

Newsletter of the European Molecular Biology Laboratory
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Council acting to resolve salary dispute

One of the major tasks at the latest meeting of EMBL's Council, held from Nov. 27-28, was to take action on recent judgments from the International Labour Organization's Administrative Tribunal (ILOAT) regarding EMBL salaries. The Council has accepted its legal obligation to implement Judgment 2057; in doing so, it will bring a close to the salary dispute that has affected the Laboratory since 1995.

Some guidelines were established at the meeting. Their implementation will

begin once the Finance Committee and the Council have had a chance to review the judgment on a pending Staff Association case. This decision is expected at the end of January, 2002.

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Peter Gruss

Peter Gruss to head Max-Planck Gesellschaft

EMBL Council Chairman Peter Gruss has been elected president of Germany's Max Planck Society for the 2002-2008 term. Gruss has been Director of the Max Planck

Institute for Biophysical Chemistry in Göttingen since 1986. He succeeds Hubert Markl, whose presidency ends in June 2002.



an interview with Stephen Jay Gould

Selection on a sliding scale

Stephen Jay Gould visited EMBL in mid-November to take part in the EMBL PhD student symposium on evolution; he and Rhonda Roland Shearer also gave a talk as part of the new EMBL-DAI Science and Culture initiative. In an exclusive interview, he discusses the mechanisms of evolution, Galileo, and the art of the essay.

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Has life evolved elsewhere in the universe?

Over 200 high school students recently asked this question at CERN; the experts answered, and EMBL was there...
from the sister sciences

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Evolution: PhD students host second symposium

In the second meeting organized by EMBL's PhD students, leading experts met in Heidelberg from Nov. 9-10 to discuss evolution. The students hope to make the PhD symposium an annual tradition.

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EMBL opens ITTC and Proteomics facility

The first phase of EMBL's new International Technology Transfer Complex (ITTC) and the new Proteomics Core Facility were opened on September 6, during a visit of German Science Minister Edelgard Bulmahn. The ITTC will be run by EMBLEM, the Laboratory's technology transfer company, and will house start-up companies. CellZome and Anadys have already moved in. The set-up that has been installed in the facility is "unique in the world," says Christian Boulin, "and includes all the facilities researchers need for protein analysis."



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EMBL opens ITTC and Proteomics facility

In early September, the ribbon was cut to open EMBL's new International Technology Transfer Complex (ITTC) and the new Proteomics Core Facility. Both ceremonies were held during a visit of German Science Minister Edelgard Bulmahn. The Minister also took the opportunity to discuss the present state and future development of EMBL with Director General Fotis C. Kafatos.

EMBLEM to run expanding ITTC facility

The ITTC will be operated by EMBLEM (EMBL Enterprise Management Technology Transfer GmbH), a company wholly owned by the Laboratory. The facility is intended to serve as a large incubator/accelerator for life science start-up companies, many of which will probably spring from work originally done at EMBL or in conjunction with collaborating institutions. Space in the ITTC will also be made available on a competitive basis to start-ups that bundle together technology from EMBL and the sixteen member states.

In its initial phase, the facility has approximately 1,700 square meters of space for lease to life science start-up companies. Space has already been made available to CellZome and Anadys, two start-ups that originated at EMBL. Current plans foresee subsequent buildings which should eventually provide about 9,000 m² of laboratory and office space.

"Until now, there has been no such thing as technology transfer in a pan-European sense," says Gabór Lamm, Managing Director of EMBLEM. "EMBL's activities are a step in this direction. The ITTC will serve as a training forum for both scientists and technology transfer professionals in Europe so that they can learn from our experiences and accelerate technology transfer in Europe."

"The formation of biopharmaceutical companies in partnership with the EMBL on the Heidelberg campus provides both parties with the opportunity to benefit from the experience and expertise



Fotis C. Kafatos and German Science Minister Edelgard Bulmahn

of each other," says Giulio Superti-Furga, a founder and Scientific Director of CellZome GmbH.

New Proteomics Facility fully functional

In cooperation with two important industrial sponsors, Micromass and BioRad, EMBL has now opened a state-of-the-art proteomics facility which will serve in-house scientists and visitors.

"The set-up that Micromass and BioRad have installed is unique in the world," says Christian Boulin, Head of EMBL's Scientific Core Facilities. "It includes two mass spectrometry machines, all the robotics and all the computing facilities needed to handle the work of protein analysis. We hope this will be a prototype for partnerships with other companies."

"This kind of arrangement will benefit both partners," says John Rontree, Sales and Marketing Director of Micromass. "Gaining direct access to leading scientists working with a proteomics line is strategically important to us. By listening to their needs, we can gain the knowledge necessary to maintain a position at the forefront in providing total proteomics solutions."

The facility thus joins other key components at EMBL – including the Genomics and Microarray facility and the Advanced Light Microscopy Facility – as service units for EMBL scientists and visitors, developed in partnership with industries, providing advanced equipment for use in cutting-edge research.

Ministers get first-hand look at EMBL

September saw the visits of two more delegations from member states. Swiss Science State Secretary Charles Kleiber was accompanied by Gérard Escher, Scientific Advisor to the Swiss Science Agency, as well as by Denis Duboule, Jean-François Conscience, and Isabella Beretta, the Swiss representatives to the EMBL Council. They met with the Director-General and senior representatives to discuss technology transfer initiatives at the Lab, science and society activities, and the new Core Facilities. The visit also included a meeting with EMBL's Swiss community.

On September 24, it was the Danes' turn. Birte Weiss, Minister of Information Technology and Research was accompanied by other ministry staff, Danish parliamentarians and delegates to the EMBL Council for a day-long, intensive look at EMBL Heidelberg and EMBO.



EMBL's International Technology Transfer Complex (ITTC)

from the Director-General

ILO judgment 2057: Decisions at the November Council meeting

On Thursday, November 29, EMBL Director-General Fotis C. Kafatos held a general assembly at the Heidelberg Main Laboratory to brief members of personnel on the outcome of the November EMBL Council Meeting. The major task for Council was to make decisions regarding the implementation of ILOAT judgment 2057. These decisions are intended to bring to a satisfactory close the salary dispute that has been affecting the Laboratory since 1995. The following is an outline of the decisions made at the Council meeting.

Four issues for Council decision

- 1 Whether to implement Judgment 2057
- 2 What adjustments to make (safeguarding purchase power parity)
- 3 Who will pay for future (change in salary baseline)
- 4 Who will pay for past (salary backpay)

Judgment 2057 (12 July 2001)

1. Whether to implement Judgment 2057

"Council has made perfectly clear on previous occasions that it will implement legal decisions. The ILO decisions are not subject to appeal."
(DG, 17 July 2001)

Decision: Yes, Council accepts its legal obligation.

2. What adjustments to make (safeguarding purchase power parity)

"A related consideration is the long-standing commitment of Management and Council to purchase power parity (according to official statistics) for the staff appointed in the four host countries."
(DG, 17 July 2001)

"The basic salary scales and the allowances for staff based outside Germany will be determined so as to preserve purchasing power parities calculated according to the procedure of the Coordinated Organisations."
(Council's pay policy, December 1995)

In principle decision:

Increase salaries baseline for 1996 by 2.1% for Germany, and based on this plus the previously agreed adjustments for 1997-2001, recalculate the salaries for these years.

Increase the 1996 baseline by the same amount and similarly recalculate the salaries for staff in France, Italy, UK, *thus preserving purchasing power parity* (equal adjustment procedure).

Why "in principle"?

FINCOM and Council want to examine the final Judgment on the pending Staff Association case, expected on 30 January 2002, to ensure its final decision is fully compatible with all ILO Judgments.

The in principle decisions were presented in a report to Council from the Chair of Finance Committee, following a Closed Session of FINCOM

"Finance Committee will make a final decision in March 2002 on how to fund the implementation of ILOAT Judgement 2057 and the Judgment to be delivered in January 2002, in principle on the basis of the equal adjustment scenario. Specifically the Committee will endeavour to achieve this by voting an additional CVI (Cost Variation Index) in March 2002 that will provide for the costs of 550 K€ baseline increase plus interest payments of approximately 140 K€ for a loan that Council hopes to authorise the Administration to take out in the amount of up to 3300 K€, to finance the back pay that EMBL will have to meet."

Consequence:

Decisions will be confirmed in March, payments probably in April.

3. Who will pay for future (salary baseline)?

Amount: 550 K€ per year

Theoretical possibilities:

- Council
- EMBL from its present budget

Decision in principle: Council intends to provide up to 550 K€ per year for this purpose.

4. Who will pay for past (salary backpay)?

A one-off amount of approximately 3000 K€ will be needed for the back payments of salary plus interest based on the equal adjustment procedures.

Theoretical possibilities:

- Council
- EMBL

Decision in principle: Payment will be provided by EMBL from its present budget.

- But Council agreed to spread the cost over three years by obtaining a loan.
- EMBL will pay the capital and Council the interest.

Consequences:

- Effectively, each part of EMBL will lose some of the increased budget obtained in 2000.
- But the impact of the loss will be minimized by delaying repayment until 2003 – 2005, with no loss of budget in 2002, and modest losses in 2003 and 2004.
- The loss will be greater in 2005, but the Director-General will be applying for a supplementary budget for that year, permitting his successor to begin with a clean slate.

Repayment schedule of the loan covering the backpay (in K€)

Year	2003	2004	2005
Indicative Scheme increases (above baseline for 2000)	10,000	10,500	11,000
Loan repayment	500	800	1,700
% Loss	5%	7.6%	15.5%



DO YOU THINK THAT THE NUMBER OF MECHANISMS REQUIRED TO ACCOUNT FOR PRESENT LIFE ON EARTH AND THE FOSSIL RECORD NEEDS TO BE ENLARGED BEYOND TRADITIONAL IDEAS OF EVOLUTION THROUGH VARIATION AND NATURAL SELECTION?

I don't think it's really so much a question of new mechanisms. It's how the mechanisms that we're more or less familiar with operate over the broad scales of time that create the macroevolutionary record. For example, we know how the mechanism of natural selection works, but in strict Darwinian theory, it operates on organisms within populations. Changes within populations, by extrapolation, then produce the full panoply of changes in the history of life. This yields a fully reductionistic, single-level account of evolution: micro-evolutionary Darwinism working within populations, at the level of the organism, produces everything. The way many paleontologists and I look at the world – I think this can be called a general movement within evolutionary theory today – is to recognise that natural selection operates on other kinds of biological "individuals" which have the requisite properties. Under certain circumstances, groups within species, or species themselves, are discrete entities that have birth points and death points. They are quite stable, and they have differential numbers of offspring which look like them. These are all the characteristics you need for Darwinian individuality, so selection can also operate on the properties of species, particularly on emergent properties of species that can't be reduced to the characteristics of organisms.

Now in a sense we understand the mechanism of selection, but when you treat a species as an irreducible entity, you are explaining trends as the differential success of species rather than an extrapolated Darwinian triumph of the individual organism. This leads to a different set of explanations for things – not a new mechanism, but the application of the selectionist argument to different levels of organisation. That is one kind of addition you need to make to evolutionary theory. It's not anti-Darwinian but it certainly expands and changes the scope of the original theory.

WOULDN'T A GLOBAL CATASTROPHE, SUCH AS A MASSIVE METEORITE STRIKING THE EARTH, HAVE A QUALITATIVELY NEW TYPE OF EFFECT ON EVOLUTION? NORMALLY CATAS-

TROPHES ARE REGIONALLY RESTRICTED, MEANING THAT POPULATIONS OF A SPECIES WHICH HAD MOVED OUTSIDE A PARTICULAR REGION MIGHT WELL SURVIVE.

A global event would cause populations which have undergone local adaptations to adapt to global change, and that's what's unexpected. As you know, under Darwinian theory if the environment changes too fast for most organisms to adapt, then they die. Things are different when unpredictable, major environmental changes result in catastrophic mass extinctions and have a fortuitous effect on a large part of the patterning of evolutionary change. You could never, by studying ordinary natural selection in normal times, predict that mammals would win over dinosaurs. In normal times before the mass extinction, they never did – they were always out-competed by dinosaurs. It took an external trigger of catastrophic change to do dinosaurs in while letting mammals get through. Not because mammals were better, but because mammals fortuitously had certain properties that enabled them to survive.

There was evidence for catastrophic mass extinction when Darwin wrote the *Origin of Species*; he tried very hard to reinterpret that evidence as due to imperfections in the geological record, and to see it as the result of ordinary, slow environmental change. In his view there might have been accelerations of environmental change, but these wouldn't have been fast enough or of wide enough scope to really discombobulate everything. The crucial factor is less the globality of the event than its major impact, one to which local creatures could not have adapted. A species' prior adaptive successes won't predict whether it will fortuitously survive such a catastrophe. Extrapolating from Darwinism, local adaptations tend to accumulate to some general state of biomechanical improvement for a species through time, which will help it get through less catastrophic events.

COULD BEHAVIOR AS WELL AS GEOGRAPHY LEAD TO ISOLATION AND SPECIATION? FOR EXAMPLE, LET'S SAY THAT A LOCAL TOWN HERE WANT TO GET RID OF A MASSIVE POPULATION OF WILD CATS. THEY GO AROUND CHASING AND ELIMINATING ANIMALS, BUT THEY DON'T HAVE A LOT OF MONEY TO SPEND ON IT, SO THEY MISS THE REALLY WILD ONES, WHICH SURVIVE. ANOTHER TYPE TO SURVIVE IS VERY FRIENDLY AND CUDDLY AND GETS TAKEN BY PEOPLE. THERE MAY BE NO DEFINABLE GENETIC DIFFERENCE BETWEEN THE GROUPS, BUT EACH WOULD BE A SURVIVAL STRATEGY.

You are suggesting the "Pied Piper" theory applied to cats in Heidelberg, instead of rats or children in Hamelin. Well, isolation only creates the potential for speciation. The precondition of speciation is that a group becomes so isolated and separate that it will breed only within itself. Conventionally, it was hard to think of a way to achieve that isolation except by true geographic separation – how would it happen if the populations shared one area? But what you're suggesting is not so far-fetched. I think there are a set of ways whereby isolation can be achieved by behavioural differences. Normally, of course, it would be something besides human selection – perhaps one group may just begin breeding at a different time than the other, or one group may live on a different type of food.

YOU'VE WRITTEN ABOUT HOW PARTICULAR FEATURES OF A SPECIES CAN BE MAINTAINED OVER VERY LONG STRETCHES OF EVOLUTIONARY TIME: OFTEN A BEAK CONTINUES TO RESEMBLE THE SAME TYPE OF BEAK OVER MILLIONS OF YEARS. IS THAT BECAUSE SELECTION NEVER TRULY WORKS ON SINGLE INDIVIDUALS, BUT ALWAYS ON POPULATIONS WITH A WIDE AND UNDEFINABLE GENETIC BASE?

Selection does work on individuals, but the effect can only be manifested in the group. It's always a statistical phenomenon. In the conventional theory you argue that those organisms that fortuitously vary in a locally adapted direction will leave more surviving offspring, so the population moves in that direction. The reason why most species show stability is that these changes are just little jiggles in the fullness of geological time. Most of these little fluctuations are very rapid and local and likely to move back and forth, rotating around small changes. Or you may find ten or fifteen little local populations within a species, with one of them changing one way, another changing another way. Those are all transient little blips and flips. The local population, unless it can achieve isolation and become a separate species, is just sitting out there. But the claim that most species are stable is an empirical one. It is not predictable a priori. In fact, most people construe Darwinian theories as expecting the opposite, whereas either result is consistent with basic Darwinian logic. Empirically, it looks as though the vast majority of species are stable for millions of years, by which I mean they fluctuate back and forth – but when they die millions of years after their origin they don't look all that different from when they began.

SUPPOSE THAT I PROPOSE TWO COMPETING HYPOTHESES. ONE IS THAT THE "CLASSICAL", OVERSIMPLIFIED CONCEPT OF NATURAL SELECTION – IN WHICH THE FATE OF A SPECIES DEPENDED ON ONE SINGLE TRAIT – HAS ONLY HAPPENED 1,500 TIMES OVER HISTORY. THE ALTERNATIVE IS THAT IT HAS HAPPENED ONE TIME FOR EVERY EXISTING GENE IN ANY EXISTING GENOME ON EARTH AT SOME POINT IN ITS EVOLUTIONARY HISTORY. "IF WE HAVE LONG EYELASHES, THEN EYELASH LENGTH MUST HAVE MADE A SURVIVAL DIFFERENCE AT SOME POINT IN SOME ENVIRONMENT." HOW CAN WE ARBITRATE BETWEEN THESE TWO STANDPOINTS?

I'm not sure you can always resolve specific questions about the historical value of a particular trait, unless you could recover direct evidence; in this case, I don't think you can – because you don't find eyelashes in the fossil record. However, certain inferences can be made. You can study the genetics of eyelash length in humans today. You might find, for example, that there is no genetic variation – in which case the question wouldn't make a lot of sense. You might find that this trait is affected by 50 different genes, at which point the inquiry makes no sense, either. On the other hand, you might find that eyelash length is linked to certain other traits whose significance we understand, or that the trait is determined by one gene that affects nothing else, at which point the inquiry becomes more plausible. But again, that would only give you an indication. I'm not sure that in the absence of detailed historical information, you are going to be able to answer the question.

This is particularly true for certain human traits like language or moral beliefs. We really want to know where these uniquenesses of our own species came from, but these are still questions about historical particulars rather than challenges to the general theory. We certainly didn't evolve a big brain so that we could read. But think of how central reading this ability to human life today. A lot of what is crucial to our current existence is simply fortuitously coopted

from the capacity of brains that got big for other reasons.

At least in theory, I think we can pursue the issue of where some aspects of universal cognitive behaviour come from. I despair at truly answering some key questions, including the origin of language. How are you going to get at this issue? Language isn't fossilized, and to talk about its development during prehistory one is forced to make distant inferences about, for example, the kind of language required for a group of humans to hunt mammals or fashion tools. But you can at least study the mechanics of brain action.

IN *THE STONES OF MARRAKECH*, YOU GIVE AN EXTENSIVE ACCOUNT OF THE POLITICAL AND HISTORICAL CONTEXT OF GALILEO'S IMPRISONMENT. WHAT GOT YOU HOOKED ON THAT STORY?

Galileo's story is so interesting because the canonical version – as a pure conflict between science and religion – is so wrong. I don't have a tremendous revisionary account of this incident; Galileo was the hero, of course, and the Pope's reaction was unjustified. But you have to realize that Galileo's ordeal unfolded in Rome in the middle of the Thirty-years' war. Catholicism was under attack all over Europe. This was a tough time, and Galileo was a notorious hot-head. He and Urban VIII had been good friends, and the Pope felt betrayed, and not entirely wrongly. Galileo had official permission to write about Copernicanism as long as he treated the theory hypothetically. All he needed to do was write an honest dialogue between a Copernican and a Ptolomean. Instead, Galileo put Ptolemy's arguments into the mouth of a character named Simplicio, whose arguments were as bad as his name. He didn't need to be so provocative to prove his point. The Copernican system would have triumphed even if he had constructed a fair dialogue, because the Copernican arguments were so much better.

ANOTHER THEME OF THE BOOK IS "MARGINALIA" – THE CONTENTS OF THE MARGINS OF GUETTARD AND LAVOISIER'S WORK ON GEOLOGY, WHICH FOR THE FIRST TIME REALLY INTRODUCE THE IDEA OF GEOLOGICAL STRATA. DO YOU HAVE A GENERAL INTEREST IN "MARGINS"?

It is the essayist's fundamental belief that important conclusions flow from tiny, seemingly-insignificant items. To reveal something so apparently insignificant that, at first, it passes beneath everyone's notice.

THE GALILEO STORY HAS THE SENSE OF PLACE AND TIME THAT ONE FINDS IN REALLY GOOD HISTORICAL FICTION. DO YOU HAVE OTHER LITERARY ASPIRATIONS BEYOND THE GENRE YOU CURRENTLY WORK IN?

The only way to convey a story like this is to try to immerse myself into the context. As for other ambitions, I'll do a book about baseball at some point... But I have no plans to experiment with fiction because I suspect that I could not write dialogue, an essential ingredient of most fiction. It is so important to recognize what you can't do. I love opera and baseball, but I know I could never be an opera star, or the New York Yankees' center fielder. I don't mean that negatively: the key to success lies in understanding the things you can't do.

– interview by Russ Hodge

Evolution: from molecules to mankind

EMBL PhD students sponsor their second symposium

From November 9 to 10, the "EMBL PhD Student Symposium on Evolution" brought together young researchers and top-level scientists for the second international symposium organised by EMBL PhD students. Following the success of last year's "From Genes to Thoughts", they hope to make the event an annual tradition. Evolution was selected as this year's topic because although it provides the underlying framework for all research in the life sciences, it sometimes fades into the background. The symposium aimed to bring home that message and help researchers from all walks of biology to attain an evolutionary perspective on their work.

The first talk appropriately addressed the subject of the origins of life. Eörs Szathmáry engaged in "constrained speculation" with a refreshing look at how ideas, experiments and mathematical simulations can be used to gain insight into this field of study. His "speculations" included the currently held belief that surfaces, rather than any "primordial soup," probably provided the conditions required for the origins of life.

Christine Orengo discussed the evolution of protein structures. A number of structural motifs (for example, IgG folds and TIM barrels) occur very frequently. The prevalence of certain structures amongst protein superfamilies that are unlikely to be related through evolution may be evidence of convergent evolution. Equally, there are structurally diverse proteins that share very similar functions. This brings a new perspective to the protein structure-function paradigm.

Adrian Friday's talk dealt with "homology". While this concept is fundamental to evolutionary biology, the word is loaded with assumptions and is frequently misused. Friday suggested that it might be better to avoid using the word at all.

Molecular biologists and zoologists found some common ground in the talks on the evolution of development, with its elegant methods to study morphology at the molecular level.

David Stern studies very small phenotypic differences by comparing closely related *Drosophila* species. Examining the hair patterns on the larvae and the legs he has found that the differences between species are due to the cis-regulatory region of a transcription factor. Pheno-

typic variation between closely-related species may frequently be due to differences in expression patterns of transcription factors.

Turning to *in vitro* systems, Andrew Griffiths introduced the powerful technique of directed evolution, focusing on a method based on artificial cell-like compartments. The principle aim of such work is to develop more effective enzymes for use in biotechnological applications. Griffiths discussed how such systems could be used to learn more about enzymatic diversity throughout the biosphere, as well as to understand the intermediate steps by which one enzyme evolves into another.

Dario Floreano introduced the fascinating world of evolutionary robotics. He exploits the mechanisms of evolution to

help us understand adaptive behaviours and neural circuits found in nature.

Oliver Curry sought to counterbalance the traditional, brutish view of "survival of the fittest" by describing how truly cooperative strategies can have evolved through natural selection. Using game theory to describe social organisation and acts of altruism, he demonstrated that survival can be more strongly promoted when all interacting individuals gain some advantage than through competitive strategies.

Some experimental data on the mechanisms of social evolution came in Gregory Velicer's talk. *Myxococcus xanthus* is a "social" bacterium. Given its short generation time, and the possibility to easily control its environment in the lab, Velicer has produced strains that



Fotis Kafatos and the organizers of the PhD Symposium on Evolution

generate robots— independently of human intervention — which adapt to a given task. The experiment starts with a random population of artificial chromosomes, each encoding a different neural network and conferring a different robotic "phenotype". Individual robots are given a set task and only the most successful ones are selected for "reproduction". After successive rounds of selection and modification of the artificial chromosomes, a well-adapted robot evolves. By introducing degrees of plasticity to the neural network, a mechanism of learning evolves and robots are able to perform in spite of changes in the environment. This work attempts to reveal new forms of autonomous intelligence as well as to

exhibit anti-social phenotypes. Social activities necessary for reproduction and development are readily lost when cells are grown under asocial conditions. This may have fatal consequences, but when certain antisocial strains are mixed and cultured together with their wild type ancestors, they cheat the system and manage to survive. There are clues this may also be the case in the wild.

In an exploration of human origins, Svante Pääbo proposed that Neanderthals and humans are more closely related to each other than to the great apes. Different parts of the human genome vary significantly in the rate and mode by which they evolve, which means that care should be taken when

An illusion of chance

using sequence analysis of a single genomic region to draw conclusions about relationships between species. Furthermore, his work has exemplified evolutionary studies in the post-genomic era, generating impressive data on human and chimpanzee gene expression. Whereas expression patterns of the liver and blood transcriptome have varied little between humans and chimps, gene expression patterns are very different in human and chimp brains.

Stephen Jay Gould raised more general points about evolutionary theory, arguing that some premises of Darwinian theory should be altered in light of new findings. These alterations should not be destructive, but rather expansive. For example, he suggested that natural selection does not only operate at the level of the organism, but on many levels simultaneously: genes, cell lineages, organisms, species are all agents of selection.

In the final talk, Simon Conway Morris presented new fossil findings that provide insights into the assembly of body plans and the emergence of metazoan complexity. Addressing the issue of evolutionary convergence, he stated that evolutionary processes are strongly constrained. For example, basic neurological principles are the same everywhere. He claimed that the emergence of intelligence was inevitable and if dinosaurs were not extinct, intelligent bipeds would probably still have evolved and dominated them.

A major strength of the symposium was the diversity of the programme: inherently, evolution is studied through many lines of research. The closing panel discussion sought to bring together different perspectives by considering to what extent large-scale evolutionary changes can be explained at the molecular level. From the discussion, it is unclear whether this macro/micro-evolution "paradox" really exists, but in any case it seems it does not offer a particular challenge to evolutionary theories.

The organisers gratefully acknowledge the support of EMBL, EMBO and the EC (High-Level Scientific Conferences).

– by Alison Shaw, Célia António, Aidan Budd, Emanuel Busch, Sílvia Curado, Natalie Deneff, Peter Duchek, Marica Grskovic, Luís Teixeira, Hanne Varmark, Jennifer Volz, Ulrich Weihe

Artists throughout history have confronted the problem of transforming three dimensions into two. The Renaissance saw the development of a whole science of perspective, which gave painters elaborate tricks to create illusions of depth on canvases, walls, and the ceilings of churches. Centuries later, the Cubists added the dimension of time, trying to incorporate the shifting perspectives of a viewer into flat surfaces.

Now sculptor Rhonda Roland Shearer is peeling the process apart again in intensive analyses of the works of French artist Marcel Duchamp (1887-1967). She presented a scientific analysis of his work in a new Science and Society venue: the first collaboration between EMBL and the Deutsch-Amerikanisches Institute (German-American Institute, or DAI) in downtown Heidelberg. More collaborative projects are planned next year.

Shearer is an eclectic figure who pursues interdisciplinarity in her daily activities. Alongside her own artistic work, she is founder and co-director (with her husband Stephen Jay Gould) of the Art Science Research Laboratory (ASRL) in New York, as well as an associate of the Psychology Department at Harvard University and a visiting scholar at the Physics Department of New York University. The ASRL, based in a loft in Soho, is a unique environment where artists, art historians, mathematicians, physicists and graphic designers work daily side by side. There the boundary that commonly separates the humanities from the exact sciences is challenged; the cultural and the scientific intermingle harmoniously. ASRL has employed a wide variety of scientists, including forensics experts, in decoding the works of Duchamp.

Duchamp is most famous for his 'toutfaits' (readymades), works of art derived from mass-produced objects, such as coat racks or bicycle wheels. To the surprise and astonishment of most art-historians, Shearer has shown that Duchamp (profoundly influenced by the mathematician Henri Poincaré) did not make these mass-produced objects artworks simply by selecting them and displaying them in an exhibition room under his name, but by forging in them hidden clues to mathematical and optical laws, available for recognition only through experiment and measure of an attentive reader. Using computer animations, she demonstrated how seemingly-innocuous photographs of objects in the artist's studio had actually been highly manipulated, often combining dozens of partial images into a single picture. These tricks have gone almost entirely unnoticed for decades because they fall "below the radar" of the viewer's awareness of proportion and perspective.

More information about the Art Science Research Laboratory can be found at www.artscienceresearchlab.org. An on-line journal devoted to Duchamp studies is available at www.toufai.com.

– Giovanni Frazzetto



Rhonda Roland Shearer



photo by Maj Britt Hansen

From genomes to cures - 2nd EMBO-EMBL symposium

The completion of the genomes of humans and other organisms holds great promise for medicine and other fields, and will inevitably have a significant impact on society. This was the topic of the second joint EMBO-EMBL Conference on Science and Society, held from Nov. 16-18 in Heidelberg. Among the speakers and panelists (pictured): Sam Broder, Frank Burnet, Barbara Jasny, and Jonathan Knowles. Extensive information about the conference can be found at the address www.embo.org/projects/scisoc/index.html.

Science, society, Pasteur & EMBL

Philippe Kourilsky, Director General of the Institut Pasteur, came to EMBL on Nov. 20 to give a Science and Society talk entitled, "The precautionary principle: a fashionable concept or a mutation in society?" He also met with scientists to discuss ways to strengthen collaborations between our two institutes.



photo by Marietta Schupp

from the Staff Association

Meeting with new administrators The Staff Association invited EMBL's new Administrative Director Bernd-Uwe Jahn and new Head of Human Resources Keith Williamson to attend its regular committee meeting on October 23. The intention was to get acquainted with the new administrators on the one hand and to present them with a list of issues that have priority with the Staff Association on the other. The list was sent earlier to the Director General, who responded positively to our initiative. Issues brought forward by the Staff Association included:

- Revision of the Rules and Regulations with respect to their legality and conformity with the laws of the outstation countries and the European Union

- Structured timetable for an expeditious revision of the Health scheme Improvements in the Personnel Section

- Eliminating problems with the financial software, which are endangering the quality of research at EMBL and EMBL's image

- Introduction of a policy on e-mail and web privacy consistent with European law

- Publication on the web of as much information for the staff as possible

- Independent legal adviser for both EMBL staff and Administration

- Regular meetings between the Administration and the Staff Association

Bernd-Uwe and Keith both expressed their interest in constructive cooperation with the Staff Association and agreed that meetings should be held on a monthly basis. The next meeting between the Administration and the Staff Association including the outstations is planned for December 17. The Staff Association looks forward to working with Uwe and Keith.

ILO Salary case The Staff Association was pleased to learn that Council has voted "in principle" to implement ILOAT Judgment 2057 (filed by three private individuals), hopefully ending the salary dispute that has been ongoing at EMBL since 1995. The Staff Association had urged Council delegates in a letter to end the dispute on the basis of 2057, but the delegates voted, for legal reasons, to wait for judgment in the pending Staff Association case and will make a final decision in March. This letter may be accessed as a pdf file via the Staff Association homepage at www.embl-heidelberg.de/~staff/ under "Staff Info" (see sidebar). A com-

prehensive history of the ILO salary dispute and the issues involved is also available from the web site or directly from the Staff Association (Meyerhofstr. 1, D-69117 Heidelberg, Germany; staff@embl-heidelberg.de).

The effect of Judgment 2057, if implemented, would be back pay for those who worked at EMBL between 1995-2001 and an increased salary base for future adjustments. Council voted in principle to add the 2.1 percent salary increase for Germany in 1995 to the base line for salaries from 1996 through the present. There is some question as to whether an across-the-board raise of 2.1 percent for all stations is the correct interpretation, however, as salary adjustments in 1995 were 3.4 percent for the U.K. and 1.7 percent for France. The Staff Association is attempting to clarify which interpretation best preserves parity for all duty stations and will report in more detail in the upcoming issue of our newsletter, *The Staff Association Bulletin*.

Home leave We would like to remind staff members who plan to use the Christmas holidays for their home leave that there are specific rules regarding the minimum number of days that must be taken to qualify as home leave (5 working days). Although no prior approval from the Personnel Section is required, we urge you to consult them in advance to make sure that your travel plans are eligible for reimbursement as home leave.

Intermedex and the Euro (€) Advice that the Staff Association representative in Grenoble has received from Intermedex:

- If you have a medical invoice in Euro, clearly state on the Intermedex form that it is in Euro. When you receive the reimbursement, check that it has not been paid in Francs

- If you have received a prescription for a patented drug from your doctor and the pharmacist has substituted a generic drug (médicament générique), ask the pharmacist to write on the reimbursement form that this drug is a "médicament générique remplaçant tel médicament", otherwise Intermedex will refuse to pay.

Hamburg and Grenoble Outstations award joint PhDs with European universities

Two PhD students at the Outstations have been awarded EMBL degrees jointly with other European universities. Attila Remeny (EMBL Hamburg) has successfully defended his dissertation with the Eotvos Lorand University in Budapest. Attila has done highly successful interdisciplinary structural and biochemical work with Hans Schöler and Matthias Wilmanns.

Cedric Clapier defended his degree on December 4, making him the first degree to be awarded by the Grenoble Outstation and the Université Joseph Fourier.

Attila and Cedric follow in the footsteps of Joep Muijers, who received his degree from EMBL and the University of Nijmegen (Netherlands) in January 2001.

Other institutions that have agreed to award joint degrees with EMBL include the Universities of Lisbon, Madrid, Heraklion, and most recently, Strasbourg.



Henk and his coat of many *indelible* inks

Instead of having a going-away party after nine years at EMBL, Henk Scholten roamed the Lab in a luminescent yellow lab coat, collecting signatures and donations for the "Newborn Screening" project at the University of Heidelberg's Children's Clinic. When last seen, Henk was heading into the elevator, weighted down by hundreds of signatures and thousands of DM.

news & Events

Hubert Markl, President of the Max Planck Society, visited EMBL on October 31 as part of the Heidelberg Forum on the Biosciences and Society. He gave two lectures: the first, "Man's Place in Nature - Evolutionary Past and Genomic Future", was intended for a scientific audience and took place at EMBL; the second talk, "Entgrenzte Wissenschaft: der Irrweg von Evolutionsbiologie und Genetik zu Rassismus und Mord," for the general public, was held at the Print Media Academy in downtown Heidelberg.

The European Molecular Biology Conference (EMBC) has appointed **Frank Gannon** as its new Secretary General. Gannon will combine these new duties with his previous post of Executive Director of EMBO. The historic decision to combine the two posts was made at the November EMBC meeting, in light of the continuing expansion of EMBC activities, and of the close cooperation between the EMBC and EMBO.

Thomas Preiss gave his inaugural lecture at the University of Heidelberg on Thursday, December 13, the final step towards obtaining his *Habilitation für das Fach Biochemie*, the license to teach Biochemistry as the professorial level at German universities.

Freddy Frischknecht has been selected as a Regional Winner for Europe for the Amersham Pharmacia Biotech & Science Prize. He was awarded a US \$5,000 prize and a plaque at a ceremony in Sweden on December 5. Freddy appears among the list of winners in the November 30 issue of Science. Read his winning essay at www.sciencemag.org/feature/data/pharmacia/prize/winning.shl

Michael Boutros received the PhD prize from the Heidelberg Society for Molecular Biologie (Gesellschaft fuer Molekularbiologie) and the German Society for Genetics prize for 2000 for his thesis, "Dishevelled mediates specificity in Wnt Frizzled signalling pathways". See more at www.gfg.bttec.de/frames/d_preise001.htm.

Group leaders from the entire Laboratory escaped to Darmstadt in mid-October for a retreat. During two half-day meetings, they exchanged information and views on the state of the Laboratory. Among the talks were presentations by Janet Thornton (EBI) and Nadia Rosenthal (Monterotondo) about the new directions that their units will take.

Are you an EMBL alumnus?
Is your address going to change?

Follow the [Alumni](#) link on the EMBL homepage; keep us updated on your whereabouts, and we'll keep sending you

EMBL & cetera

obituary

Carmen Berthet, staff scientist at the EMBL Grenoble Outstation, died on September 13, 2001, only a few weeks after being diagnosed with pancreatic cancer. During that historic week we had to grapple with our own local tragedy as well as the global one, making it a very difficult time for everyone.

Carmen originated from Barcelona where she was trained as a physicist. She moved to Grenoble in 1962 to pursue her PhD work in neutron diffraction from magnetic materials and from 1969-1975 was a scientist at the Institute Laue-Langevin, responsible for the diffractometer D2. Carmen was one of the founder recruits to the EMBL Grenoble Outstation which was established in late 1975, along with Dino Tochetti, Jo Sedita and Jean-Marie Bois. Under the first Head of Outstation, Dr. Andrew Miller, she installed the first X-ray generator and remained responsible for the Outstation X-ray facilities from then on. She made important contributions to most of the major scientific projects carried out at the Outstation, pursuing X-ray and neutron diffraction studies of collagenous materials. That was the time of rat-tail tendons, turkey tendons, fish bones and bovine intervertebral disc... work which resulted in publications in *Science* and *Nature* nevertheless!

With the coming in 1980 of the second Head of Outstation, Bernard Jacrot, the focus of the laboratory and Carmen's work switched to virus structure, using both neutrons and X-rays. Crystals of the adenovirus fibre grown in the laboratory by Christiane Devaux stimulated Carmen and myself to learn protein crystallography in the mid-1980s, although it was not until ten years later that technical improvements yielded a solution to the fibre structure. We had more luck with aminoacyl-tRNA synthetases, a subject introduced into the laboratory by Reuben Leberman and Michael Härtlein. That was still the heroic period of protein crystallography, of week long measuring sessions at LURE or EMBL Hamburg, breathing dark room fumes to develop the stacks of films. Nicolas Nassar, a PhD student, Carmen, and I eventually solved the structure of seryl-tRNA synthetase. By the 1990s, we had our own synchrotron next door and improved detectors. Carmen worked closely with students on two other difficult crystallographic projects: the structure of the *E. coli* EFTu-EFTs complex, which was the PhD project of Taki Kawashima and was published in *Nature* as the first structure of a G-protein/exchange factor complex. The second project, the structure of p24, the HIV capsid protein, in complex with an Fab, was a collaboration with a pharmaceutical company, bioMerieux. Carmen crystallised the p24-Fab complex and worked with PhD student Stephanie Monaco to solve the structure. It remains the only structure of the complete p24 molecule. Carmen's most recent projects were related to asparaginyl-tRNA synthetase. She solved the first structure of this enzyme together with one of Reuben Leberman's PhD students, Lawrence Seignovert. In the last two years this project was extended to the crystallization and solution of asparaginyl-tRNA synthetase from the human parasitic nematode *Brugia malayi*, the causative agent of a widespread and debilitating tropical disease called filariasis. Carmen spent her last months trying to soak into crystals or co-crystallise lead compounds which had been



Carmen Berthet
(1940-2001)

identified as inhibitors of enzyme, intending to make a limited, high-throughput screen. Unfortunately she was unable to succeed before her death.

Over the 25 years of Carmen's career at EMBL, the Outstation has changed enormously, growing both in size and scientific reputation, to which Carmen's solid scientific output contributed significantly. One constant during this time was Carmen's enthusiasm, generosity and energy which never failed to help maintain the laboratory as more than just a place of work but a warm and friendly community. A very large number of staff members, students, visitors and external scientific colleagues have interacted with her over that period and messages of condolence have poured in from them. All remember her strength of character, good humour and understanding that often helped them in difficult moments. She was a "mother" to us all, particularly for young scientists, notably women, and I think of Nicolas, Hassan, Taki, Stephanie and Lawrence, amongst many others who made their first steps in research accompanied by Carmen. Before she died, Carmen often spoke of her two families, both of which were a central part of her life: the family at the laboratory and of course her own family, particularly her children and grandchildren.

Carmen never really left her native Barcelona and returned there to be laid to rest. She brought us the warmth and sun of Spain. As a former PhD student summed up, "I worked with Carmen during my thesis years at the EMBL. She was a happy, loving woman always ready to help. Just listening to her talking with her Catalan accent was enough to cheer you up."

– Stephen Cusack

We are family

How do you pronounce EMBL? Do you say "EMBUL" or "EMBEL" or "E.M.B.L."? or is it something that sounds like "EMBUH"?

The same sounds can emanate from those who speak about activities in EMBO (to rhyme with toe or EMBUH?). Those who drive up Meyerhofstrasse are aware of the co-existence of the two organizations even if they are sometimes confused as to where one begins and the other ends. Those outside the Heidelberg region however are totally confused to the point where it doesn't make any difference to them. EMBO/EMBL/ the "EMBO laboratory" are mixed in sentences as different actions are carried out by the organizations either individually or collectively.

The confusion is not surprising given that both organizations come from the same root and have the same goal i.e. to promote and improve molecular biology in Europe. In legal terms they are separate organizations, with a further complication that EMBO is not only the organization but is also supported in a more invisible way by the EMBC. The EMBC or the European Molecular Biology Conference was established in 1969, to support the activities of EMBO, which was a dream of many years earlier and is made up of the scientific community. The EMBC delegates today come from 25 member states and a subset of these are the supporters of the EMBL.

In 1974 the EMBL (which was discussed and planned as far back as 1962) was

established, or to use today's terminology, a "spin-off" from the EMBC in recognition of the importance of having a strong independent structure for the laboratory-based activities. The three organizations (EMBO-EMBC and EMBL) work with great synergy on many different projects while guarding their independence on the areas that are appropriate to themselves. The most obvious point of interaction is with the EMBO Courses and Workshops. The cornerstone of these are the practical courses provided for many years by the EMBL group leaders and their colleagues. The funding comes from the EMBC through EMBO, the work is carried out by the EMBL scientists and the benefits go to the scientific community.

Another major form of interaction relates to the housing of EMBO within the EMBL campus. Many years ago the EMBL offered to house the EMBO/EMBC activities and this arrangement continues to today. One obvious change is the fact that EMBO now has its own building paid for by EMBO funds but benefiting from the infrastructural and practical support which comes from the neighbouring EMBL organization.

This version of the EMBO corner is being co-signed by the directors of EMBL and EMBO. This is to send a particular message to those in the scientific community who sometimes may need reassurance that both organizations remain fully committed to jointly working in a most productive way to deliver on their individual and collective agendas. The opportu-



nities for cooperation are expanding rather than contracting. For example the Science and Society joint symposium is a new aspect of the combined strengths of the organizations being used to expand into new areas which are required by the community in which we live. The EMBO Young Investigator Programme is another point where this cooperation is inherent in the delivery of this new development, with the EMBL group leaders acting as a reference point for the young investigators that are selected throughout Europe. Given the energy and dynamic actions that both organizations have displayed over the last number of years it would be surprising if further opportunities for cooperation do not arise. When they do there is a commitment from both of us to ensure that these will be addressed in a positive and cooperative manner.

So when you are next asked how to say EMBL consider the subtle differences which are present in the last letter but more than anything else realize that we are family!

– Frank Gannon and Fotis C. Kafatos

"I like the cut of EMBL's jib"



Keith Williamson

One of the first things Keith Williamson realized when coming for his interview at the EMBL was that adding "limited knowledge of German" to his CV was a slight overstatement. He recalls causing great confusion to the waiter in an Italian restaurant where he was to meet Fotis C. Kafatos, resulting in the total rearrangement of two tables for absolutely no reason.

Keith worked for many years in the UK Civil service as an accountant, most recently as the Director of Administration in the Central Office of Information, a

semi-commercial British government organisation specialising in publicity, advertising and filmmaking. Fotis felt that Keith's long experience and personality would fit very well into the EMBL spirit. "I was immediately impressed by the friendliness

and enthusiasm of everyone I met during my first visit to Heidelberg," Keith says. "I had always wanted to work on the Continent, and being offered the position of Head of Human Resources was a perfect opportunity to do so."

Getting to grips with the terminology used within the institute took a little bit of getting used to. "Every time I mentioned an EM as in EMBL or EMBO, I got the wrong one," he says, adding "a simple enquiry for the organisation's organogram turned out to be less straightforward than I was used to, and gave me a good idea of the content of my work for the months and years to come." Still, there are a lot of similarities between his previous workplace and the EMBL. "Specialists, whether they are in the field of media or science, tend to be enthusiasts who do not want to be bothered too much with the administrative side of things," Keith explains. He finds that the laboratory functions quite well without heavy-handed controls and rigid structures in place, especially considering so many different languages, cultures and projects are melted together. "Yet the EMBL has an outstanding international reputation and delivers very high-standard output. Maybe one reason for this is that it is a place where 'people' come first and share a common enthusiasm. This is why I really like the cut of EMBL's jib."

– Lena Reunis

Dooooon't panic - it's only the Euro!



photo by Maj Britt Hansen

The arrival of the Euro has understandably thrown us all into disarray, particularly when it comes to doing your Christmas shopping or when you place your order at Starbucks and discover you've just spent eight hundred marks for a double Mocha. Even worse is having to find the symbol for the Euro on the key-

board of your computer. Few computers have that key, because they were all made in America or Japan and their manufacturers figured this would be a good trick to make all the Europeans buy new computers. A new computer costs 2,000 – no matter what currency you use to pay for it. An alternative is to spend 200 on a software patch which will enable you to type € by holding down the capital letter "C", the "=" sign, Control, Option, Apple, and Escape all simultaneously. This will swiftly lead to carpal-tunnel syndrome. The best solution is to retrieve your paper from the laser printer and simply write in € by hand.

The biggest problem with €, however, is that nobody understands what anything costs. Prices are completely random. At first there will only be two prices. Everything that doesn't cost €2000 will cost €3.99. It costs a lot of € to make new money, especially since you can't pay for the new currency in Euros. As a result, governments have decided to start with the largest denominations and work their way down, which means that € one-cent pieces will not be made until about the year 2044. This raises the disturbing question of what will happen to all of those single cents in change you're supposed to get when you pay €3.99. These will go into a slush fund and store managers will use them to do day trading on the stock market via the internet. However, if you have a Lufthansa frequent flyer card, you can present it to the store and the cent will be added to your miles. In 42 years, when they finally make cents, you will have accumulated 93 billion miles, including interest.

There are a number of myths surrounding the Euro, some of which are simply unkind and malicious. For example, some people have gotten the impression that prices have gone up in the

Now the facts about the Euro changeover...

By 31 December 2001, all bank accounts will be converted to euro automatically and free of charge.

As from 1 January 2002 it will be possible to use euro banknotes and coins for payments, i.e. they will have legal tender status, all over the euro area, which consists of **Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.**

Most ATMs (automated teller machines) will dispense euro as from 1 January 2002.

In principle, retailers will give change in euro as from 1 January 2002. After that, the use of euro banknotes and coins will be increasing rapidly, and national banknotes and coins will be withdrawn and not re-issued for circulation.

Exchange of national banknotes for euro will take place at credit institutions, national central banks or dedicated exchange points starting on January 1, 2002. Do not accept, or exchange, legacy currencies for euro banknotes prior to this date.

In general, banks will exchange national currency against euro free of charge up to the end of February 2002. In some countries this will be limited to "household" amounts and/or to the banks' own customers.

It will be possible to exchange national banknotes of the other euro area countries free of charge until the end of March 2002 at points designated by the national central banks of the Eurosystem. It will not be possible, in principle, to exchange coins of other euro area countries.

National central banks will exchange their respective national banknotes against euro free of charge at least until the end of 2012; coins may be exchanged free of charge at least until the end of 2002. In most countries the exchange periods are longer or even indefinite.

Tips and tricks

Return to the banks, or use up hoarded cash, in particular coins, in the course of 2001.

Buy coin starter kits when they become available and use the coins as from 1 January 2002.

Try to 'avoid the rush' by exchanging hoarded national cash, or depositing it at banks either before or after the busy period in early January.

Use national coins of other euro area countries in the countries of issue before the end of the changeover period or exchange them afterwards at the respective national central bank, or donate them to charity.

For more information on the introduction of the euro banknotes and coins see the official euro website at <http://www.euro.ecb.int>.

(provided by the European Central Bank)

process of rounding things off to €3.99. This is simply not true. Converting things into €s is very complex, which is why governments recommend that you not try it yourself. It may be necessary in an emergency, however, so we have provided handy conversion formulae at the end of this article.

Other stories turn out, in fact, to be true. The British, for example, will probably start driving on the correct side of the road. This is because all toll booths which accept the Euro have their baskets on the right side. This was done as a penalty because the British have the only unit of currency worth more than the Euro.

It is not true that all Euros will be easy to counterfeit. The Euro from your country will be incredibly difficult to counterfeit, once people know what it looks like. Euros from places like Namibia will be somewhat easier, but the EC has promised to find a solution before too many of them are circulated.

According to financial expert Lawrence B. Fishbein, of the International Institute for Psychoeconomics, the main thing is simply not to panic during the transition period. His institute has compiled a list of a few simple things people can do to maintain calm:

As in any crisis, lay in a stock of canned goods and ammunition;

Take all of your money from the bank, convert it all first into French francs, then into Belgian francs or Austrian shillings, and finally into Japanese yen or Icelandic Krona. Put it into Mason jars and bury them in your back yard (do not put air holes in the jars). Be sure to draw a map so that you can find them later.

Put all your old spare change in a box and mail it in to pay next year's income tax deficit.

Send out an e-mail saying that your father milked a third-world government of 787,992,312,413 _____ (fill in the blank with your old currency) and you are just looking for a bank account to put it in.

"There will undoubtedly be some confusion due to the fact that no one has ever understood exchange rates," Fishbein said. "The part of the brain which processes exchange rates is the same as the part which has to figure out whether you get to sleep an hour more or less at daylight savings time. Objective exchange rates aren't very valuable anyway; what's important is that people have a practical method to translate their 'feeling' for the value of money – the monetary unit they are used to dealing with – into Euros."

His institute has published a simple handbook called "Foreign exchange for dummies" which will soon be published on the internet. Here are some excerpts:

Case study 1: A UK citizen who has lived in Italy for many years has now moved to Germany. Multiply one (British £) by 3000 (Italian lire), divide by 1000 (DM) and then divide by two again. The formula is: $\text{€} = (1 \times 3000) / (1000 \times 2)$.

Case study 2: An American who has lived in France, receiving a salary in Belgium, recently moved all his money to a Swiss bank account. Multiply one (\$) by 7.5 (FF) and then by 6 (Belgium francs). Divide this number by 31 (Swiss francs). Then divide again by 1.45. The formula is: $1\text{€} = (1 \times 7.5 \times 6) / (31 \times 1.45)$.

The institute promises that these formulae will give you the psychological value of one Euro within about a factor of ten, which is close enough.

– Russ Hodge

The EMBL Cup: a report on a glorious day

When the international referee, Dr. Oliver Gruss, whistled the end of the final, Giulio Superti-Furga was crying like a fountain. Gitté Neubauer was yelling at her players like an injured eagle. CellZome athletes were stunned. On the other side of the pitch, the Structures II team was jubilating in scenes of collective hysteria. What a game it had been! During the last 5 minutes of the game, it was Armageddon in front of the valiant and fearless Arie "the Flying Dutch" Geerlof, Structure's goalkeeper. Defenders had to resort to some rough methods to stop Miro "Spread the game" Brajenovic and David "Braveheart" Dickson from scoring the equalizer...

What we are talking about, of course, is the football tournament that took place on October 8 and 22. We had teams from almost every department in EMBL: Cell Biology was there, Gene Expression, the new Predocs and Core Facilities as well. We had two teams from both Developmental Biology and Structures and Biocomputing. There were also two external teams, CellZome and Boxberg. Participants included group leaders and even people who had never seen a football in their lives. We also had a bunch of hooligans, the feared S.O.S (Structures Organized Supporters) that rocked the place with their music and cheerleaders.

Teams to make it to the finals included Development, Structures II and CellZome. At first, due to a miscalculation by one of the organizers (I ran out of gas! I got a flat tire! I lost my tux at the

cleaners! I locked my keys in the car! There was an earthquake! A terrible flood! Locusts! IT WASN'T MY FAULT!), we thought that the Boxberg team had made it through by goals difference. But thanks to the captain of Development II, Thomas "Delpierino" Vaccari, an accomplished mathematician, we stopped this semifinal (Structures II – Boxberg) and played the real one. Though CellZome comfortably qualified for the semis, they struggled to reach the final (3-2 against Development I). Structures II had a tough time, both in the first round and in the semis, making the finals only with a last-second goal. A penalty shoot-out was needed to beat Development II and to meet CellZome (thanks Arie and thanks Vitor). Because of lack of time (and the arrival of a police officer – it seems that some people don't like the sound of a bouncing ball after 21:15 in Boxberg), the finals had to be played on the 22nd. CellZome lost. Structures won. Development II reached third place after beating their "brothers" (Development I) in a tense derby. The prizes? None, just the right to make fun of the losers until the next tournament, which will be held in March or April. Winners and losers celebrated together in the pub.

So, in conclusion, we would like to thank everybody that made this tournament so cool, CellZome for the drinks during the first day of the tournament, and the organizers for thinking about it. We hold weekly football sessions in Boxberg. If you are interested, it's quite relaxed and it's free.

– by Federico De Masi and Christian Edlich

from the sister sciences

On the evolution of extraterrestrial intelligence

Governments are spending a tiny dollop of our tax money to turn huge radio-telescope ears to the stars. Only a hard-hearted person would not be fascinated by the prospect of listening to an alien civilization's classical music, or their equivalent of Dr. Laura. But how likely are we to catch the broadcast, and could we understand it if it came? The British astronomer Ian Morrison recently tried to answer these questions, speaking to 200 enthusiastic European high school students from 23 countries who had come to CERN for a science fair called "Life in the Universe." Students entered scientific or artistic projects on this theme into national competitions, and the finalists were invited to the international fair at CERN.

The students hoped that Morrison would give them some hard scientific answers. As head of important international SETI (Search for Extraterrestrial Intelligence) activities, he is a proponent of widening the search, following in the footsteps of astronomer Frank Drake. Back in 1961, Drake proposed using radio telescopes to search for life, and created an equation to predict how many alien radio stations we could expect to find. His famous formula looks like this:

$$N = R^* \cdot f_p \cdot n_e \cdot f_l \cdot f_i \cdot f_c \cdot L$$

which means, in plain language, that the number of broadcasting civilizations can be calculated by multiplying the rate at

which suitable stars form, by the number of those with suitable planets, by the fraction of those where life develops, by the probability of intelligent life evolving, the fraction of that life which develops technology, and the longevity of communicating civilizations. Whew. There are probably a few factors missing, like the alien psychology – whether they are paranoid about being gobbled up by us extraterrestrials, which may depend on whether they caught "Independence Day" on DVD.

Most people regard the equation as a useful thing, although so far it has been impossible to substitute real values for Drake's variables. Science should eventually fill in part of the equation. At CERN, Willy Benz, discoverer of the first planet outside our own solar system, said that improvements in technology will probably help us discover other planets with the basic prerequisites for sustaining life. Just days ago the Hubble space telescope discovered traces of a planetary atmosphere 150 light-years away.

But will life or intelligence evolve there? With enough time, all sorts of ecospheres could probably produce self-replicating molecules. From that point on, many agree, pure Darwinism would reign. But would evolution function the same way in an alien ecosphere? Does all life operate according to variation within species and natural selection? Could an alien biochemistry achieve a very long-term, crys-

tal-like steady state, where molecules reproduced themselves almost flawlessly, and variations from the template were punished with instant extermination? Or could conditions systematically wipe out life that exceeded a certain size?

What about the likelihood of intelligence, technology, and communication? A lot of people believe that intelligence is an almost inevitable outcome of natural selection – you even hear statements like, "If the asteroid hadn't hit the earth, dinosaurs would have become intelligent," despite the fact that neither geckos nor chameleons have started to build radios.

This is an area in which we actually have some statistics, and in fact, things don't look promising. Of all the billions (trillions?) of species that have ever lived on earth, it's only happened once, and so far only for a very short time. The earth did perfectly fine without our brains for nearly all of its history, and there's no reason to think that it couldn't have gotten along fine without us forever. Every species alive today has an evolutionary history just as long and successful as our own, and it can be just as proud of itself as we are (at least until we exterminate it). Sharks' teeth and bacterial flagella are just as successful as an evolutionary strategy as human intelligence, in the uncompromising Darwinian formula that states, "survival equals success."

Research at the Kinderhaus



photo by Marietta Schupp

It has been almost a year now since Eva Puhm joined the EMBL as the Head of the Kinderhaus, and most parents would agree that the place is buzzing with activity.

After finishing a degree in pedagogical studies in Vienna, Eva moved to Amsterdam to complete a combined degree in women's studies with a one year course in Kindergarten management. "The most important thing I learnt during this course is to always have a vision of how

one would like your organisation to function", Eva says. "This vision can develop and change as time goes by, but it is a vital

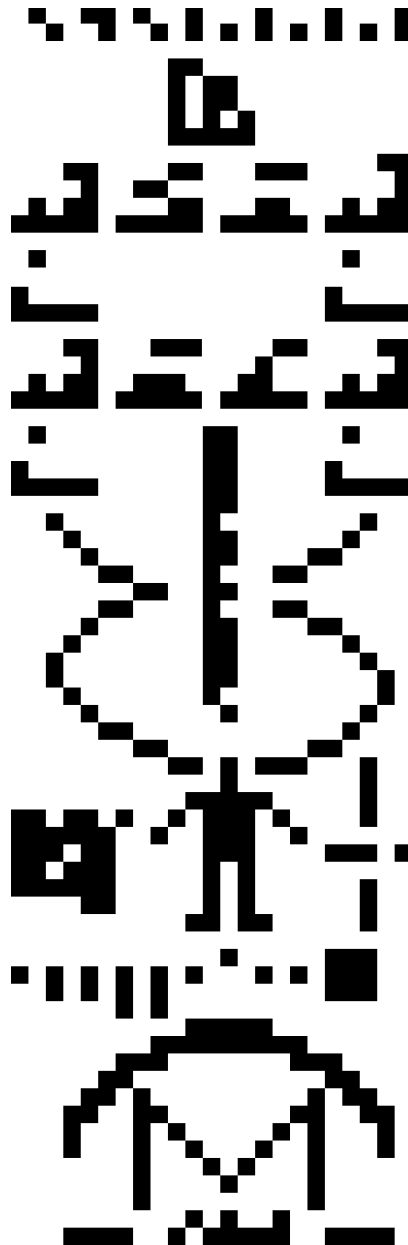
basis to go back to whenever a difficult situation arises". The managerial course concentrated mostly on how to provide efficient leadership within a Kindergarten, covering issues such as personnel questions, pedagogical concepts, parents' policy, accommodation, communication, financial management and healthy nutrition. "As part of my training, I also worked in a kindergarten with men, which is more common in the Netherlands and a welcome change to a mostly female oriented world," she adds.

Coming to Heidelberg was a big challenge for Eva, though one that she was eager to take on. The international atmosphere, beautiful surroundings and fantastic infrastructure at the EMBL Kinderhaus immediately appealed to her. "My first duty was to gain the trust of all teachers and find my place in middle management, balancing between my staff and the EMBL administration," she says. This was followed by taking a close look at communication structures, the security measures and nutrition.

Intelligence certainly doesn't mean that you are capable of broadcasting intelligible signals. We've only made two curious attempts at that ourselves. In 1974 a bunch of our best and brightest put their brains together to beam a message to the stars, and what they came up with can be seen to the right.

This is an odd message because it is so loaded with anthropomorphic symbols that I think it would be completely incomprehensible to anyone else. First of all, it's a two-dimensional image that's supposed to represent a three-dimensional object. Only beings with eyes and a nervous system almost identical to ours would ever do the bizarre thing of representing volumes by squashing them into planes. (You would also need plants that can be cooked and pressed into flat sheets, or animal skins that can be stripped and flattened, which were the original types of flat writing surfaces until the flat-screen monitor was invented.)

There's nothing keeping us from sending a message that could be reconstructed into a cube or sphere, but then we'd have to take a close look at the contents. In this message, we teach our alien friends how to count from one to ten, then immediately show them the structure of a carbon atom and the chemistry of our genetic code. I don't know how many years of education you needed to make this jump, many of us needed a little while.



How should we depict an atom in three dimensions, anyway? In reality, neutrons and electrons are so tiny, and there is such an immense amount of space between them, that you could pack the whole universe into a space the size of a large molecule. (You shouldn't try to do it; you'd probably cause a Big Bang.) What's shown here is a peculiar shorthand that some human found convenient. A message that attempted to portray an atom in its correct proportions would have to be really (* really * really * really) ^{1,000,000,000,000} long, consisting almost entirely of zeroes. (Hopefully the transmitter software won't crash during transmission.) ...and the Uncertainty Principle states that we can't really know precisely where the electrons are, so we'll have to put some blur into the message.

But help is on the way. A company called Encounter 2001 (in Texas, where else?) has sent a second message into space. For just \$14.95 (that's €15.70, at today's exchange rate) people were allowed to add a 30-word message to the broadcast. Their next project is to send a spacecraft along with Ariane 5. For just \$49.95 you can have a sample of your own DNA sent along. I'm not sure exactly what the idea is. Perhaps they hope that by exporting intelligence (well, at least its DNA), the (so far) silent universe will someday be full of planets containing vast numbers of clones of people who are willing to fork out the \$ (DM, €).

– Russ Hodge

Now Eva has finally reached the point where she feels she can start concentrating on her vision, and how to implement it in the Kinderhaus. "During my training I was greatly inspired by the so-called De Reggio Emilia approach," Eva explains. Originating from a Kindergarten in Italy, this approach is based on the idea that one has to first observe a child's points of interest and find out what he or she would like to learn, rather than imposing a teaching programme on them. "Listening to children's questions can lead to a week's activity," Eva explains. "For example, during a project on life in medieval times, a child asked how soap was made. That gave us our cue to do our own research and then pass that on to them!" The approach also focuses on continuity rather than isolated activities. Four sheep were brought in for the "Burgfest" in October, serving as a starting point for the baby group to make sheep-shaped lanterns two months later.

"What I would appreciate is an increase in parents' involvement in our activities," Eva replies when asked what she would like to

change in the future. "Children with such various cultural backgrounds as here at the Kinderhaus could bring along very interesting material from home," she explains. As an example Eva points out how a simple photograph of grandparents living in Norway or a tape with Spanish music could lead to a whole set of interesting activities. "All children are natural researchers," Eva points out, "give them a few familiar clues and they will go a long way." As part of this, Eva would like to urge scientists to think about safe objects from the lab that could be donated to the kinderhaus. "Our younger researchers might just be able to use it for further experimenting," she says.

Finally, Eva asked us to look out for the Kinderhaus' own website designed by Sophie Chabanis-Davidson, to be launched soon...

– Lena Reunis

names to faces

Ever wondered what name goes with that face you keep seeing around EMBL? or who else works nooks and crannies of the Main Lab and the Outstations, helping you get to know some of the

A little mouse, and a microscope

If you drop in on Tony Landomini in the Mechanical Workshop (fourth floor), it probably won't be long before he trots out his map of the United States and starts to talk about his four-and-a-half month, 22,000-kilometer adventure with an antique Topolino (Italian for "little mouse"). He's got pictures of his 1953 Fiat Belvedere Topolino Estate Wagon (the name is longer than the car) in front of the White House, sitting on a pothole-ridden road in Monument Valley, and parked under the Golden Gate Bridge.

"I worked at EMBL from 1986 to 1995, then had one of those really incredible leaving parties," he says. "My gift to myself when I left was a trip around the U.S. in my Topolino." At the party, somebody gave him a paperback copy of John Steinbeck's book *Travels with Charley*, the author's account of a three-month trip through the U.S. with his dog. Tony was amazed to discover that the route he had planned was nearly identical to Steinbeck's. One major difference was that Tony had no trouble skipping across the Canadian border in his Topolino. Steinbeck wouldn't have had any problems, either, except that he couldn't have brought his dog.

After a six-year hiatus, during which Tony traveled around Europe and the rest



Tony Landomini

of the world demonstrating maintenance equipment for golf courses, he has found himself back at EMBL on a temporary basis. Leo Burger is currently running the Mechanical Workshop, which has always been a critical support team for the Laboratory's scientific groups. Upon the recent retirement of Hans Flösser (*EMBL & cetera* 6), who had headed the workshop since it was created along with the Laboratory, the team found itself short of hands. (Now at three people since its heyday when the staff totaled seven.) Leo thought of Tony and invited him to come back.

Leo had an ongoing project for which Tony's expertise in plexiglass could be useful. Working with Andreas Girod, Jens Rietdorf, Rainer Pepperkok, and the electronic workshop, Leo and Siegfried Winkler were designing air-tight plexiglass boxes with a temperature and CO₂ controller to build around microscopes. "The scientists have a number of experiments they would like to perform where samples ought to be studied at very precise temperatures, or in a CO₂ environment," Leo says. "The best solution was simply to build a box around the microscope, but that didn't exist on the market with the required specifications."

Now it does, thanks to the efforts of the ALMF team and the workshops. They have already built boxes for two microscopes, are working on several more, and their most recent design for a Nikon instrument will likely serve as a prototype that can be adopted by external manufacturers and produced on a wider scale.

Like many other projects, this is precision work that has to be carried out by the workshops in close collaboration with scientists. The Nikon box is tidy and elegant, with smooth plastic curves, and screws set tightly into transparent holes in the plexiglass. Leo demonstrates a hinged door that has to swing back and forth as the neck of the microscope is moved. Panels on the sides can be opened for access to the instrument's controls.

"This is really typical of the type of project we do," he says. "We're usually in the background on projects, and some people have the impression we're a sort of warehouse. That's not at all accurate; we've always been actively involved in the design and construction of original scientific equipment. If a researcher wants something special, or if he would like to custom-design a piece of equipment that he's not satisfied with, we're the place to come."

Throughout the history of the Laboratory, the workshops' efforts have made important contributions to some high-profile scientific projects. Teams built cryo-lenses for scanning transmission electron microscopes (STEM) practically from scratch for Arthur Jones and Max Haider, have constructed large "cell-crackers," and one

lab notes

from the Szilard Library

The **Science Citation Index** with data back to 1975 is now available throughout EMBL - including the outstations and Monterotondo. The Szilard Library at EMBL has joined a consortium of other libraries (including those at the DKFZ and MDC-Berlin) to benefit from a reduced price for this service.

New journals online Current Protocols in Molecular Biology and Current Protocols in Cell Biology are now also available online. For more information on either of these services either visit the library's web-site at <http://library.embl-heidelberg.de> or mail the library at library@embl-heidelberg.de.

from the Photolab

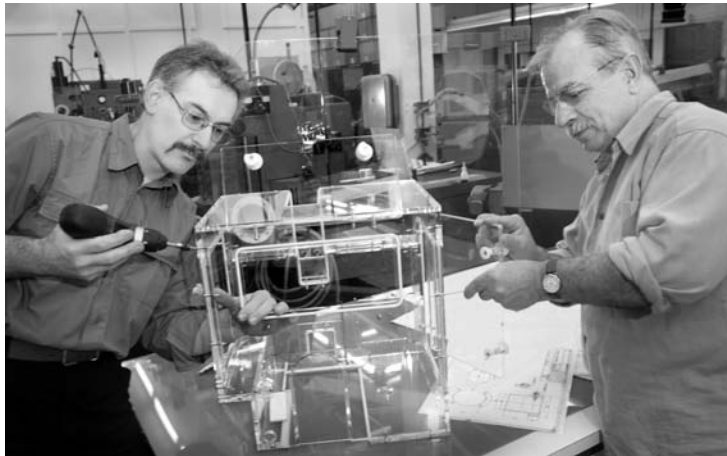
New Colour Printers: The installation of the five new OCE colour printers is now complete. They are located throughout EMBL (see below). All are identical and require a new printer driver which should be updated on the computer you are printing from. Instructions and the download for Macs can be found on our web pages www.embl-heidelberg.de/LocalInfo/Photolab/printer.pdf. PC and UNIX users, please contact the Computing department.

Printer name	Location
OCE-216_CS110-CS115_print	rm. 216 (Library)
OCE-306_CS110-CS115_print	rm. 306 (Structures)
oce-409	rm. 409
OCE-549a_CS110-CS115_print	rm. 549a (Development)
OCE-PHOTO_CS110-CS115_print	rm1.80 (Photolab)

here besides scientists? Starting in this issue, we'll be regularly exploring some of the people who, behind the scenes, in their quiet way, do a lot to help EMBL function.

in a plastic box

of their major accomplishments has been the design and construction of standard-setting electrophoresis equipment still in use today and for which they have filled numerous orders from universities and other institutions. They have built instruments with the Ansoerge group in Biochemical Instrumentation, and have also been heavily involved in building equipment for the Hamburg and Grenoble Outstations. Now they are working on projects with the groups of Christian Boulin (who is responsible for the facility), Ernst Stelzer, Philippe Bastiaens, and many others.



Leo Burger, Tony, and the Box

Along the way, there have been some curious stories. "You know the computer mouse which operates by running a ball over the table?" Leo says. "Before that existed, there was a need for something like that to drive a part of the electron microscope, and equipment at DESY. So the design team of the STEM used a billiard ball to build what was called the

'Cartesian ball,' which worked on the same principles as the mouse."

Another challenge was the creation of a "floating table" for precision microscopy – where samples and instruments had to be held absolutely still, protected from tremors in the building due to passing trucks or other causes. Leo describes how a crane was used to raise a 10,000 kilogram stone slab into the Laboratory. The Mechanical Workshop built an "air mattress" that would hold it up.

"It's like making a table swim on a big rubber balloon," Leo explains.

Instruments detect all the changes in the surface and compensate by changing the pressure in the balloon." He drops the cap of a pen on the table. "It has to be sensitive enough in order to compensate for that type of change."

What happened to the slab? "The development of computers and lasers made it out-of-date; you don't need to make tables that heavy anymore," he says. "Eventually they cut it up. But there are still pieces of it around somewhere."

– Russ Hodge

Photos by Maj Britt Hansen

False Positives

Here are this month's contributions in our continuing search for the "Best of PubMed." Have a look at these PMID numbers...

11098371
2308280
11046411
9686446
6502774

Send contributions to
info@embl-heidelberg.de

Would you like to contribute to the next issue of EMBL & cetera?

Just send a message to info@embl-heidelberg.de.

Deadline for submissions is February 15, 2002

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Video Conferencing. During the Science and Society Conference in November we installed a multisite video conference link in order to test the possibility of broadcasting conferences and talks from the Operon live to the other EMBL sites. This allowed viewers from the Outstations and Monterotondo to participate directly in the conference. Live webcasting on the internal Heidelberg network also allowed web browser users to follow the conference from their work places. The results were encouraging and the service was appreciated. We are evaluating a permanent installation.

Book your Beamer in advance! The shift to laptop presentations has finally overtaken traditional slide use. As many of you already know, we have several beamers available on loan. We cannot always accommodate last-minute requests - so, book in advance! Send us an email (photolab@embl-heidelberg.de) or ring us at 238 and we'll confirm your booking.

from the Office of Information and Public Affairs

Jason Soffe has joined the staff of the **Office of Information and Public Affairs** in Heidelberg. His main area of responsibility will be to help overhaul the design of the EMBL website. He has already put up a new OIPA home page, worked with us on electronic versions of press releases, and redesigned the Science and Society and PhD programme pages.

people @EMBL



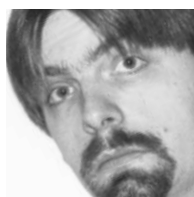
Asifa Akhtar joined EMBL in October as a Group Leader in the Gene Expression Programme. Asifa did her PhD at Imperial Cancer Research Fund, London, with Richard Treisman, and post-doctoral work with Peter Becker at EMBL (Heidelberg) then at the Adolf Butenandt Institute (Munich). At EMBL, Asifa plans to continue her work on chromatin regulation using Dosage Compensation as a model system ...and drink tea.

Jürg Müller is another new Group Leader in the Gene Expression Programme. He did his PhD at the University of Zürich with Mariann Bienz and postdoctoral work in the lab of Peter Lawrence at the MRC Laboratory of Molecular Biology in Cambridge, England. After that he became a group leader at the MPI für Entwicklungsbiologie in Tübingen where he used *Drosophila* to study chromatin-related aspects of gene regulation. At EMBL, Jürg plans to continue these studies but complement genetics with biochemical approaches to tackle old problems from a new angle.



In October, **Carsten Schultz** moved into the chemistry facilities of the EMBL as an interdisciplinary group leader in the Gene Expression Programme. Carsten received his PhD at the University of Bremen, German, and after three years as a post-doc work with Roger Tsien at the University of California San Diego, he returned to Bremen for his habilitation in Organic Chemistry. He continued his work intracellular messengers at the MPI for Molecular Physiology in Dortmund, and has now expanded this to the development of novel methods to monitor signaling events in living cells.

Michael Knop is the most recent Group Leader addition to the Cell Biology and Cell Biophysics Programme. He did his PhD in Stuttgart with Dieter H. Wolf, and his postdoctoral work at the MPI in Munich with Elmar Schiebel and at the Beatson Institute in Glasgow. He joins EMBL after two years at the MPI in Martinsried as an independent researcher. At EMBL he will work on cell differentiation, membrane organisation and cell cycle control in Baker's yeast -the real yeast.



Claus Nerlov joined the Mouse Biology programme in Monterotondo as a Group Leader in October. Claus did his PhD with Ed Ziff at New York University, followed by a postdoc with Thomas Graf in the EMBL Developmental Biology Programme. He has spent the last three years running the Laboratory of Gene Therapy Research at the Copenhagen University Hospital. Claus will continue his work on C/EBP

transcription factors in development and disease, whenever the weather in Rome is not sunny.

Carl Neumann is a new Group Leader in the Developmental Biology Programme. He did his PhD at EMBL Heidelberg in 1997 with Steve Cohen, and then postdoctoral work at the Max-Planck Institute for Developmental Biology, Tübingen, Germany. At EMBL he will focus on the role of cell-cell signaling in patterning the zebrafish retina and paired fins.



faculty appointments

Klaus Scheffzek (Structural and Computational Biology), Kim Henrick (EBI), Manfred Weiss (Hamburg) have been appointed as team leaders. Hassan Belrhali (Grenoble), Martin Hetzer (Gene Expression), Elena Lehvashina (Additional Research Activities), and Hans-Michael Müller (Additional Research Activities), Andrea Schmidt (Hamburg), and Young-Hwa Song (Hamburg) have been appointed as staff scientists.

Who's new?

In the Cell Biology and Cell Biophysics Programme: Nicola Berns (González), Maiwen Caudron (Karsenti), Emmanuel Caussinus (Gonzalez), Ute Kahl (Knop), Michael Knop (Group Leader), Peter Maier (Knop), Kota Miura (Pepperkok), Alexandra Moreno-Borchart (Knop), Martin Offerdinger (Bastiaens), Anna Peyker (Bastiaens), Emmanuel Reynaud (Pepperkok), Teresa Sardon (Vernos), Jeanette Seiler (Vernos), Vytaute Starkuviene (Pepperkok), Hideki Yokoyama (Karsenti), Ivan Yudushkin (Bastiaens); in the Developmental Biology Programme: Lodovica Borghese (Rørth), Carl Neumann (Group Leader), Rebecca Quiring (Wittbrodt), Martina Rembold (Wittbrodt), Giorgia Salvagiotto (Nebreda), Eve Seuntjens (Treier), Alena Shkumatava (Neumann), Marija Spasikova (Neumann); in the Gene Expression Programme: Asifa Akhtar (Group Leader), Alessia Buscaino (Akhtar), Carlo Dinkel (Schultz), Ulrich Elling (Treier), Cerstin Franz (Mattaj), Cornelia Fritsch (J. Müller), Nicole Heath (Schultz), Maria Koffa (Mattaj), Jürg Müller (Group Leader), Martina Niksic (Valcarcel), Andreas Schleifenbaum (Schultz), Carsten Schultz (Group Leader), Aditya Sengupta (J. Müller), Dan Slocum (Akhtar), Mikko Taipale (Akhtar), Leonie Unterholzner (Izaurrealde), Oliver Wichmann (Schultz), Brigitte Wild (J. Müller), Louise Woodley (Valcarcel); in the Structural and Computational Biology Programme: Richard Bayliss (Conti), Fulvia Bono (Conti), Sandra Esteras (Serrano), Caroline Hadley (Russell), Caroline Lemerle (Serrano), Christian Marx (Böttcher), Vladimir Pena (Scheffzek), Ximena Ramirez (Macias), Frederic Rousseau (Serrano), Joost Schymkowitz (Serrano), Parantu Shah (Bork), Baozhen Song (Leonard), Christian von Mering (Bork); in Additional Research Activities: Graziella Penot (Gannon), Dina Vlachou (Kafatos); at the EBI: Philippe Aldebert (Apweiler), David-William Binns (Trembl), Paul Browne (Apweiler), Idelfonso Cases (Ouzounis), Yuan Chen (Ensembl), Nikos Darzentas (Ouzounis), Federico Garcia Diez (Trembl), Martin Hammond (Birney), John Livingstone (Jokkinen), John Melford, Ahmet Oezcimen (Brazma), Christel Perrin (Apweiler), Manuela Preuss (Apweiler), Anastasia Samsonova (Brazma), Esther Schmidt (Birney), Siamak Sobhany (MSD), Mohamaed Tagari (MSD), Abel Ureta-Vidal (Birney), Wim Vranken (MSD), Dan Wu (Apweiler); at the Grenoble Outstation: Susan Fridd (Cusack), Bernard Lavault, Anastasia Mylona (C. Müller), Antoine Royant; at the Hamburg Outstation: Vladimir Volkov, Alexander Kornelyuk, Manfred Weiss, Frank Lehmann, Virginia Calabritto, Huseyin Uysal, Fernando Ridoutt, Young-Hwa Song, Olga Kirillova (Lamzin), Anni Linden (Wilmanns); at the Monterotondo Programme on Mouse Biology: Jose Gonzalez, Claus Nerlov (Group Leader), Craig Panner; elsewhere at EMBL: Tanja Blotz (Szilárd Library), Siegfried Candussi (ISG), Heinz Harz (ISG), Marc Hemberger (Computer & Networking Group), David Ibberson (Core Facilities), Bernd-Uwe Jahn (Administration), Heike Kirsch (Switchboard), Nathalie Leclercq (DG's Office), Karl-Heinz Marx (ISG), Goeran Nitzsche (ISG), Emmanuel Reynaud (Core Facilities), Sara Savaresi (Core Facilities), Sabine Schmidt (Core Facilities), Jason Soffe (OIPA), Janin Topaloglu (Kinderhaus), Nadine Winter (Personnel), Keith Williamson (Personnel); at EMBO: Baerbel Laur