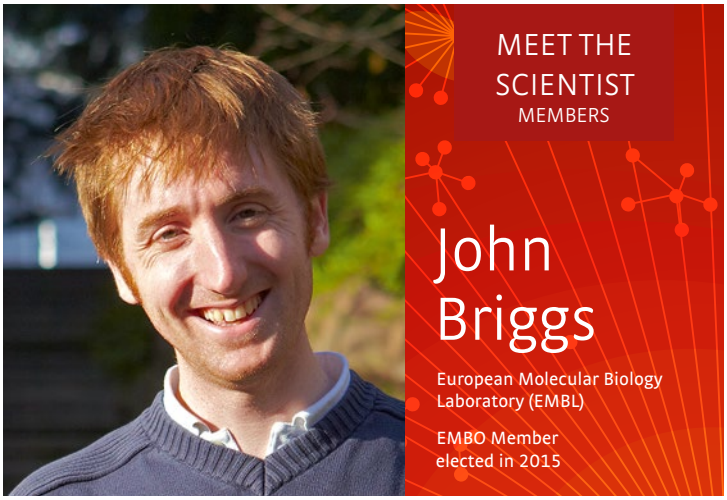
You often highlight the basic nature of your research. How does it relate to the applied aspects?
I consider myself a curiosity-driven scientist. I am interested in basic questions in biology. Our work on aneuploidy has of course led to implications for cancer and raised the possibility of developing new therapeutic interventions, for example drugs that target the aneuploid state of cancer cells. However, I am hoping that others will pursue the more applied avenues. My passion is figuring out how things work.

Do science and serendipity go hand in hand?
Yes. This is at least my experience. Sometimes you just stumble on things. The trick is to realize that you discovered something important and not just that you went down a rabbit hole. This takes intuition and instinct, which, in my opinion, are key characteristics of a good scientist.

Is it easier for a female scientist to work in the United States?
I do not know whether it is easier. Science is hard for everyone everywhere. However, one thing is certain: More is done in the United States to promote women in science and to support them so that they can succeed. Much more is also done to recruit women into visible leadership positions, which is of course very important to encourage young women to pursue a career in science.

What is the biggest challenge you have faced in your career?
Trying to find the right balance between work and family. When I was at work I felt guilty that I was not with the children and when I was with the kids I felt guilty that I was not at work.

Is there any particular area of science that has grabbed your attention recently?
We have begun to study how mitochondria communicate with the nucleus. It is fascinating to me how such a close relationship could have evolved between two very distinct species – a pre-eukaryote and a prokaryote.



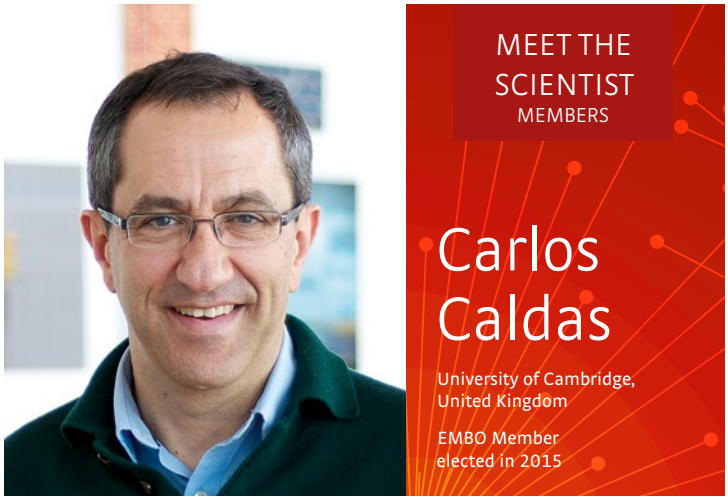
At 37 you are the youngest EMBO Member elected this year. You were also one of the youngest group leaders when you joined EMBL in 2006. What did you do right in your career?
I was in the right field at the right time. EMBL was looking for someone in the cryo-electron microscopy area, and at the time there were perhaps not so many of us. The methods I had been working on during my PhD put me in a good position to start on "structural cell biology," which fit well into the EMBL environment. From my experience as a PhD student, I knew how much could be found out by optimizing new technologies towards important applications. In the end, I think the most important factor in our laboratory's success is the people behind it: great students, postdocs and collaborators.

How and when did you first become interested in the structures of viruses?
I joined a four-year Structural Biology D.Phil. programme in Oxford where we spent the first year working in two different laboratories before deciding where we would do our thesis work. One of the group leaders I worked for was Stephen Fuller, who co-pioneered studying virus structure by cryo-electron microscopy. I worked on cryo-electron microscopy of retroviruses and enjoyed both the biology and the method. Retroviruses seem simple at first glance. One of the reviews at the time was entitled HIV-1: fifteen proteins and an RNA, which describes it very well. Yet they compress a lot of function in those few proteins. They also undergo some spectacular structural changes during their lifecycles. Cryo-electron microscopy is very direct and visual – you take a picture and see something. Moreover, with image analysis much more information can be obtained. In the end, it was an easy decision to join Stephen's group. My present laboratory is still doing cryo-electron microscopy of retroviruses.

The importance of networking?
When I was starting my lab, I knew the methods we were developing for studying retroviruses should also be useful for coated vesicles and was looking for potential collaborators. Hans-Georg-Kräusslich, our partner in research on HIV-1, introduced me to Felix Wieland with whom we started to work on COPI vesicles. Marko Kaksonen joined EMBL as a group leader about the same time as me, and we soon realized it would be fun to work together. Our joint topic is clathrin-mediated endocytosis.

What do you enjoy most about being a team leader?
I like the excitement of seeing new data and trying to work out what it tells us. Also discussions with interesting colleagues representing diverse points of view and having the freedom to follow interesting directions.

And the least?
The time spent on all of the things that are not research, but that need to be done to keep research moving – grant administration, timesheets for EC grants, and budgeting spring to mind.



What are the big questions you work on?
My laboratory is focused on studying human breast cancer. We are looking for answers to several questions: What is the extent of intertumoral heterogeneity? In other words, how many different molecular subtypes of breast cancer exist? We also want to know if intratumoral heterogeneity is distinct across the different breast cancer subtypes? Are different breast cancer subtypes 'forests' of similar clonal phylogenetic trees? Can we develop tractable models to study the biology and to develop novel therapies for each of the breast cancer subtypes?

What inspired you to move into breast cancer research?
I was determined to study cancer as a problem using the ultimate model – human cancer. I decided to focus on breast cancer because of its significant burden – one in eight women in Europe will develop it in their lifetime – and also because of its fascinating clinical and biological heterogeneity.

What is the one big achievement you would like to accomplish?
To make cancer control a reality. The problem should be tractable since we know its essence: cancer is a genetic disease. Our studies have shown that breast cancer is a constellation of several distinct molecular diseases with subtype-specific drivers.

Will diagnostic tests for breast cancer soon become fast and cheap enough for widespread use?
That is one of the great motivations for our work. The fact that healthcare is free at the point of delivery makes me very optimistic that the not-for-profit NHS in the United Kingdom will make it possible to develop such tests, validate them and make them widely available.

You have lived in the United Kingdom for almost twenty years. Do you still follow scientific developments in Portugal?
Certainly. Although I have been away for 27 years, I can say that Portuguese science has improved exponentially in the past fifteen years. I am delighted for example that two other Portuguese scientists in Portugal were elected to EMBO this year. I was on the scientific advisory board of the Institute of Molecular Pathology and Immunology of the University of Porto for ten years. I am now Chair of the Scientific Advisory Council of the Institute for Molecular Medicine in Lisbon.

What type of scientist and team leader are you?
I am a clinical scientist driven by scientific curiosity: I want to help patients. I try to bring the best out of each of the members of my team. To me it is a privilege to work with young scientists who are motivated by the pleasure of scientific discovery.

What inspired you to move into the competitive field of gene regulation?
For my PhD, I worked on post-transcriptional gene regulation by microRNAs. I became increasingly fascinated by transcriptional regulation and the corresponding genomic regulatory elements, in particular enhancers. My move into gene regulation was therefore driven by scientific curiosity rather than strategic considerations or concerns about the competition. I also liked the fact that the questions can be addressed by a combination of genome-wide experiments and computational analyses, a scientific approach that I much enjoy.

How do you choose your research goals? Do you like changing topics?
I have indeed changed topics several times: from developmental neurobiology for my Masters thesis work to structural bioinformatics and microRNA target predictions for my PhD, and from comparative regulatory genomics for my postdoctoral research to functional regulatory genomics as an independent investigator. These changes came quite naturally when I became interested in new questions and challenges. I assume – and hope – this will continue in the future because it will keep me motivated, and our work relevant and timely.

EMBO is one of the early supporters of the DORA agreement. What is your opinion?
Most scientists would agree that neither the quality of individual articles nor the merit of a scientist are necessarily reflected in journal impact factors and that these measures should not be used as the sole criteria for hiring, promotion, or funding decisions. The same applies to all attempts to reduce science to a single number. Judging scientific work – be it individual papers, yearly progress and career merits – is difficult and takes time, especially when assessing tens or hundreds of applications, but in the end I think it should be judged in detail and depth by experts from the same field without too much reliance on metrics.

On what basis do you employ members of your research group?
I focus on whether I see genuine interest and excitement, a positive attitude, and the willingness to focus thoroughly on science. I want to work with people for whom science is as important as it is to me. Of course, their prior work also counts as well as my team's preference: Our entire group interviews each candidate and we only hire if there is unanimous support.

You spent three postdoctoral years at the renowned Broad Institute. Is there anything you miss?
At the Broad Institute and the Computer Science and Artificial Intelligence Laboratory, I worked with some of the best scientists and was exposed to the latest ideas and technological developments. The Research Institute of Molecular Pathology (IMP) and the Vienna Biocenter have a similar international atmosphere. I enjoy science most when the limits of what we can do are set only by our own imagination and I have been lucky to find such environments in Europe and the USA.

EMBO Members for 2015

Fifty-eight life scientists were elected to EMBO membership last May. Fifty of the scientists reside in Europe and neighbouring countries; eight Associate Members were elected from China, Japan, New Zealand and the United States. The latest scientists to join EMBO come from 19 different countries and include 18 female scientists recognized for their contributions to life science research. The EMBO Membership currently comprises more than 1700 life scientists.

EMBO MEMBERS

DE **Amparo Acker-Palmer**
DE **Detlev Arendt**
FR **Jean-Louis Bessereau**
PT **Monica Bettencourt-Dias**
DE **Ralph Bock**
PL **Magdalena Boguta**
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FR **Sandrine Etienne-Manneville**
IL **Ehud Gazit**
GR **Vassilis G. Gorgoulis**
NL **Joost Gribnau**
GB **John Hardy**
SE **Thomas Helleday**
IT **Emilio Hirsch**
GB **Kairbaan Hodivala-Dilke**
GB **Philipp Holliger**
NL **Casper Hoogenraad**
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FI **Johanna Ivaska**
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GB **Susan M. Lea**
GB **Alison Lloyd**
DE **Jan Lohmann**
AT **Javier Martinez**
CH **Jean-Claude Martinou**
GR **Rebecca Matsas**
ES **Pura Muñoz-Cánoves**
DE **Georg Nagel**
AT **Magnus Nordborg**
GB **Duncan T. Odom**
GB **Sharon Peacock**
CH **Lucas Pelkmans**
GB **Luca Pellegrini**
FR **Graça Raposo-Benedetti**
IL **Eran Segal**
DE **Ralf Sommer**
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IL **Amos Tanay**
GB **Simon Tavaré**
CH **Nicolas Thomä**
FR **Maria Elena Torres Padilla**
PT **Henrique Veiga-Fernandes**
FR **Danièle Werck-Reichhart**
GB **Anne E. Willis**
CH **Mihaela Zavolan**
FR **Chiara Zurzolo**

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US **Angelika Amon**
US **Lewis C. Cantley**
CN **Xuetao Cao**
US **Sean B. Carroll**
US **Edward F. DeLong**
SA **Takashi Gojobori**
NZ **Paul Rainey**
CN **Feng Shao**

Upcoming deadlines

EMBO Courses, Workshops and Conferences
1 August

EMBO Long-Term Fellowships
14 August

***The EMBO Meeting* 2015 online registration**
19 August

***The EMBO Meeting* 2015 late abstract submission**
29 July

EMBO Keynote Lectures
1 October

Nominations 2016 Women in Science Award
15 October

Congratulations

to the following EMBO Members

EMBO Members who joined the ranks of the Royal Society in the UK and the US National Academy of Sciences this year:

New Royal Society Fellows and Foreign Members:

FELLOWS

→ **Stephen Brown**
→ **Jane Clarke**
→ **Stephen Cusack**
→ **Michael Häusser**
→ **Jane Langdale**
→ **Gero Miesenböck**
→ **Ketan Patel**
→ **Bryan M. Turner**
→ **Frank Uhlmann**

FOREIGN MEMBERS

→ **Li Jiayang**
→ **Susan Lindquist**

New Members and Foreign Associates of the National Academy of Sciences

FOREIGN ASSOCIATES:

→ **Jean-Laurent Casanova**
→ **Reinhard Jahn,**
→ **Jonathan Jones**
→ **Satyajit Mayor**
→ **Nahum Sonenberg**
→ **Jan Svoboda**

Events

EMBO Members

Immunotherapy@Brisbane
Brisbane, Australia | 24–26 November

EMBO Member **Frank Gannon** is organizing the meeting Immunotherapy@Brisbane from 24-26 November in Brisbane, Australia. The conference features talks from several EMBO Members and focuses on clinical application and novel immunotherapeutics for cancer, infectious diseases, autoimmune disorders and other diseases.

More information can be found at www.conference.qimrberghofer.edu.au/page/Immunotherapy/

Organelle Crosstalk in Membrane Dynamics and Cell Signalling
Edinburgh | 26–29 October 2015

EMBO Young Investigator **Maya Schuldiner** is co-organizing the conference Organelle Crosstalk in Membrane Dynamics and Cell Signalling to be held in Edinburgh, 26-29 October 2015. This conference is of particular interest to cell biologists and will attract a broad audience with interests in cell signalling, membrane trafficking pathways, and the control of organelle dynamics – their size, shape, composition, function, and biogenesis.

For additional information go to /www.biochemistry.org/Events/tabid/379/ItemID/2538/view/Conference/Default.aspx

Microorganisms for a better world

© Mike Jetten

EMBO Member Mike Jetten hunting for anaerobic bacteria

EMBO Member MIKE JETTEN of Radboud University, Nijmegen, The Netherlands has spent his career looking for difficult-to-find bacteria. His quest has helped find ways to deliver benefits to the environment. The long-term goal is to build sustainable economies based around applications arising from newly discovered anaerobic microorganisms. Microbes that can survive without oxygen can play important roles in applied science and can even be used to trap or neutralize greenhouse gases.

In the 1990s, Mike Jetten and his colleague Mark van Loosdrecht from TU Delft discovered anammox, anaerobic ammonium-oxidizing bacteria that convert ammonium directly to nitrogen without the need for oxygen. These bacteria are now used worldwide in compact installations that provide a low-energy system for purifying wastewater without the generation of greenhouse gas emissions. In December 2013, Jetten and fellow collaborators from TU Delft, Wageningen University and the Royal Netherlands Institute for Sea Research (NIOZ) received a Euros 22.9 million Gravitation grant from the Dutch Ministry of Education, Culture and Science. The funds have been used to establish The Soehngen Institute for Anaerobic Microbiology (SIAM), a research institute to identify new anaerobic microorganisms with characteristics that will benefit the environment and health. The centre for excellence investigates greenhouse gas production and consumption, studies the gut microbiome to improve the health of host organisms, and is looking to establish more sustainable production processes for biochemicals in open systems. To accommodate the research of SIAM, a new bioreactor laboratory was built at Radboud University. The new laboratory contains 12 new state-of-the-art bioreactor systems to investigate anaerobic ammonium and methane-oxidizing bacteria.

The research at the new centre is already generating results. Recent highlights of the group include the isolation of a prokaryotic organelle from the anammox bacteria.[1] Proteomic analysis showed that all proteins for the production and conversion of the rocket fuel hydrazine are located in this organelle and stable isotope assays showed that the organelle can make dinitrogen gas from ammonium and nitrite. In addition, the major S-layer protein of anammox bacteria was isolated and characterized.[2] Furthermore, by excellent scientific sleuthing it was discovered that anammox bacteria after all do contain peptidoglycan in the cell wall.[3] In collaboration with geoscientists from Utrecht University, the iron-dependent anaerobic oxidation of methane was observed in sediments of the Bothnian Sea, and subsequent batch incubations with stable isotope confirmed this activity in the laboratory.[4]

In the course of 2014, several of the young scientists of the Department of Microbiology at Radboud University were awarded prestigious personals grants. Dr. Boran Kartal received an ERC Starting Grant to investigate new more sustainable wastewater treatment systems. Dr. Laura van Niftrik was awarded a Volkswagen seed grant to establish a genetic system for anammox planctomycetes and Dr. Sebastian Luecker received a Veni grant to investigate the biochemistry of nitrite-oxidizing bacteria. Ph.D. students Muriel van Teeseling and Olivia Rasigraf were awarded with Frye international mobility stipendia. Senior staff of the group have also been very successful, Dr. Huub Op den Camp was awarded an ERC Advanced Grant to study the microbiology of acid volcano systems.

The preparations for a new international Master's program in microbiology that will start on 1 September 2015 are in full swing. The programme combines the educational efforts of both environmental and medical microbiologists of Radboud University (www.ru.nl/masters/microbiology). It will be the first microbiology Master's program in The Netherlands to continue the excellent tradition established by the Dutch School of Microbiology that befits the motto of Martinus W. Beijerinck: "Fortunate those that are starting now."

Professor Jetten was elected to the membership of EMBO in 2014.

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VIDEO

Watch a video:
The hunt for impossible bacteria
www.youtube.com/watch?v=ZgiomhH6nN8

Tara Oceans Expedition unveils scientific results

The Tara Oceans consortium just published five scientific papers in the journal *Science* revealing the initial wave of scientific results from the first six years of the project.[1–5] The findings show the extraordinary diversity of plankton in the world's oceans, uncover many of the interactions between these organisms, and reveal how plankton impact and are influenced by the environment. This publication is accompanied by two editorials by Eric Karsenti and colleagues in EMBO's journal *Molecular Systems Biology* that describe the history of the project and reveal some of the challenges of translating such a vast amount of data into knowledge.[6,7]

The special issue of *Science* devoted to Tara Oceans includes five publications that unveil the vast amount of scientific data arising from a project that grasped the attention and imagination of both the scientists and the public. The sequencing of almost a billion genetic barcodes, short genetic sequences that help identify organisms, have revealed more than 150 000 new genetic taxa of plankton, a number that far surpasses previous expectations. The scientists also determined the "interactome" of the plankton living in the world's oceans – the more or less complete set of interactions between bacteria, viruses and planktonic eukaryotes.

Two papers revealed the global patterns and ecological drivers of oceans' planktonic communities as well as an oceanic "cold wash cycle" that appears to limit the number of species that manage to cross from the Indian Ocean into the South Atlantic. Temperature seems to be a crucial factor in influencing the distribution of plankton in the different parts of the world's oceans.

The high prevalence of parasites within this ecosystem was one of the significant findings of this hidden world. For the first time, scientists now have a picture of the structure and function of much of the global ocean microbiome, which may have implications for the study of climate change.

No formal funding mechanism

Although the project is delivering results, securing funding has been a considerable challenge. The transformation of Karsenti's initial idea into the large-scale Tara Oceans project was only made possible thanks to funders willing to take the risk of backing a self-organized community of researchers. "We had no success with finding funding from conventional sources including the European Commission. Our initiative was deemed outside the usual boundaries of funded scientific research," says Karsenti. The interdisciplinary nature of the project proved to be a serious barrier to many sources of funding. First, if the project did make it to a stage where it was considered for funding, it was difficult to find reviewers with a suitable set of expertise and understanding of large-scale projects of this type. Second, despite a broad consensus that interdisciplinarity is needed for innovation and discovery, there is an acute shortage of efficient mechanisms to fund such projects.

The scientists involved in the project eventually found the solution to the funding gap. They were able to build a consortium of financial support through their own institutions and also received funding from private companies and organizations including Agnès b and Fondation Veolia. Financial support for the data analysis part of the project was eventually secured from the French "Investissements d'avenir" funding programme.

Overall, Tara Oceans sampled plankton at more than 210 sites and at multiple layers of depth in all the major oceanic regions. The scientific sampling followed protocols developed to capture the entire morphogenetic complexity of the plankton community across several orders of size (from 0.02 µm to a few mm), together with an extensive range of physicochemical parameters. Sampling typically lasted 60 hours per station. The 35,000 samples collected form the basis for extensive processing and data integration on land.

"The Tara Oceans project emerged from an early romantic idea I had in 2000: organizing a sailing expedition in the wake of Darwin's voyage aboard the Beagle to popularize biology," said Eric Karsenti, Director of the Tara Oceans project and Senior Group Leader at EMBL, in his editorial in Molecular Systems Biology. "Fifteen years after what was initially a wild dream, a treasure trove of incredibly exciting data is revealed to the scientific community."

The research articles in *Science* describe the first foundational resources from the project (based on a first data "freeze" from 579 samples at 75 stations) and their initial analyses, illustrating several aspects of the Tara Oceans' ecosystems biology approach. The project provides unique resources for several scientific disciplines. According to EMBO Member Peer Bork, Scientific Coordinator of Tara Oceans and Senior Scientist at EMBL: "the rich publicly available resources are likely to stimulate a wealth of research in laboratories way beyond the Tara Oceans consortium."

The project has clearly delivered results that far exceed expectations. "No one could have predicted the wealth of information that we would uncover when we took the first few nautical miles of our journey," says EMBO Member Chris Bowler, Scientific Coordinator of Tara Oceans, working at the Institut de Biologie de l'Ecole Normale Supérieure in Paris. "We hope that what we have achieved may also serve as a model for other large-scale projects in the future."

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7. Sunagawa et al. (2015) *Molecular Systems Biology* **11**: 809.

Germ-free mice for European scientists

The laboratory mouse is the most commonly used mammal for human biology and disease research. Most animal house facilities in Europe raise mice under specific pathogen-free (SPF) conditions where animals are maintained in the absence of pathogens defined by the Federation of European Laboratory Animal Science Associations (FELASA). Few specialized facilities can generate and raise germ-free (axenic) mice that are devoid of any non-viral microorganism. As a member of the European Mouse Mutant Archive (EMMA) – a repository that stores and distributes mouse mutant strains – the Instituto Gulbenkian de Ciência (IGC) offers to the scientific community a service of "axenization" that provides germ-free mice for specific research purposes. As part of this service, the IGC recently implemented a gnotobiology suite where germ-free mice can be infected with specific pathogens or elements of the microbiota.

In the last decade, the demand for axenic and gnotobiotic mice has risen considerably to support studies of the symbiotic interactions between the host and its microflora. Scientists and many of the wider public are increasingly aware that disruptions in these interactions may have great impact on health. For instance, manipulation of the mouse microflora has been crucial to discriminate between autoimmunity and inflammatory responses of the immune system linked to disease, to investigate host-commensal interactions during tissue regeneration, or to study how metabolic disorders or even behaviour are influenced by the composition of the microbiota. "Access to germ-free mice allows a completely new range of experiments to answer some long-standing scientific questions," says Jonathan Howard, EMBO Member and director of the IGC. "The IGC is providing a service open to the scientific community and that should boost research." Axenic mutant lines are available upon request for the biomedical research community in Europe. The IGC also offers to host scientists for short visits to carry out analysis of the germ-free mice using its technological platforms.

Last March, the research community interested in the complex relationship between the host and its microbiota gathered at the IGC to participate in the workshop "Mouse Microbiota: Genotype-Phenotype Control And Technological Challenges." This event also addressed the infrastructure needs and experimental strategies required for the development of this thriving research field. Jocelyne Demengeot, director of the EMMA-Portugal node and scientific coordinator of the IGC vivarium says: "It is fascinating to witness the impact novel technologies are having on the revival of gnotobiology, a century old science that is now a central concern in many domains of biology."

For further information:
www.igc.gulbenkian.pt/pages/facilities.php/A=116___collection=article
www.infrafrontier.eu/resources-and-services/axenic-service

What is EMMA?

Over the past years, a rapidly growing number of mouse mutant lines have been produced to investigate mechanisms and therapeutics of human disease. Answering the need to create a repository to store all mouse mutant strains, the European Mouse Mutant Archive was established and implemented.

Integrated in the INFRAFRONTIER-I3 Project, EMMA is a non-profit world-class research infrastructure that works as a repository to maintain mutant mouse lines for basic biomedical research and to make them available to the scientific community. The EMMA network is a partnership of several laboratories and other institutions throughout Europe that ensure effective collection, archiving and distribution of mutant mouse lines under the highest quality standards. A comprehensive description of the genetic and phenotypic properties of all mutant strains that EMMA stocks is available in the EMMA resource database that facilitates submission and requests of mice.

Both EMMA and the INFRAFRONTIER projects are funded by the 7th Framework Programme of the European Commission.

Phosphatase inhibitor prevents protein-misfolding diseases

Scientists led by EMBO Member ANNE BERTOLOTTI of the MRC Laboratory of Molecular Biology in Cambridge have modified a medicine for high blood pressure into one that might tame misfolded protein diseases. The findings were published in the 10 April issue of *Science*.

The new molecule, called Sephin1, countered the effects of aggregating proteins in mouse models of how different types of protein-misfolding diseases such as amyotrophic lateral sclerosis and Charcot-Marie-Tooth disease. It might also work for other neurodegenerative disorders, suggests Anne Bertolotti. Moreover, Sephin1 did this by selectively inhibiting dephosphorylation of a translation factor. This was thought to be extremely challenging because phosphatases have so many substrates. In conjunction with their previous report published in *Science* in 2011 (Tsaytler et al., 2011), the group has provided significant evidence that targeting R15A phosphatase activity could be relevant to restore cell proteostasis.

"We have studied the cellular defence system against misfolded proteins for many years hoping that one day we could exploit these pathways for therapeutic purpose. What we have shown in mice now might ultimately benefit human health," says Bertolotti, senior author of the study.

Bertolotti was elected an EMBO Member in 2013. In 2004, she was selected as an EMBO Young Investigator and received an EMBO Long Term Fellowship from 1998 – 2000, which allowed her to take up a postdoctoral position in David Ron's team at the New York University Medical Center. "EMBO has been with me from the start," says the French scientist. "It is through the Young Investigator network that I heard about an opening at the Laboratory of Molecular Biology – a great move which allowed me to continue to explore the unexplored."

Preventing proteostasis diseases by selective inhibition of a phosphatase regulatory subunit
Das I, Krzyzosiak A, Schneider K, Wrabetz L, D'Antonio M, Barry N, Sigurdardottir A, Bertolotti A.
Science, 10 April 2015
doi: 10.1126/science.aaa4484.

EMBO Workshop held at the IMP Vienna

For four days, from May 12 to 15, the Research Institute of Molecular Pathology (IMP) in Vienna hosted the EMBO Workshop "SMC proteins – Chromosomal organizers from bacteria to human."

EMBO Workshops are original meetings that provide scientists from different fields with an opportunity to discuss common themes and exchange interdisciplinary results. Ana Losada (Spanish National Cancer Research Centre; CNIO), Christian Häring (EMBL, Heidelberg), Tatsuya Hirano (RIKEN), and Jan-Michael Peters (IMP) arranged this intensive exchange of research results and ideas. The scientific workshop, jointly organised by the IMP and EMBO, attracted some of the world's leading experts on SMC proteins to the IMP at the Vienna Biocenter.

Proteins of the SMC (Structural Maintenance of Chromosomes) family are one of the most fundamental classes of chromosomal organizers and are found in all organisms, from bacteria to humans. They are involved in a wide variety of chromosomal processes, including cell division, DNA repair and gene regulation. The talks and discussions spanned the entire spectrum from basic research to future therapeutic concepts for human medicine.

SMC proteins play crucial roles in the function of all life forms – from yeast to humans. The fact that they are widespread also means that there are serious consequences when they do not function properly. Defects in SMC proteins have been linked to human developmental syndromes and mutations in SMC proteins are frequently observed in certain types of cancer. Life scientists from the fields of structural biology to human genetics are therefore interested in understanding how SMC proteins work and their link to human disease.

The first SMC complexes were identified and described about 20 years ago. EMBO Member Kim Nasmyth, the institute's director from 1997 to 2006, carried out pioneering research at the IMP in Vienna. Together with Doug Koshland in the United States, he discovered the cohesin-complex in the yeast *Saccharomyces cerevisiae*. EMBO Member Jan-Michael Peters, scientific director of the IMP since 2013, has been studying cohesin in human cells for many years. This long-standing focus makes the IMP an ideal meeting-point for leading experts in the area of SMC proteins.

Around 140 researchers – from New Zealand to Canada – attended the workshop at the IMP. The guests included EMBO Member Kim Nasmyth (University of Oxford), Doug Koshland (University of California, Berkeley), EMBO Associate Member Mitsuhiro Yanagida (Okinawa Institute of Science and Technology), EMBO Member Frank Uhlmann (Crick Institute, London), EMBO Member Jan Löwe (MRC Lab of Molecular Biology, Cambridge), EMBO Member David Sherratt (Department of Biochemistry, University of Oxford), Barbara Meyer (Berkeley), EMBO Associate Member Yoshinori Watanabe (University of Tokyo), Katsu Shirahige (University of Tokyo), Xiaolan Zhao (Memorial Sloan Kettering Cancer Center, New York), and Tatsuya Hirano (RIKEN Institute, Japan).

The IMP in Vienna is a basic biomedical research institute largely sponsored by Boehringer Ingelheim. With over 200 scientists from 35 nations, the IMP is committed to scientific discovery of fundamental molecular and cellular mechanisms underlying complex biological phenomena. Research areas include cell and molecular biology, neurobiology, disease mechanisms and computational biology. The IMP is a founding member of the Vienna Biocenter.

IMP: www.imp.ac.at
Vienna Biocenter: www.viennabiocenter.org

Practical Courses

Structure, dynamics and function of biomacromolecules by solution NMR
DE-Garching, 31 July–7 August 2015

Image processing for cryo electron microscopy
UK-London, 1–11 September 2015

Two-photon imaging of brain function: From spiny dendrites to circuits
DE-Munich, 5–12 September 2015

Insights into plant biological processes through phenotyping
BE-Ghent, 13–19 September 2015

Current methods in cell biology
DE-Heidelberg, 14–22 September 2015

Computational analysis of protein-protein interactions: From sequences to networks
UK-Norwich, 28 September–3 October 2015

Analysis of high-throughput sequencing data
UK-Hinxton, 19–24 October 2015

Targeted proteomics: Experimental design and data analysis
ES-Barcelona, 15–20 November 2015

iCLIP: Genomic views of protein-RNA interactions
DE-Mainz, 15–21 November 2015

Phylogenetics in the '-omics' era
PE-Iquitos, 10–17 January 2016

Metabolomics bioinformatics for life scientists
UK-Cambridge, 14–19 February 2016

Bioinformatics and genome analyses
TR-Izmir, 2–14 May 2016

Computational molecular evolution
GR-Heraklion, 8–19 May 2016

Computational analysis of protein-protein interactions: Sequences, networks and diseases
HU-Budapest, 30 May–4 June 2016

Advanced methods of electron microscopy in cell biology
CZ-Ceske Budejovice, 14–24 June 2016

Computational biology: Genomes to systems
DE-Heidelberg, 19–23 June 2016

3D developmental imaging
PT-Oeiras, 1–9 July 2016

Integrative modelling of biomolecular interactions
ES-Barcelona, 4–9 July 2016

Non-coding RNA in infection
DE-Würzburg, 18–24 September 2016

For a complete and up-to-date list of EMBO events please go to ***events.embo.org***

Workshops

Cell and developmental systems
CH-Arolla, 18–22 August 2015

Cell cycle
HU-Budapest, 4–7 September 2015

Mitochondria, apoptosis and cancer (MAC 2015)
DE-Frankfurt, 10–12 September 2015

DNA topoisomerases, DNA topology and human health
CH-Les Diablerets, 13–17 September 2015

Molecular mechanisms of muscle growth and wasting in health and disease
CH-Ascona, 20–25 September 2015

Mitochondrial DNA and neurodegeneration
ES-Sitges, 23–25 September 2015

Stem cell mechanobiology in development and disease
IT-Capri, 18–21 October 2015

Cell division: Molecular machineries and cancer targeted therapies
ES-Baeza, Jaén, 19–21 October 2015

Telomeric chromatin and telomere fragility
SG-Singapore, 7–10 December 2015

Systems biology of non-coding RNAs
IL-Rehovot, 8–11 February 2016

Multiple functions of piRNAs and PIWI proteins
FR-Montpellier, 6–9 April 2016

Neural control of metabolism and eating behaviour
PT-Cascais, 5–7 May 2016

Mechanisms of neuronal remodelling
DE-Seeon, 5–9 June 2016

Dendritic anatomy, molecules and function
GR-Heraklion, 14–17 June 2016

New model systems for early land plant evolution
AT-Vienna, 22–24 June 2016

Bacterial cell division: Orchestrating the ring cycle
CZ-Prague, 14–17 September 2016

Organelle contact sites: Intracellular communication and role in disease
IT-Domus de Maria, 15–18 September 2016

Conferences

Ribosome synthesis
BE-Brussels, 19–23 August 2015

Aquatic microbial ecology
SE-Uppsala, 23–28 August 2015

Meiosis
UK-Oxford, 30 August–4 September 2015

Physics of cells: From molecules to systems (PhysCell 2015)
DE-Bad Staffelstein, 30 August–4 September 2015

Autophagy signalling and progression in health and disease
IT-Chia, 9–12 September 2015

Cell therapy today: Achievements, hopes and hype
UK-Manchester, 9–12 September 2015

Protein synthesis and translational control
DE-Heidelberg, 9–13 September 2015

Ubiquitin and ubiquitin-like modifiers: From molecular mechanisms to human diseases
HR-Cavtat, 18–22 September 2015

Signalling in plant development
CZ-Brno, 20–24 September 2015

Nuclear receptors: From molecules to humans
FR-Ajaccio, 24–28 September 2015

The multidisciplinary era of endocytic mechanics and functions
FR-Mandelieu-la-Napoule, 27 September–2 October 2015

Genetic control of development and evolution
FR-Paris, 29 September–2 October 2015

The DNA damage response in cell physiology and disease
GR-Cape Sounio, 5–9 October 2015

Nuclear structure and dynamics
FR-Isle sur Sorgue, 7–11 October 2015

Exploring the genomic complexity and diversity of eukaryotes
ES-Sant Feliu de Guixols, 17–22 October 2015

Neural development
TW-Taipei, 4–8 December 2015

From host genomes to microbiome: Immunity in the genomic era
IL-Rehovot, 14–16 February 2016

Visualizing biological data (VIZBI 2016)
DE-Heidelberg, 9–11 March 2016

Imaging the brain
PL-Warsaw, 18–21 May 2016

Cellular signalling and cancer therapy
HR-Cavtat, 27–31 May 2016

Gene transcription in yeast: From chromatin to RNA and back
ES-Sant Feliu de Guixols, 11–16 June 2016

The biochemistry and chemistry of biocatalysis: From understanding to design
FI-Oulu, 12–15 June 2016

Problems of Listeriosis (ISOPOL XIX)
FR-Paris, 14–17 June 2016

Molecular and developmental biology of *Drosophila*
GR-Chania, Crete, 19–25 June 2016

ORGANIZERS: APPLY NOW FOR:

2016 funding for courses, workshops and conferences by 1 August 2015

Keynote lectures given by EMBO members at major international scientific meetings in 2016 by 1 February, 1 June and 1 October

For further information see: www.embo.org/funding-awards/courses-workshops

Ribosome structure and function 2016
FR-Strasbourg, 6–10 July 2016

Chemical biology 2016
DE-Heidelberg, 31 August–3 September 2016

Lymphocyte antigen receptor signalling
IT-Pontignano (Siena), 3–7 September 2016

Retinal proteins
DE-Potsdam, 2–7 October 2016

Cilia 2016
NL-Amsterdam, 4–7 October 2016

Experimental approaches to evolution and ecology using yeast and other model systems
DE-Heidelberg, 19–22 October 2016

Structure and function of the endoplasmic reticulum
ES-Girona (Gerona), 23–27 October 2016

ESF | EMBO Symposia

Thiol-based redox switches in life sciences
ES-Sant Feliu de Guixols, 12–17 September 2015

Interaction between the immune system and nanomaterials: Safety and medical exploitation
PL-Pułtusk, 4–9 October 2015

EMBO | FEBS Lecture Courses

Mitochondria in life, death and disease
GR-Fodele, 12–16 October 2015

EMBO | EMBL Symposia

The mobile genome: Genetic and physiological impacts of transposable elements
DE-Heidelberg, 16–19 September 2015

Seeing is believing: Imaging the processes of life
DE-Heidelberg, 6–10 October 2015

New approaches and concepts in microbiology
DE-Heidelberg, 11–14 October 2015

The non-coding genome
DE-Heidelberg, 18–21 October 2015

Biological oscillators: Design, mechanism, function
DE-Heidelberg, 12–14 November 2015

Other EMBO events

EMBO Laboratory Management Courses
DE-Leimen, Various dates

The EMBO Meeting
UK-Birmingham, 5–8 September 2015

EMBO Members' Meeting
DE-Heidelberg, 28–30 October 2015

16th EMBO | EMBL Science and Society Conference | Emerging Biotechnologies – Hype, hope, and hard reality
DE-Heidelberg , 5–6 November 2015

Excellence is a choice

The French microbiologist EMMANUELLE CHARPENTIER is a pioneer of CRISPR-Cas9 technology, a prize-winning tool for gene editing. Viewed as a revolution in biology, it is already used in a wide variety of applications in laboratories worldwide. Professor Charpentier will present her research at the upcoming *EMBO | EMBL Science and Society Conference* in November. In an interview with EMBOencounters she speaks about her life-changing discovery and what it is like to suddenly step into the full public spotlight.

How has your life changed after your breakthrough discovery in 2012?
Over the last two years, the research of my laboratory has been awarded with a number of prizes. I am quite amazed by the strong and fast support received from the scientific community for our achievements on CRISPR-Cas9. This all happened while I was establishing my new laboratory in Germany. The change of environment helped me keep my feet on the ground because I needed to deal with substantial activities around my integration in the new institution, such as administrative and logistic issues and recruitments to establish a new team. The prizes surely highlight the fundamental nature of our research that has been translated at dazzling speed into biomedical and biotechnology applications on a large-scale. This is a critical message to convey to the governmental and funding organizations that, once again, it all comes down to basic science: the investigation of new mechanisms, the basis for the development of novel therapeutic strategies or biotechnologies.

Were you aware at that time that this is a game-changing method?
I understood very quickly that if CRISPR-Cas was to be exploited as a tool for genome silencing and engineering, then the CRISPR-Cas9 system would provide the best opportunities for application – because it is the simplest of the CRISPR-Cas systems existing in bacteria. This was later confirmed by seminal experiments done with my student Krzysztof Chylinski showing that the enzyme Cas9 just needs a duplex of RNA to cleave DNA. I had even predicted early on that the system could be harnessed to treat human genetic disorders, which the Swiss-based company CRISPR Therapeutics that I cofounded together with Rodger Novak and Shaun Foy now focuses on.

How do you define scientific success?
To me scientific success can be measured on different levels. Surely, ultimate success is linked to an unexpected finding that can result in a scientific breakthrough: to be able to identify a high-impact biological mechanism, not only a purely theoretical one but one that opens up new applications on a global scale. Scientific success can also be measured by activities around science per se, which most scientists also focus on: successful contribution to teaching, the transmission of knowledge and science, training and mentoring of younger scientists, promoting of a field of research.

Do you think the technique will soon become faster and cheaper to be performed on a wide medical scale?
Yes. There are already signs of progress. Scientists either buy the chips sold by some companies or they order cost-free the plasmids that provide the components of the system (protein and RNA). Then they only need to design the RNA molecule that is part of the CRISPR-Cas9 component to create the tool. It is already cheap and this is why it has spread so quickly to research benches all over the world. A small lab running with limited funds can apply the system. CRISPR-Cas9 gene editing has become very democratic.

You are popular with the media. Do you enjoy standing in the limelight?
This is not a natural exercise for a scientist. However, I feel that CRISPR-Cas9 is an excellent example of a scientific breakthrough originating from pure basic science to highlight to the public and media: blue sky research. There are no old or obsolete topics – one can discover interesting findings in many fields of research. The main focus of the research in my laboratory is to understand molecular and cellular mechanisms of regulation in human host-bacterial pathogen interactions that could ultimately be exploited for the development of novel therapeutic strategies for the treatment of infectious diseases. My initial interest in the CRISPR-Cas9 story was to study small RNA-mediated mechanisms relevant to the virulence and adaptation of the human pathogen *Streptococcus pyogenes*. It is a wonderful feeling to have highlighted a mechanism that has such a broad range of applications in biomedicine.

Are there any things that you would have done differently if you had a second chance?
I wish that better support would be provided to scientists in Europe with regard to intellectual property issues and the potential commercial applications of research. The US is very active in the field of intellectual property and commercial benefits of discoveries.

Was it challenging to start thinking about funding? You managed to collect 18.5 million euros to found CRISPR Therapeutics.
This was a matter of gathering the right team around me. I was just lucky to know Rodger Novak and Shaun Foy, who have long-term experience and expertise in the biotech, pharma and venture capital world. We cofounded CRISPR Therapeutics, which has raised 89 million Euros in series A and B financing rounds. The operations of the company are now located in London and Cambridge, Massachusetts. I do not have an operational role in the company but advise on the science.

What will be your topic at the EMBO | EMBL Science & Society Conference?
I will explain the principle of CRISPR-Cas9 to the audience, and present recent developments and applications of the technology, including potential therapies. I will also highlight some ethical concerns that were recently raised with respect to germ line modifications. In these regards, it is critical that the public, scientists, clinicians, developers and ethical specialists understand the technology and appreciate its great benefits for biotechnology and medicine.

16th EMBO | EMBL Science and Society Conference
Emerging biotechnologies: Hype, hope, and hard reality
DE-Heidelberg | 5–6 November 2015 | A. Bendiscioli
http://events.embo.org/science-society-conference/

Genomic Medicine in Australia

The GARVAN INSTITUTE OF MEDICAL RESEARCH in Sydney is one of the first institutes in the world to acquire DNA sequencing machines that can sequence a whole genome for a cost less than US$ 1000. The sequencing capabilities are part of its Kinghorn Centre for Clinical Genomics, a facility established in 2012 to further the use of genomic information in research and patient care.

The Garvan Institute announced the acquisition of the HiSeqX Ten sequencing platform early last year, a genome sequencing system that allows the centre to sequence up to 18,000 whole human genomes per year.

"I believe we have reached a tipping point where genome sequencing has become achievable on a population scale," says EMBO Associate Member John Mattick, Executive Director of the Garvan Institute. "Just over a decade ago, it cost over a billion dollars to sequence the first human genome. Illumina's new system makes it possible to address the pressing clinical needs of the thousands of people in Australia with genetic diseases and the tens of thousands diagnosed with cancer each year."

Clinical genomics is a rapidly evolving field focused on the use of genome sequencing information in patient diagnosis and treatment. In 2012, The Garvan established the Kinghorn Centre for Clinical Genomics as an Australian research and sequencing centre to deliver and interpret genome sequences for research and clinical use. Mattick believes this initiative must be at a national level and involve international partners due to the need of massive global databases to support the interpretation of the data. In May 2014, the Centre became a genomics node of BioPlatforms Australia, a research infrastructure organization that helps to expand access to breakthrough technologies. The Garvan has partnered with BioPlatform facilities AGRF (Australian Genome Research Facility) and the Ramaciotti Centre for Genomics to streamline access to whole genome sequencing for Australian researchers.

Researchers at the Kinghorn Centre for Clinical Genomics are investigating cancer and monogenic diseases, as well as complex diseases such as diabetes, osteoporosis and immune-related diseases. The Centre acts to integrate and translate genomic research into the clinic, in partnership with clinician researchers around the country and beyond.

"My expectation is that genomic sequencing will become widely available for personal health management in the near future," says Mattick. "With the advice of a physician, we should see improvements in avoiding adverse drug reactions, progress in understanding and reducing the risk of diseases like diabetes, stroke and other conditions. We are in the early stages of the transformation of medicine from the art of crisis management to the science of good health."

Great questions in life sciences

What can we learn about ourselves by sequencing our genomes? How do intricate structures emerge in living cells? Is it possible to visualize electrical signals in an intact brain? These and other fascinating questions are explored by top researchers in a series of videos called GREAT QUESTIONS IN LIFE SCIENCES. The series offers a unique glimpse into cutting edge research at the intersection of physics, computation, and biology.

Great Questions is part of a large library of videos produced by iBiology (www.ibiology.org), an educational project that records talks from the world's leading biologists and makes them freely available online. The videos aim to offer deeper insights into the process of research and make science and scientists accessible to audiences around the world, particularly people who would otherwise have limited opportunities to see talks from renowned scientists. iBiology has produced 350 videos to date, with over 150 of the talks subtitled in English and more than 50 with Spanish subtitles. So far viewers from over 170 countries and territories have visited the portal.

iBiology videos target a broad audience, from undergraduate to graduate students and postdoctoral researchers, and the topics range from cell biology to neuroscience to evolution (see also article in EMBOencounters issue 26). In addition to research lectures, the video collection also features talks that highlight the human side of research and offer resources for teaching science in the classroom.

David Haussler, University of California, Santa Cruz, and Howard Hughes Medical Institute, discusses sequencing our genomes in a recent iBiology video

Source: iBiology.org

The portal is making a concerted effort to feature more European scientists. Earlier this year, iBiology released a research talk by EMBO Member Pascale Cossart. In the three-part video series, the French biologist begins with an overview of microbiology and then focuses on the bacterium *Listeria monocytogenes*, a food-borne, intracellular pathogen. She explains how *Listeria* enters epithelial cells, moves around inside them, and spreads between cells. In her final talk, Cossart reviews the many cellular processes impacted during infection with *Listeria*.

Cossart's talks were recorded at the European Molecular Biology Laboratory (EMBL) as part of a collaboration between EMBL, EMBO and iBiology. In June 2015, videos for a synthetic biology course were recorded at EMBL Photolab and will be posted online later in the year. This helps expand the collection of international speakers and helps EMBO disseminate research being done by its members and colleagues.

For more information contact Mónica I. Feliú-Mójer, Science Outreach Programme Manager at monica.feliu-mojer@ucsf.edu.

Awards of excellence

EMBO MEMBERS

InBev-Baillet Latour Health Prize

Bruce M. Spiegelman of the Dana-Farber Cancer Institute and Harvard Medical School Center for Life Sciences, Boston, United States was awarded the InBev-Baillet Latour Health Prize for his work in the field of metabolic disorders, the theme of the prize for 2015. He was recognized for original contributions relating to the differentiation and function of adipose tissue and its role in pathophysiology. This annual prize worth 250,000 Euros is the most important international science award in Belgium. The theme of the prize for 2016 will be infectious diseases.

NAS Award for Scientific Reviewing

Thomas D. Pollard of Yale University received the 2015 NAS Award for Scientific Reviewing from the US National Academy of Sciences. The award was established in 1979 "to recognize authors, whose reviews have synthesized extensive and difficult material, rendering a significant service to science and influencing the course of scientific thought." Pollard was awarded for his reviews describing the molecular mechanisms of actin and cell motility.

Canada Gairdner International Award

Michael Hall from the Biozentrum, University of Basel, has been awarded the Canada Gairdner International Award 2015. The award recognizes his discovery of the protein kinase TOR – Target of Rapamycin – and its role as a key regulator of cell growth. The prize is endowed with 100,000 Canadian dollars.

Liliane Bettencourt Prize for Life Sciences

Scott Waddell has received the Liliane Bettencourt Prize for Life Sciences 2014. Each year, the Bettencourt-Schueller Foundation awards the prize to a young researcher under 45, recognized in the scientific community for the quality of his or her international publications. Since 1997, 19 researchers have received this prize.

Distinguished Women in Chemistry or Chemical Engineering Award

Lucia Banci of the University of Florence, Italy, received this award from the International Union of Pure and Applied Chemistry. The prize was created in 2011 to acknowledge and promote the work of women chemists/chemical engineers worldwide. This year, twelve awardees have been selected.

Australian Academy of Health and Medical Sciences

Frank Gannon has been elected a fellow of the Australian Academy of Health and Medical Sciences this year. The academy was established in June 2014 with 15 initial fellows and council members. This year, 116 new fellows from institutions all around Australia joined the organization.

Prix Galien Greece

George Kollias of the Medical School of Athens has been awarded the Galien Scientific Research Award for his contributions towards the development of biological anti-TNF therapies for rheumatoid arthritis and the discovery of novel disease pathways in animal models of chronic inflammation and autoimmunity.

Royal Society of Edinburgh

Ian Chambers of the University of Edinburgh was elected Fellow of the Royal Society of Edinburgh.

Ernst W. Bertner Memorial Award

John Mattick was awarded the 2014 University of Texas MD Anderson Cancer Center Ernst W. Bertner Memorial Award for Distinguished Contributions to Cancer Research.

EMBO YOUNG INVESTIGATORS

Philip Leverhulme Prize

Thomas Richards of the University of Exeter was awarded the Philip Leverhulme Prize in Biological Sciences worth 100,000 British Pounds. The Leverhulme Trust awards the prizes in recognition of researchers at an early stage of their career whose work has already had a significant international impact, and whose future research career is exceptionally promising. Richards wants to use his award to develop new approaches to link genome data with methods to understand how microbial cells function in their environment.

Congratulations to EMBO Members, Young Investigators and Installation Grantees who received the Consolidator Grants awarded by the European Research Council for 2014. The full list of names can be found at http://erc.europa.eu/sites/default/files/document/file/erc_2014_cog_results_ls.pdf

A good read – Publications from the EMBO Community

EMBO MEMBERS, YOUNG INVESTIGATORS & FELLOWS

Cell-intrinsic adaptation of lipid composition to local crowding drives social behavior

Howard Riezman (EMBO Member), Mathieu Frechin (EMBO Fellow) and colleagues

Nature | 25 May 2015
doi:10.1038/nature14429

Selective, rapid and optically switchable regulation of protein function in live mammalian cells

Jason Chin (EMBO Member), Yu-Hsuan Tsai (EMBO Fellow) and colleagues

Nature Chemistry | 18 May 2015
doi:10.1038/nchem.2253

The chromatin remodeler Brg1 activates enhancer repertoires to establish B cell identity and modulate cell growth

Claudia Bossen (EMBO Fellow) and colleagues

Nature Immunology | 18 May 2015
doi:10.1038/ni.3170

The microRNA-200 family regulates pancreatic beta cell survival in type 2 diabetes

Markus Stoffel (EMBO Member), Bengt-Frederik Belgardt, Kashan Ahmed (EMBO Fellows) and colleagues

Nature Medicine | 18 May 2015
doi:10.1038/nm.3862

"A Cold Spring Harbor in Europe." EURATOM, UNESCO and the Foundation of EMBO

Francesco Cassata

Journal of the History of Biology | 1 May 2015
doi: 10.1007/s10739-015-9408-5

Histone H3.3 is required for endogenous retroviral element silencing in embryonic stem cells

Simon J Elsässer (EMBO Fellow) and colleagues

Nature | 4 May 2015
doi:10.1038/nature14345

Structures of actin-like ParM filaments show architecture of plasmid-segregating spindles

Jan Löwe (EMBO Member), Tanmay A.M. Bharat (EMBO Fellow) and colleagues

Nature | 27 April 2015
doi:10.1038/nature14356

ATP synthase promotes germ cell differentiation independent of oxidative phosphorylation

Ruth Lehmann (EMBO Associate Member), Felipe K. Teixeira (EMBO Fellow) and colleagues

Nature Cell Biology | 27 April 2015
doi:10.1038/ncb3165

Preventing proteostasis diseases by selective inhibition of a phosphatase regulatory subunit

Anne Bertolotti (EMBO Member) and colleagues

Science | 10 April 2015
doi: 10.1126/science.aaa4484

Activity of defined mushroom body output neurons underlies learned olfactory behavior in Drosophila

Scott Waddell (EMBO Member) and colleagues

Neuron | 9 April 2015
http://dx.doi.org/10.1016/j.neuron.2015.03.025

MAD2L2 controls DNA repair at telomeres and DNA breaks by inhibiting 5' end resection

Jacqueline J.L. Jacobs (EMBO Young Investigator) and colleagues

Nature | 23 March 2015
doi:10.1038/nature14216

Pharmacological inhibition of PI3K reduces adiposity and metabolic syndrome in obese mice and rhesus monkeys

Manuel Serrano and colleagues

Cell Metabolism | 2015
doi: 10.1016/j.cmet.2015.02.017

Quantitative gene profiling of long noncoding RNAs with targeted RNA sequencing

John S Mattick (EMBO Associate Member) and colleagues

Nature Methods | 9 March 2015
doi:10.1038/nmeth.3321

A vitamin D receptor selectively activated by gemini analogs reveals ligand dependent and independent effects

Daniel Metzger and colleagues

Cell Reports | 3 February 2015
doi: 10.1016/j.celrep.2014.12.045

Next issue *EMBOencounters*

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Editorial

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EMBO MEMBERS & YOUNG INVESTIGATORS

BOOKS

Natural dietary therapies for the "gluten syndrome"

Diter von Wettstein and colleagues

Scientia Danica of The Royal Danish Academy of Sciences and Letters
Series B. Biologica. Vol.3, 1-87, 2014. I

www.royalacademy.dk/da/Publikationer/Scientia-Danica/Series-B/the-gluten-syndrome

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FRIDAY 6

Things you can make with biotechnologies

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