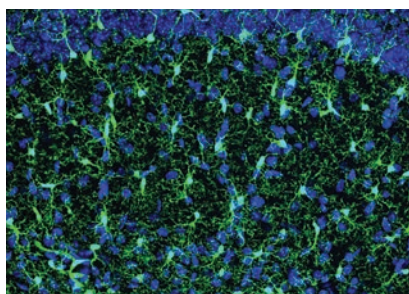


# EMBL etcetera

Issue 64 • August 2011 • [www.embl.org/newsletter](http://www.embl.org/newsletter)



## Brain gardening

Research by the Gross group at EMBL Monterotondo has revealed that in a developing mouse brain, microglia prune the connections between neurons, shaping how the brain is wired – much like how gardeners trim plants.

When the scientists introduced a mutation reducing the number of microglia, they observed effects similar to those identified by other researchers in cases of autism in humans – many more connections between neurons.

The research opens up a number of questions relating to the impact that this characteristic has on behaviour, and to long term consequences.

page 5

## Science in the spotlight



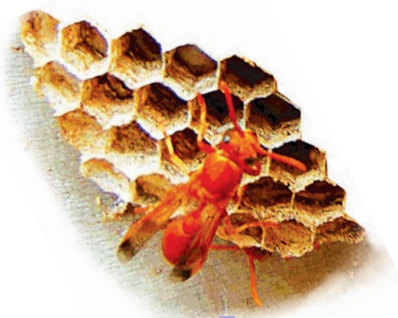
Visitors come from far and wide to get a taste of life at EMBL, pages 7 and 8

## Summer Council meeting in Grenoble

Movers and shakers meet to discuss developments across EMBL sites

Key themes discussed included highly positive evaluations of EMBL-EBI services and the Developmental Biology Unit, encouraging progress of the EMBL Partnership Programme, and the approval of a Memorandum of Understanding as a first step towards setting up the European Life Science Infrastructure for Biological Information (ELIXIR) as an EMBL special project.

find out more on page 2



9

Learning about  
insect societies

2

What is  
humanness?

6

New instrument  
enhances BioSAXS

10

Neuroscience:  
thinking outside  
the box

## EMBL Council meets in Grenoble

EMBL's movers and shakers convened at the Grenoble outstation for the summer Council meeting in July.

### Key themes

Issues discussed included a highly positive evaluation of EMBL-EBI services and the Developmental Biology Unit, presented by Roberto di Lauro, chair of the Scientific Advisory Council. The EBI was described as a 'leading force and a key player in bioinformatics provision worldwide'. Research in the Developmental Biology Unit was rated 'outstanding' and the Unit was described as one of the best in the world in its field for its size.

Council, which convenes twice a year to discuss and vote on the approval of various items such as salary adjustments, changes to staff and financial regulatory documents, heard that collaborations in the EMBL Partnership Programme – currently involving eight official partnerships with member state institutions – were progressing well and partners have adopted the central principles of the EMBL model.

Delegates continued to discuss EMBL's budget for the five-year period 2012–16 in detail. An extraordinary Council meeting will be held in Heidelberg in October to advance discussions and, if possible, develop an indic-

ative scheme to be agreed at the subsequent Council meeting in November.

EBI Director and European Life Science Infrastructure for Biological Information



(ELIXIR) project leader Janet Thornton gave a status update on ELIXIR. Council approved a Memorandum of Understanding as a first step towards setting up ELIXIR as an EMBL special project, with a view to securing signa-

tures in the coming weeks from EMBL and ELIXIR member states. ELIXIR will create a stable pan-European infrastructure for biological data, the hub to be located at the EBI.

### Other developments

- ⇒ The Spanish delegation expressed interest in creating an EMBL outstation in Spain, building on the existing EMBL partnership unit at the Centre for Genomic Regulation in Barcelona and will present a formal proposal at a forthcoming Council meeting.
- ⇒ Council announced changes to the procedure EMBL uses to calculate the Cost Variation Index, a measure of the effect of inflation in member states on the EMBL budget year-by-year to include calculations based on the most recent data, to closely mirror current developments.
- ⇒ EMBL's 2010–11 Annual Report was approved and commended by Eero Vuorio, chair of the Council, calling it "an impressive description of the research work".
- ⇒ Council said 'goodbye' to delegates from Denmark, Israel and the Netherlands after many years of service and look forward to welcoming new delegates from these countries in the autumn.

## Understanding the human animal



What is humanness? Is the public being misinformed by genetic screening? How are technologies impacting on how we see ourselves? These were just some of the questions considered by 20 participants at the beginning of August at the EMBL|EMBO Science and Society summer school 'The Human Animal: Scientific, Social and Moral Perspectives' held at EMBL Heidelberg.

The six-day programme included lectures from EMBL scientists and experts from around the world. Tutors, including Agnar

Helgason (deCODE Genetics, Iceland), Tecumseh Fitch (University of Vienna) and Eric Parens (The Hastings Centre, USA), discussed a broad range of social and scientific issues relating to genetics, genomics, patenting, human enhancement, neuroscience, bioethics, and more.

The interactive programme included student presentations, classroom sessions, tours of labs and core facilities and other means of exploring how new know-how and technologies emerging from the

biological sciences are forcing people to re-examine their views of the human species.

Organised by faculty from EMBL, the European School of Molecular Medicine and Harvard Kennedy School, the summer school involved pre- and postdocs from both natural and social sciences from countries as far-flung as the US, Mexico, Finland, Israel and Australia.

Robin Lovell-Badge of the UK National Centre for Medical Research, teaching at the summer school, said: "Twelve years ago I was plucked out of the lab and put in a situation where I had to talk to the public and politicians about some issues to do with ethics. I definitely would have benefited from these types of interaction before I did that. It is such a valuable thing to have this interdisciplinary mixing together of different people and ideas."

Student Krishanu Saha, a postdoc from Harvard University, added: "This type of space is rare and it breaks down boundaries in many different ways. I think it will have a long-lasting impact."





The Otto Meyerhof Centre in Heidelberg, the new home for the MMPU



Technician, Nicole Echner, working in one of the new labs

## New home for Molecular Medicine Partnership Unit

Groups forming the Molecular Medicine Partnership Unit (MMPU) have begun to move into a new home at the Otto Meyerhof Centre, provided by Heidelberg University. The partnership, which brings together scientists from EMBL and the Medical Faculty of the University, comprises five internation-

al research teams jointly headed by experts from both institutions. The arrangement combines the complementary expertise of basic and clinical scientists to research the molecular mechanisms that underlie common diseases, under one roof. "The MMPU holds remarkable potential for making real

advances in treatments for diseases," says EMBL Associate Director Matthias Hentze, who co-heads the MMPU with Heidelberg University's Andreas Kulozik. "The new space holds both lab and patient care facilities, enabling truly integrated molecular medicine research."

### Data down under

On 21 June, EMBL Australia launched a freely available service that allows Australian researchers to make the most of public bioinformatics resources. The new service is hosted by the University of Queensland, based in Brisbane.

Australia's molecular biology community can now benefit from access to a wide range of data resources, including some of EMBL-EBI's core databases, software frameworks and tools, such as similarity searches, multiple sequence alignment and applications for discovering protein function. EMBL Australia is also ensuring that Australian researchers can contact a team of bioinformaticians for assistance with data access and processing.

Australia became EMBL's first associate member state in 2008. Since then, EMBL Australia and EMBL-EBI have collaborated closely to integrate the fruits of Australian research with the vast stores of data in EMBL-EBI's public resources.

To learn more, visit:  
[www.emblaustralia.org](http://www.emblaustralia.org)

### Independent thinking

EMBL has become a hot-bed for top research grants, and recently two more scientists have been awarded prestigious Starting Independent Researcher Grants by the European Research Council. EMBL Grenoble group leader Christiane Schaffitzel will lead research focused on 'NMD Complexes: Eukaryotic mRNA Quality Control'. Meanwhile, EMBL Monterotondo scientist Rocio Sotillo will carry out studies to 'Define the Impact of Chromosome Instability in Tumour Initiation, Maintenance and Relapse'. Christiane and Rocio follow closely in the footsteps of EMBL Heidelberg group leaders Marcus Heisler, Takashi Hiiragi and Francesca Peri, and EMBL Grenoble group leader Ramesh Pillai in receiving an ERC Starting Grant. EMBL Heidelberg's Peer Bork was awarded an ERC Advanced Investigators Grant in December. "I am greatly looking forward to lots of exciting and challenging work," says Christiane. "It's a tough selection process but it's fantastic to have been given the opportunity to follow up this important research," adds Rocio.

## Faster than a speeding molecule

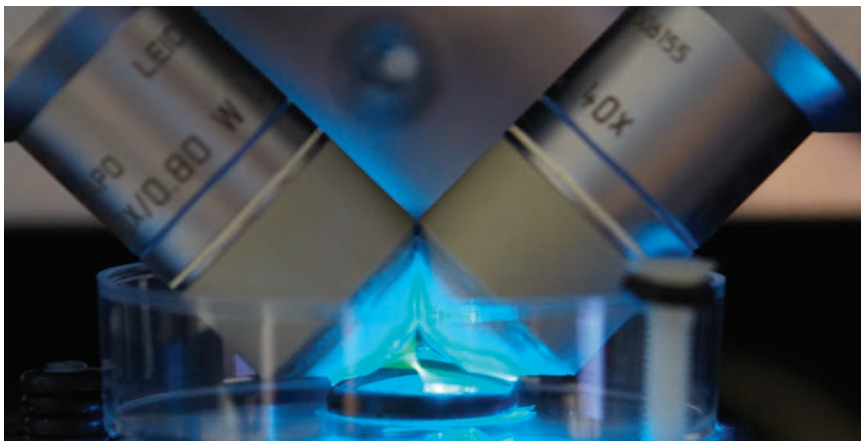
Molecules can now be studied with split-second timing following the development of a new microscope that can literally watch and measure fast-moving molecules millisecond by millisecond.

A team led by EMBL Heidelberg scientist Malte Wachsmuth combined light-sheet microscopy with single molecule spectroscopy to enable a recording of the fluorescence of every pixel within view and take snapshots at intervals of less than one thousandth of a second – at least one hundred times quicker than it takes to blink once.

“We can follow fluorescently-tagged molecules in whole live cells, in 3D, and see how their biochemical properties, like interaction rates and binding affinities, vary throughout the cell,” explains Malte.

The technique, published in *Nature Biotechnology*, has already provided insights into processes that were, until recently, invisible such as the formation of chromatin (the combination of DNA, RNA and chromosome-forming proteins). “Our research suggests that chromatin may exist in an intermediate state which was not observable before in living cells,” says Michael Knop, now at Heidelberg University.

It is thought that the new microscope could help investigate processes such as the role of growth hormones in cancer, the regulation of cell division and the patterning of tissue development in the embryo.



The technique represents a considerable step up from previous methods, based on confocal microscopy

## Bioinformatics at your fingertips

The challenges of sharing information amongst the increasingly diverse biocomputing community have inspired EMBL scientists to construct a new bio-IT portal. The portal, launched in July, enables users to share expertise, develop contacts and exchange information. Users at EMBL Heidelberg can log on to the site and access and contribute to databases and directories and access information on services, protocols, and events. “People can find out what to do, who to talk to and how to share and integrate their services more easily,” explains Aidan Budd, senior computational biologist in the Gibson group. The service, developed as a joint project by research units, Core Facilities and IT, also features a Linux software repository, a resource that enables the sharing of innovative software between laboratories. “This can significantly increase the efficiency and effectiveness of installing and utilising software,” adds Frank Thommen, IT support engineer in the Structural and Computational Biology Unit. The team welcome ideas to enhance the service. Users located at EMBL Heidelberg can log on to the site: [www.bio-it.embl.de](http://www.bio-it.embl.de)

## All aboard!

EMBL scientists rubbed shoulders with the great and the good at the 61st Lindau meeting of Nobel Laureates. Pre- and post-docs Amanda Cobos, Mateusz Putyrski, Katarzyna Mleczko, Shotaro Otsuka and Peter Blattmann were among a select group of scientists from around the world chosen to attend the event, which was this year dedicated to physiology and medicine.

Amongst the speakers at the July meeting were Bill Gates, founder of Microsoft, together with 23 Nobel Laureates, including Harald zur Hausen, Ada Yonath and Elizabeth Blackburn. Speakers discussed past and present projects and research as well as offering young scientists career advice.

“To meet and hear the Nobel Laureates and many young researchers from around the world was a great inspiration and motivation,” says Peter, a predoc in the Pepperkok group. EMBL also manned an exhibition stand at the event, enabling



Left: Education officer Philipp Gebhardt (left) speaks about EMBL's research programmes with Germany's Baden-Württemberg state's prime minister, Winfried Kretschmann, and science minister, Theresia Bauer  
Right: One of the venues for this year's event



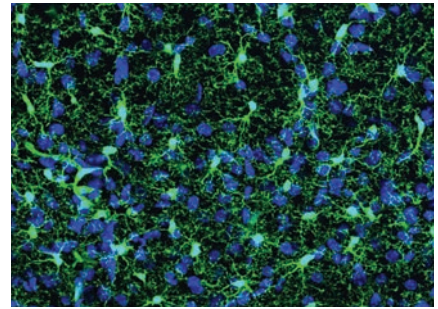
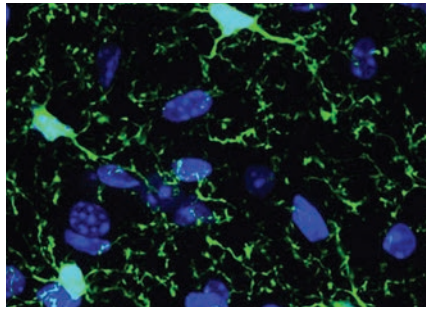
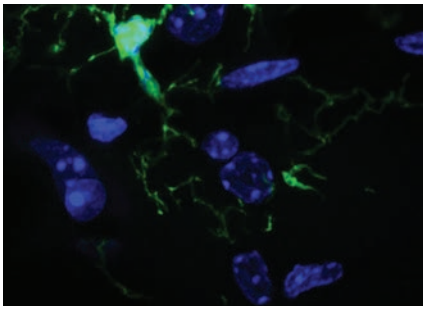
many of the 566 young researchers from 77 countries in attendance to learn about EMBL's research programmes.

“We met more than 200 people wanting to know about career opportunities, the PhD programme and the EMBL Interdisciplinary Postdoc Initiative – the interest was

really fantastic,” adds Philipp Gebhardt, education officer in EMBL's European Learning Laboratory for the Life Sciences.

Other activities at the annual event included a barbeque, an excursion to the Isle of Mainau and a concert by the Verbier Festival Chamber Orchestra.





Microglia (green) in a mouse brain. The nuclei of all cells in the brain are labelled blue. Over time the number of microglia increases and the mouse brain establishes the right connections, but the scientists would like to find out if the delay they recorded has any long-term consequences

## Invasion of the nasty gardeners?

It's the biological equivalent of a horror film where clean-up robots turn rogue: finding microglia, which usually remove debris and dying cells from injured brains, 'eating up' connections – synapses – between healthy neurons. In reality, when she observed just this in the brains of developing mice during her PhD work in the Gross group at EMBL Monterotondo, Rosa Paolicelli realised it's not so much a case of cleaning-crew gone wrong as of the cleaners moonlighting as gardeners.

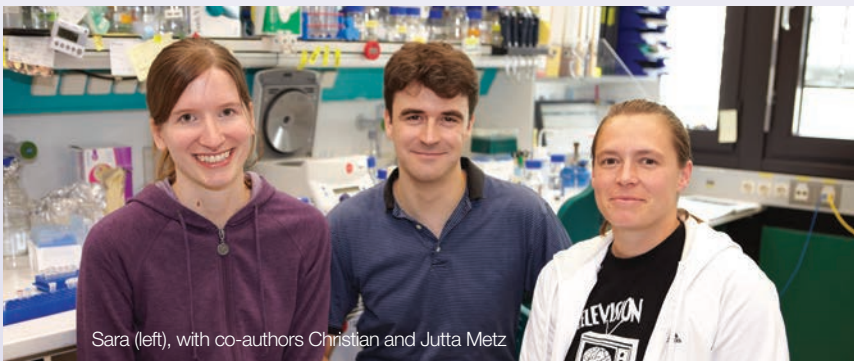
With collaborators in Rome and Turin, the EMBL scientists found that in the

developing mouse brain, microglia prune the connections between neurons shaping how the brain is wired. "They 'eat up' synapses to make space for the most effective contacts between neurons to grow strong," group leader, Cornelius Gross, explains.

When the scientists introduced a mutation that reduced the number of microglia in the developing mouse brain, what they saw was similar to what others have seen in at least some cases of autism in humans: many more connections between neurons. The microglia-limiting mutation the EMBL

scientists used has only temporary effects, so eventually the number of microglia increases and the mouse brain establishes the right connections. However, this happens later in development than it normally would, and Cornelius and his colleagues would now like to find out if that delay has long-term consequences. This involves addressing important questions, such as: does it affect the mouse's behaviour? At the same time, they plan to investigate what microglia do in the healthy adult brain, where their role is essentially unknown.

## Keeping untangled



Sara (left), with co-authors Christian and Jutta Metz

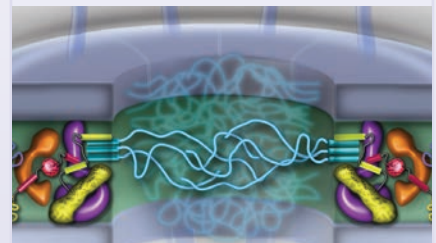
As any rock-climber knows, trailing a long length of rope behind you is not easy. A dangling length of rope is unwieldy and hard to manoeuvre, and can get tangled up or stuck on an outcrop. Cells face the same problem when dragging chromosomes apart during cell division. The chromosomes are pulled by their middle – the centromere – their arms trailing along behind. Just like climbers carry their rope coiled up, inside cells a protein complex called condensin keeps chromosome arms folded and easy-to-transport. During her PhD work in Christian Häring's group, Sara Cuylen discovered it does so by acting as a cord-stopper.

Her results, published in *Nature Structural and Molecular Biology*, indicate that

condensin forms a ring around two different regions of a chromosome arm, like a cord-stopper bringing together a looped length of rope. The condensin ring can slide along the DNA 'rope' to some extent, but Sara and Christian also found evidence that, like a cord-stopper when the button is released, condensin may also be able to stop sliding, attaching itself to specific parts of the chromosome arm.

"This is the first step towards understanding how the largest molecule in the cell can be organised into something that can be handled during cell division," says Christian. Next, the group plan to investigate how chromosome arms are looped into and released from condensin rings.

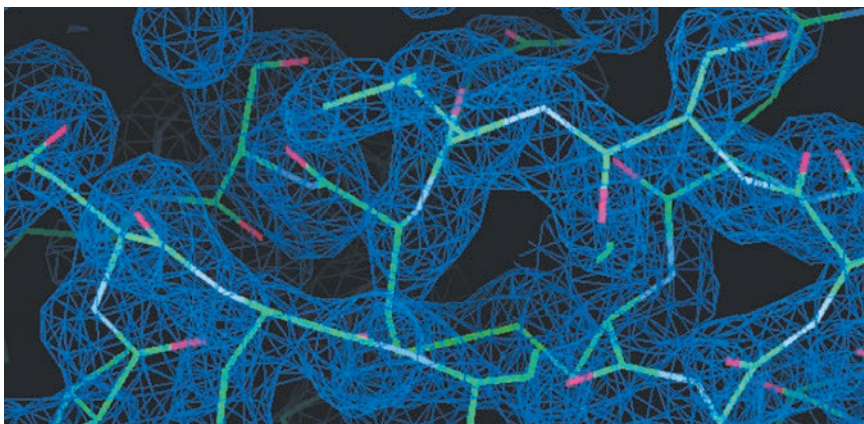
## Some like it hot



Model of the inner ring (green) of the nuclear pore

A fungus that lives in soil, dung and compost heaps, at temperatures up to 60°C, could help understand structures within our own cells. The Bork group, in collaboration with the lab of EMBL alumnus Ed Hurt, now at Heidelberg University, were the first to sequence and analyse the genome of a heat-loving fungus and published the study in *Cell*.

For this fungus to survive such heat, its proteins have to be very stable, and the scientists took advantage of that stability to determine the long-sought after 3D structure of the innermost ring of the nuclear pore, the gateway that controls what enters and exits a cell's nucleus.



Electron density map for insulin using phases obtained via the sulphur-SAD method.

## To the MX

Developments are happening apace at the newly constructed beamline facilities operated by EMBL Hamburg at the PETRA III synchrotron. On 6 June, diffraction images were recorded for the first time on the macromolecular crystallography (MX) beamline, P14. This first experiment was followed by a full data collection on crystals of insulin, and the structure was routinely solved. The team was delighted with the results: “You don’t see such data quality very often,” reveals Gleb Bourenkov, project leader in the Schneider group.

In the following weeks, the beamline was thoroughly put to the test. The structure of glucose isomerase, another test crystal system, was solved by molecular replacement based on data collected on a crystal measuring less than 20 microns. “To solve the structure under such challenging conditions was both encouraging and exciting,” adds Gleb.

The first internal users have since used the beamline to collect data, while further fine-tuning, testing and enhancements continue to be developed.



## Train online

EMBL-EBI has launched a free online training service to guide researchers through its public molecular data resources.

Train online offers courses covering the EBI’s most widely used resources, including Ensembl, the Gene Expression Atlas and InterPro.

Previous experience in bioinformatics is not required – the courses are for anyone who would like to explore biomolecular databases.

Train online will be showcased at this year’s EMBO Meeting in Vienna, 10–13 September. You can have a look at the EMBL stand to learn more about the service.

EMBL-EBI invites you to try a course and welcomes your feedback. [www.ebi.ac.uk/training/online](http://www.ebi.ac.uk/training/online)

## BioSAXS experiments now easier, faster and more reliable

Thanks to a trilateral collaboration between EMBL Grenoble, EMBL Hamburg and the ESRF, BioSAXS can now fully benefit from the small and powerful beams of third generation synchrotrons. Small-angle X-ray scattering (SAXS) has become widely used by structural biologists to study macromolecules and their complexes in close-to-native conditions. But at European synchrotrons, SAXS beamlines are increasingly oversubscribed – and there is an urgent need to improve user access.

EMBL Grenoble’s instrumentation team, led by Florent Cipriani in collaboration with EMBL Hamburg, has developed a high-throughput automated sample environment, which has recently been integrated into the new state-of-the-art EMBL@PETRA3 BioSAXS beamline in Hamburg.

The system follows a first sample changer built under the supervision of Manfred Roessle, project leader in the Schneider group, for the DORIS X33 beamline. It is based on original solutions developed to rapidly transfer micro-volumes of sample in solution with minimal losses, and to efficiently clean the exposure cell and fluid path.



The new sample changer on the Bio-SAXS beamline at EMBL Hamburg

Several hundred samples stored in 96 well plates at controlled temperatures between 4 and 40°C can be automatically loaded into a thin wall glass capillary for exposure to X-rays and an integrated spectrometer, together with liquid-handling features, enabling *in-situ* sample optimisation.

BioSAXS experiments can now be run automatically faster than ever, with less than

a minute turnover and controlled remotely. “The collaboration between EMBL and the ESRF has led to a dramatic increase in the efficiency of the BioSAXS beamlines,” says Florent. “This is confirmed by the exceptionally good feedback received from more than 200 user groups in Grenoble and Hamburg since a first prototype was installed in June 2009.”



## 'Goodness! I haven't seen you since forever'



EMBLers past and present living in Germany and Switzerland met in the EMBL Advanced Training Centre Courtyard Room on the morning of the EMBL summer party on 2 July for a relaxed and enjoyable mini science and networking event. The programme, organised by former predoc Freddy Frischknecht and EMBL alumni relations officer Mehrnoosh Rayner, was informal yet informative, including speakers from academia and industry who shared details not only of their science but also the perks of the cities and institutes where they now live and work. Each offered plenty of good advice, which

was particularly appreciated by the EMBL pre- and postdocs who are now in the same boat as the speakers were some years back.

One of the benefits of holding such meetings on the same day as the EMBL summer party is bumping into so many familiar faces! For this reason, EMBL alumni in Germany agreed to organise this event annually on the morning of the EMBL summer party, and look forward to increasing the staff participation both as speakers and audience at future events.

To view the list of speakers, programme details and photos, please visit: [www.embl.org/alumni/summerparty](http://www.embl.org/alumni/summerparty)

“Returning to EMBL brought on a mixed feeling of joy, excitement, and ‘goodness, I haven’t seen you since forever’. Even people I never met during my EMBL days had the same spirit: the moment we started talking, new ideas came along like in the old days. It felt as if I’d never left.”

– Markus Grabenbauer, group leader, MPI-Molecular Physiology, Dortmund

“These alumni meetings are important platforms for exchanging ideas and experiences of work done in different institutes, especially with today’s growing trends in interdisciplinary research. They provide the opportunity to maintain a network of former EMBL scientists, while strengthening connections with EMBL.”

– Gary Davidson, group leader, Institute of Toxicology and Genetics, Karlsruhe

“In the familiar atmosphere of the meeting, speakers talked openly about their career, results, challenges and tasks. It is very interesting to see the different paths taken after EMBL, and I gained great insight into work both in academia and industry.”

– Annelie Wünsche, predoc, Ellenberg Group

## Greek alumni going strong



The next local chapter meeting in Greece will take place in Dilofo in June 2012.

L-R: Greta Brallou (behind Stavros), Stavros Taraviras, George Simos, Christian Boulin, Anastasia Politou, Thomais Papamarçaki, Frosso Paraskeva, Zoi Lygerou, Spyros Georgatos, Bia Boleti

Despite the difficult circumstances in Greece, EMBL alumni gathered for the fifth annual meeting of the Greek chapter in the picturesque villages of Aspraggeio and Dilofo, 25–26 June. Ten Greek alumni, two affiliated members and 10 graduate students and postdocs from their research groups, along with Christian Boulin from EMBL and Andreas Merdes from CNRS/ Université de Toulouse, enjoyed a sunny weekend.

Christian gave an update on EMBL news and the Core Facilities, while Andreas, a former predoc in the Georgatos lab, gave a scientific talk on Centrosome protein assembly and dynamics, and was unanimously pronounced a honorary member of the Greek alumni chapter.

Several EMBL alumni discussed their latest research and future plans – topics ranged from ancient microRNAs in animal evolution to activities of a biopolitics international organisation. Participants also heard the latest in Greek science and explored possibilities for collaboration.

– Anastasia Politou

## Board elections: Who gets your ✓ote?

Don't forget to vote online between 19–30 September for the new EMBL Alumni Association (EAA) board. The following candidates are only nine of the 16 standing for election. View all and vote at [www.embl.org/alumni/elections](http://www.embl.org/alumni/elections).



**Marja Makarow**

**Now:** Chief Executive, European Science Foundation, Strasbourg

**Then:** Postdoc, 1981–83; EMBL Council delegate; President of EMBC/EMBO

*"I propose to further the careers of young EMBL alumni by organising training and mentoring when they apply for ERC Starting Grants, and by facilitating ways for them to embark on careers provided by the EMBL Partnership labs."*

- Standing for Vice-Chair



**Gareth Griffiths**

**Now:** Associate Professor, Institute of Molecular Biosciences, Oslo

**Then:** Group leader, 1977–2009

*"The role of the EAA is to provide support to the laboratory. Despite its reputation, too few people in the member states are actually aware of the possibilities offered at EMBL. The alumni network is perhaps the best avenue to communicate this."*



**Maj Britt Hansen**

**Now:** Photographic Designer, mbhstudios, Freiburg

**Then:** Photographer, 2001–6

*"The EAA is a potential platform for continuing the EMBL spirit in science, support, partnerships and friendships. I would like to contribute with my creativity, both visually and technically."*



**Des Higgins**

**Now:** Professor of Bioinformatics, Conway Institute, Dublin

**Then:** Group Leader, 1990–96

*"The EAA has a key role in advertising and promoting the importance of EMBL in the member states to ensure continued participation by national governments, but also to ensure active participation by individuals in all the programmes."*



**Jacqueline Mermoud**

**Now:** Scientific Staff, Babraham Institute, Cambridge, UK

**Then:** Predoc 1990–94

*"I am enthusiastic about the role of the EAA board in supporting alumni and maintaining their links with EMBL. I am keen to explore fundraising opportunities so we can develop and advance the initiatives of the Association for all alumni."*



**Preben Morth**

**Now:** Assistant Professor, Centre for Molecular Medicine, Oslo

**Then:** Predoc, 2001–5

*"The international environment that is represented at EMBL is reflected in the EAA, which indeed makes it a powerful human resource and knowledge source. I would like to strengthen the network between EMBL and EMBL partner nodes in Northern Europe."*



**Joep Muijers**

**Now:** Venture Capital, Life Sciences Partners, Amsterdam

**Then:** Predoc, 1997–2001

*"As an active investor in companies focused on the life sciences, and based on my experience and knowledge in raising funds for European and US-based life sciences companies, I'd like to apply my synergistic perspective to promote fruitful collaboration between academia and businesses."*



**Sarah Sherwood**

**Now:** Head of Communications and External Relations, IRB, Barcelona

**Then:** OIPA Officer, 1999–2007

*"The EAA provides a real and practical framework to stay connected to an incredible network of talented and resourceful people. It also allows us to give back to that community. Having spent many years*

*of my time at EMBL deeply involved in helping the Association on its way to reach its goals, I am now honoured to stand for election to the board."*



**Wim Vranken**

**Now:** Group Leader, Free University Brussels

**Then:** Senior Technical Officer, 2001–10

*"I would like to strengthen ties between alumni and EMBL, especially for those based at the outstations. I want to work towards clarifying and communicating the complex and supportive role of the member states and their policies to all employees."*

## Mark your diaries...

Open to all EMBL staff and alumni

### 13 September Austrian local chapter meeting/The EMBO Meeting

From 5.30pm onwards in the rooftop seminar room of the CeMM. Participants will be transported by bus from *The EMBO Meeting* to the CeMM to enjoy a skyline view of Vienna, drinks and fun networking activities. Organisers: Giulio Superti-Furga and Ioannis Legouras

### 19–30 September Board elections

Make sure you cast a vote online for the new EMBL Alumni Association board.

### 29–30 October Iberian local chapter meeting

Taking place in Palma de Mallorca. Invited speaker: EMBL Director General, Iain Mattaj. Organisers: Daniel Bachiller and Maria Vivanco

### November/December(tbc) 18th EMBL Alumni Association board meeting

From 9am–6pm at EMBL Grenoble. Please send items you would like to have discussed to the alumni office.



# Spotlight on science

This summer, EMBL's sites have welcomed a large number of high-profile visits from journalists, students and other important guests



## Media under the microscope

In July, science communicators from across Europe were given a taste of life at EMBL as part of a three-day visit to Heidelberg organised jointly by EMBL and the German Cancer Research Centre (DKFZ). Scientists from both institutions gave lectures and participants, who are all members of the European Union of Science Journalists' Associations, toured laboratories and Core Facilities and took part in evening networking events. Collaborative projects connecting basic science and medicine between EMBL and DKFZ were a key focus during the visit of 22 journalists from 11 countries.

Marta Palomo, a science communicator from Barcelona said: "The research that both institutions are performing is really at an amazing level and the scientists have an extraordinary capacity for synthesis and communication." Gorm Palmgren, a Danish journalist who contributes to *Science Illustrated* magazine, added: "We heard research scientist Mani Arumugam talking about gut flora, and I expect to write a big article on this subject."

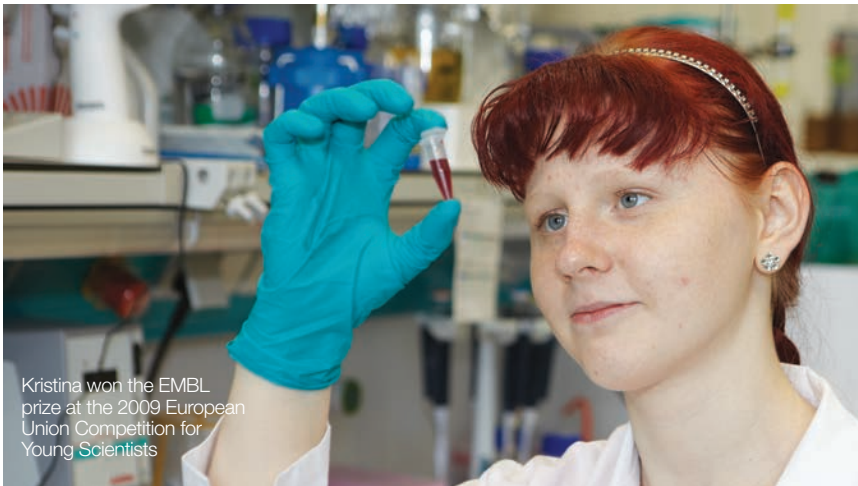
## Summer of science

High-school students swapped bucket and spade for pipette and ice bath at summer schools organised at EMBL Heidelberg and EMBL Monterotondo. Participants took part in workshops, featuring a mix of seminars, experiments and tours of laboratories and Core Facilities. A key emphasis was placed on interdisciplinary research, and groups of students were given a number tasks, including making presentations at a level appropriate to both scientists and the public on research such as model organisms and advanced light microscopy. In Heidelberg, a highlight for visitors was a careers panel consisting of pre- and postdocs and staff scientists who matched the nationalities represented in the group and shared their experiences of working in the sciences. In Monterotondo, the emphasis on hands-on experience gave participants the opportunity to work in research groups at EMBL and partner institutions CNR and University La Sapienza.



## Learning about research

A large number of other visits took place across EMBL sites during the action-packed summer months. EMBL-EBI hosted a visit of the London International Youth Science Forum, with over 300 of the world's leading young scientists travelling to Hinxton to learn more about the centre of excellence for bioinformatics research. Meanwhile, EMBL Heidelberg hosted visits from several groups, including 40 of the most talented students in Spain as part of the Becas Europa initiative – a three-week tour of some of Europe's most important universities and institutions. Other visits included students from the US, Canada and the UK, visiting as part of the Research Internships in Science and Engineering (RISE) programme, which provides opportunities for undergraduate students to work with leading research groups across Germany and two winners of the EMBL prize from the European Union Contest for Young Scientists, Kristina Aare (2009) and Raghd Rostom (2010) both completed internships at EMBL Heidelberg (see page 8).



Kristina won the EMBL prize at the 2009 European Union Competition for Young Scientists

## Tricks of the trade

Kristina Aare, who has just completed a month-long internship at EMBL Heidelberg, gives the low-down on her experiences

“The idea of carrying out research in the Structural Biology Unit excited me from the very beginning – it was something completely new to me. Research in Orsolya Barabas’ lab, where I was working focuses on molecular mechanisms of transcriptional regulation and epigenetics. And, while basic wet lab methods like PCR and cloning were familiar, performing them in a working laboratory gave me a unique opportunity to re-think my understanding of these techniques. On one occasion, I observed a very strange gel image from one of my experiments, and it became clear that in molecular

biology experimental results often happen contrary to your expectations. Project

“Working together with some of the leading specialists in molecular biology has made a huge difference”

– Kristina Aare

leader, Franka Voigt (who coordinated my month-long internship at EMBL, together with other scientists in the lab), asked me: “So, how do you feel now about doing science?” I answered, truthfully: “More excited

than before!” and part of me feels I will immediately miss the unpredictability of working in cutting-edge science when back in the teaching labs at my university, where experiments often go as expected.

“Another event that stuck in my mind was a talk with postdoc Eike Schulz. I asked Eike if he ever regretted his choice of research field, given the inherent frustrations and routine that are part and parcel of science. ‘It’s all about the way you treat it’, he replied, beckoning me toward his laptop. ‘Look at this protein structure prediction. As long as I’m considering it as a piece of art, something that fascinates me, my research evolves. If I only interpreted it as a black screen with a collection of spots on it, the whole study would just collapse.’

“With that advice in mind, over the course of a month, members of the Barabas group taught me everything the prospective scientist should know – from the art of time management, multitasking whilst concentrating on the challenge at hand in the lab, to polishing my practical skills.

“At the moment, I am at home in Estonia with my family, taking part in the summer activities I do every year. At first glance it may seem that nothing has changed in my life, but in fact my time working together with some of the leading specialists in molecular biology has made a huge difference: My ambition to become a fully qualified scientist has transformed from a vague childhood dream to something that I am now determined to achieve.”

”

## The day the old cafeteria disappeared...



One morning, EMBL Heidelberg staff were quietly enjoying a delicious routine morning coffee...



But the very next day the cafeteria had vanished! Where would staff go for a much needed break?



Luckily, just upstairs, someone had installed a bigger, brighter cafeteria (with even tastier snacks)





Colonies of *R. marginata* typically consist of 40–50 members, large enough in size to observe group interaction but small enough to watch individuals

## Inside the wasp's nest

Raghavendra Gadagkar speaks about a lifetime studying insect colonies

Charles Darwin voiced hints of regret over his eight-year study of a single type of animal, the barnacle. Not so Raghavendra Gadagkar, who has spent over four decades studying a primitive paper wasp, and foresees many more years of fascinating research ahead.

“There is so much to learn from this organism,” he says, holding his arms out widespread. “Every time you learn something new, the next question that occurs is even more interesting.”

Gadagkar, who was at EMBL Heidelberg to deliver a Forum lecture on ‘Interrogating an Insect Society’, explains how the research on *Ropalidia marginata* continues to shine new light on our understanding of how insects live.

“We are looking to answer evolutionary questions, such as why insects are social, rather than solitary; and mechanistic questions, such as how they build their nests,” he says.

Unlike queen bees, queen wasps are often barely distinguishable from workers and drones. Gadagkar and his students at the Indian Institute of Science in Bangalore mark the wasps with a special paint and painstakingly observe individuals in their

nests, as they sit, stand, fight and tend young. They also intervene to try to answer specific questions about their behaviour.

“We found that unlike queens of other wasp species who aggressively attack uncooperative members of the colony, the queen of *R. marginata* rarely rules by physical force, except at the beginning of her reign when she asserts her authority to show the others who is in charge,” he says. “After that she uses pheromones to dictate behaviour.”

“It’s unlikely I will ever find reason to abandon this species and study something else, even with the lure of many other fascinating species on my doorstep.”

— Raghavendra Gadagkar

Experiments, such as removing the queen wasp from the colony, have given insight into how wasps ‘choose’ their leader. One, the ‘queen-in-waiting’, acts aggressively to exert authority, while others carry on as normal. Reinstate the original queen and the ‘queen-in-waiting’ returns unresistingly to her previous life as a worker. “The result

was absolutely spectacular – something we had never expected,” Gadagkar says. “But, in a sense, it was very dissatisfying because it opens up new questions, such as how workers perceive the pheromone from the queen.”

A trained molecular biologist, Gadagkar develops ideas from the experimental methods he learned and also draws inspiration from the ecosystems just outside his window. “Around my home and office there are many different types of social insects, from primitive Asian dwarf honeybees to ant colonies that have evolved to stop producing queens,” he explains.

But 90% of Gadagkar’s research time is dedicated to *R. marginata*, and the host of experiments conducted by him and his students, from swapping queens from one nest to another to introducing outsiders into the colony and limiting food supply, continue to raise important research questions and could even help us to learn more about human societies.

“It is unlikely I will ever find reason to abandon this species and study something else, even with the lure of many other fascinating species on my doorstep,” he adds.





## Thinking outside the box

A chance encounter at a conference has sparked an exciting collaboration between EMBL Monterotondo deputy head Cornelius Gross and Brazilian neuroanatomist Newton Canteras.

Confronted with the tricky question of how new tools might revolutionise the understanding of fear and anxiety, Cornelius and Newton put their heads together and realised the potential to combine techniques.

“Scientists are going back to study parts of the brain that have been neglected for 30 years,” explains Cornelius. “Molecular biologists like myself, for example, are beginning to realise that fear is not just about higher cognitive brain structures, but is actually orchestrated in the hypothalamus and brain stem.”

Step forward Newton, a genial Paulistano (someone from São Paulo), whose research into primal fear responses at the University of São Paulo has mapped in exquisite detail a set of parallel hypothalamic circuits for fear of predators, bullies, and pain. He uses neuroanatomical techniques such as neuronal tracing, chemical lesioning, and immediate early gene activation to map circuits controlling fear behaviour in rats.

But to learn more about the latest developments in molecular neuroscience he is visiting the Monterotondo outstation. “We are trying to figure out how animals experience

and remember fear,” he explains. “The classical approach is not as detailed as the molecular approach, where you can be sure that you are manipulating only one type of neuron in a complex brain structure, for example. In a single structure different cell types project to different places and getting a grip on their function could help to understand things like memory and cross talk between fear circuits.”

To do this, Newton is interested in a number of methods being pioneered in the Gross group. These include electrophysiological techniques that allow scientists to study how different parts of the brain respond when confronted with a natural predator (such as a hungry rat) and pharmacogenetic manipu-

lation tools that allow for the silencing of genetically-defined cell types.

“Most research on fear uses foot shocks, tones, and lights, but we want to identify what is happening under natural circumstances when fear is primal,” Newton explains. “This type of fear is more likely to be related to the panic attacks and phobias that so commonly afflict humans. Combining molecular, electrophysiological, and anatomical techniques has the potential to reveal the origins of fear on a cellular level, as it is happening.”

The scientists are currently putting together a review article outlining the need for molecular neuroscientists in the field to reconsider classical anatomical studies of hypothalamic fear circuits. And Newton believes, after some fleeting doubts, that he has come to the right place: “You could never tell from the outside that this is a centre of research excellence,” he laughs. “But once inside the building, it’s a different story: the facilities, equipment, people, and capacity of doing new things are amazing. We are finding many common interests and will certainly strengthen links between our labs.”



Newton taking a well-deserved break

## Fun in the sun



Summer got into full swing in July as traditional parties took place at EMBL’s sites. In Heidelberg, younger guests enjoyed trampolining, face painting and horse riding, before a barbeque, music and dancing until the early hours. In Monterotondo, lab coats were swapped for bright outfits and accessories as people embraced this year’s colour theme, yellow, at a party organised by PhD student Tomoko Ishibashi, with refreshments and a violin recital followed by a live DJ. More than 5500 Euros was raised for charity over the two events.



## Lennart Philipson: Obituary

Lennart Philipson, who served as EMBL's second Director General, passed away on the 26 June. Lennart headed EMBL for over a decade between 1982-93, a crucial time for molecular biology when different scientific disciplines in the life sciences were becoming increasingly interlinked.

He reorganised the laboratory into new scientific and instrumentation units, with a profound impact on both scientific success and the development of innovative technologies in areas such as microscopy. Most influentially, he realised the power of bioinformatics approaches and ensured that EMBL became a stronghold of research and service activities in this area.

He also insisted that turnover was key to the long-term success of the Laboratory and ensured that this principle was reflected throughout EMBL.

Throughout his career, Lennart was renowned for bringing together the right combinations of talent to achieve goals. He held a number of important positions on both sides of the Atlantic and was deeply passionate about the importance of basic research in the life sciences as an international activity.

Lennart will be fondly remembered as a great scientist, colleague and friend. He is survived by his wife Malin and family.



## newsinbrief

⇒ EMBL's well-travelled exhibition stand found itself in Turin at the end of June for the **36th annual Federation of European Biochemical Societies (FEBS) Congress**, attended by more than 2000 visitors. Mostly pre- and postdocs from across the world stopped by, eager to learn about opportunities at EMBL. Meanwhile, in July, EMBL-EBI hosted a busy booth at the International Conference on Intelligent Systems for Molecular Biology (ISMB), in Vienna. EMBL-EBI Director Janet Thornton gave a well-attended keynote talk at the event, as well as chairing a special session on ELIXIR.

⇒ **EMBL Explore's latest podcast is now live**, this time delving into the exciting worlds of the model organisms used in research across EMBL's sites. The podcast features interviews with scientists, narrative, as well as additional photos and text. To listen to this, and other exciting podcasts, covering a range of science and technology related to EMBL visit: [www.embl.org/explore](http://www.embl.org/explore)

⇒ Registration is now open for the following **EBI hands-on bioinformatics training courses**: 'Analysis of High-Throughput Sequencing Data', 24–29 October; 'Computational Structural Biology – From Data to Structure to Function', 14–18 November. For applications and deadline information: [www.ebi.ac.uk/training/hands-on](http://www.ebi.ac.uk/training/hands-on).

## EMBL-EBI to lead UK Pubmed Central



EMBL-EBI has been awarded a five-year contract to manage and develop UK PubMed Central (UKPMC), a freely available information resource for life science researchers.

UKPMC provides access to a repository of over two million full-text

biomedical research articles, 25 million citations from PubMed and Agricola, patents from the European Patent Office, and biomedical PhD theses. UKPMC contains over 250 000 articles published under open-access licenses.

"We want to help researchers make the best possible use of the scientific literature by building deep content links between articles and the underlying data," said Johanna McEntyre, head of literature services at the EBI.

The EBI will lead the development of the service in partnership with the University of Manchester and the British Library.

<http://ukpmc.ac.uk>



⇒ **A showcase of six short video interviews** with a cross-section of the EMBL Monterotondo community is now live online. Topics include the visitor programme, starting and leading a new group, EMBL's Core Facilities, life as a PhD student, together with other insightful aspects of life at the outstation. [www.embl.it/explore](http://www.embl.it/explore)

⇒ **Fascinated by the eye-catching banner on the front cover?** The image, by Spike Walker for Wellcome Images, zooms in on the foreleg of a certain creepy crawl. The first person to post the correct name of the insect behind the art on the EMBL Facebook page competition wins a stylish EMBL t-shirt. [www.facebook.com/embl.org](http://www.facebook.com/embl.org)

8 September EMBL Heidelberg

**Distinguished Visitor Lecture:**

Bonnie L. Bassler, Princeton University

14 September EMBL Heidelberg

**EMBL Forum on Science and Society seminar:**

The New Geography of Science: Changing the Global Research Map, Jonathan Adams

15 September EMBL Heidelberg

**Distinguished Visitor Lecture:**

Jim Hudspeth, The Rockefeller University

17–19 September EMBL Heidelberg

**EMBO|EMBL Symposium:**

Cancer Genomics

7 October EMBL Monterotondo

**Distinguished Visitor Lecture:**

Nathaniel Heintz, Rockefeller University

13–16 October EMBL Heidelberg

**EMBO|EMBL Symposium:**

Structure and Dynamics of Protein Networks

4–5 November EMBL Heidelberg

**12th EMBO|EMBL Science and Society Conference:**

Making Sense of Mental Illness: Biology, Medicine and Society

For more details about these events and more, visit [www.embl.org/events](http://www.embl.org/events).

Dig this!

A large pit has appeared near EMBL-EBI on the Wellcome Trust Genome Campus. No, it's not aliens. A team from Oxford Archaeology East has been excavating the site for two months as part of the development process for a new technical hub building. Since the campus was established in 1993, they have found several significant remains. The latest dig has uncovered evidence of Neolithic flint tool making, Bronze Age pits containing pottery vessels, Iron Age enclosure ditches, and buildings from the Saxon and Medieval periods. The findings from the past 20 years will be published in two monographs.



The Initiative for Science in Europe (ISE) has a new executive coordinator, **Wolfgang Eppenschwandtner**. ISE is a platform of European societies and scientific organisations to promote science in Europe. Prior to joining ISE, he worked at the Austrian Research Promotion Agency (FGF) as programme manager for Structural Programmes. Wolfgang has a Ph.D. in mathematics.



EMBL Heidelberg group leader **Anne-Claude Gavin** has been promoted to senior scientist. The new role reflects Anne-Claude's involvement in activities above and beyond leading a group, including various collaborations across EMBL and with groups in partner institutions. The position will enable her to advise faculty on appointments and on matters of scientific importance.



**Debbie Howe** has joined the Director's office at EMBL-EBI as PA to Janet Thornton. Debbie worked at the University of Cambridge for the past 15 years in administrative positions firstly in the Department of Public Health and Primary Care and later the Department of Oncology at Addenbrooke's Hospital helping to set up a 40 strong team researching prostate cancer.



**Pierre Neveu**, joins the Cell Biology and Biophysics Unit at EMBL Heidelberg in September. Pierre gained his PhD in 2007 at the École Normale Supérieure, France, before postdoctoral research at the Kavli Institute for Theoretical Physics and the University of California. The Neveu group will study the dynamics of stem cell differentiation at the single cell level.



Joining as Scientific Coordinator in the EMBL International Centre for Advanced Training (EICAT), **Andrew Robertson** completed his PhD in biochemistry at the University of Wisconsin, Madison, and then undertook a postdoc at Stanford University. He held positions at the University of Iowa and Merck Research Laboratories, before joining Keystone Symposia in 2006 as Chief Scientific Officer.



**Athanasios Typas** joins the EMBL Heidelberg as the Genome Biology Unit's newest group leader in September. Anastassios gained his PhD at Freie Universität Berlin before postdoctoral research at the University of California. The Typas group will investigate bacterial lifestyle and interspecies interactions with systems approaches.

**Syed Asad Rahman**, a research scientist in Janet Thornton's group, was presented with the Killer App Award 2011 by the ISCB at ISMB/ECCB, Vienna, Austria. He won the award for creating EC-BLAST; a novel tool for searching and comparing similar enzymes, which will assist studies of metabolic pathways, enzyme chemistry, drug discovery and toxicity based studies, among other things.

