



NEWSLETTER

4th edition | February 2013



IST Austria's new Managing Director, Georg Schneider.

Introducing Georg Schneider:

"Every once in a while exceptional things happen, and this is the case for IST Austria. Over the course of five years, a combination of a daring vision, long-term financial backing and hard work transformed a construction site into a thriving hub of scientific activity that measures itself against the most successful research institutions of its kind in the world.

I am proud of being part of this endeavor as new Managing Director. Heading the administration of IST Austria is a personal challenge that I am very happy to take on. I would like to thank all friends of IST Austria for their warm welcome in the past weeks, and am looking forward to our continuing work together."

With the best wishes for the new year,
Georg Schneider | Managing Director

NEW PROFESSORS

Björn Hof is a German experimental physicist, who acquired his PhD at the University of Manchester in 2001. After postdoc positions in Manchester and at TU Delft, he returned to the University of Manchester as lecturer in 2005. In 2007, Hof became leader of the independent research group "Complex Dynamics and Turbulence" at the Max Planck Institute for Dynamics and Self Organization in Göttingen. Hof combines theoretical work, computer simulation and precision experiments in investigating fluid dynamics. Hof recently received an ERC Starting Grant.

Uli Wagner is a German mathematician. He completed his PhD at ETH Zurich in 2003, followed by postdoc positions at MSRI Berkeley, Charles University in Prague, the Hebrew University of Jerusalem and ETH Zurich. From 2008 to 2012, he was a Senior Researcher at ETH Zurich. Since June 2012, Wagner was Assistant Professor at EPF Lausanne. Uli Wagner works in discrete and computational geometry and topology, an area at the junction between mathematics and theoretical computer science.

NEWS

Lab Building East opened

Lab Building East (LBE), the new laboratory building on the campus of IST Austria, opened its doors on November 28. Lab Building East was inaugurated in an opening ceremony in the presence of the Federal Minister for Science and Research, Karlheinz Töchterle, and the Governor of Lower Austria, Erwin Pröll. With LBE, a further 7'000 sqm are available for the experimental research of up to twelve research groups. The first scientists have already taken up their work in the new building.

Lab Building East was designed by the Vienna architect's office Frank and Partner. Located in the eastern part of the campus, LBE, together with the Central Building and the Bertalanffy Foundation Building, surrounds the pond and the green areas at the campus center. The building with its six floors is adapted for experimental research in the life sciences and, a first for IST Austria, physics. Once fully occupied, up to 120 researchers will work in Lab Building East.



The geometry of LBE is based on the leading principle of "form follows energy". Reminding of a crystal, the building's body is designed to be as compact as possible, and energy is used sustainably.

The end of the opening ceremony was marked by the filling of a foundation tube for Lab and Office Building West. This building, with 11'500 sqm floor area distributed over two building blocks, will provide space for up to 300 researchers in the fields of mathematics, physics and chemistry, and is expected to be completed by 2015.

APPOINTMENTS

President Thomas A. Henzinger re-appointed Georg Schneider new Managing Director

The Board of Trustees of IST Austria re-appointed **Thomas A. Henzinger** for a second four-year term as President of the Institute at its meeting on November 28. The Board also approved Prof. Henzinger's recommendations to appoint **Georg Schneider** as the new Managing Director of IST Austria as of December 1, 2012.

Thomas Henzinger, accepting to lead the Institute for another term, said: "The reappointment is a great honor for me. The last four years were a tremendous experience. I am very grateful for the confidence vested in me by the board members, and by the scientists who joined IST Austria."

Claus J. Raidl, Chair of the Board of Trustees, said: "We are delighted that Thomas Henzinger has agreed to accept the offer to serve a second term as President of IST Austria. Our decision is based on his achievements in the past four years and his vision for the future. In his first term, Thomas Henzinger proved to be a successful leader of this rapidly growing Institute, coordinating the interests and efforts of all partners to create an atmosphere of excellence that has become the hallmark of IST Austria. With Thomas Henzinger, we are confident that IST Austria will remain on its trajectory to success."

The new Managing Director, Georg Schneider, joins the Institute coming from



left to right: Haim Harari, Thomas A. Henzinger, Georg Schneider, Claus J. Raidl, Anton Zeilinger

A*Star, Singapore's strategic umbrella organization for science, technology, and research, where he served as deputy director and CIO of A*Star's Bioinformatics Institute since 2008. Schneider holds a Master's degree in Business Administration from the Vienna University of Economics and Business and a PhD in Chemistry from the University of Vienna. He follows Gerald Murauer, who moved to a position in industry.

SCIENCE AT IST AUSTRIA

Cell Biology Michael Sixt

Michael Sixt and his group aim to understand the molecular and mechanical principles of cell motility at both the cellular and tissue level. Their most recent paper, published in *Science* on January 18, provides the first evidence for directed cell migration along concentration gradients of chemical cues immobilized in tissues, a concept that has long been assumed but never experimentally proven.

In their newly published work, produced in collaboration with the physicists Robert Hauschild and Tobias Bollenbach at IST Austria, the scientists visualized immune cells and their cue, the chemokine CCL21, and recorded movies of navigating cells in living tissues. The researchers found that the chemokine is exclusively produced by the lymphatic vessel, from where it distributes into the surrounding tissue forming a



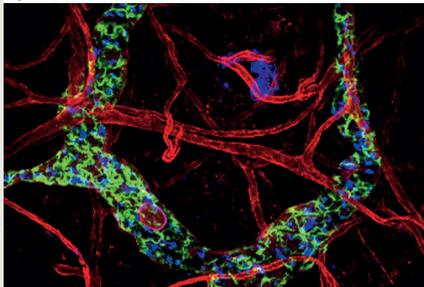
concentration gradient. Observation of migratory routes and quantitative measurements of chemokine distribution matched well, suggesting that a cell can find the next lymphatic vessel by comparing chemokine concentration across its surface and crawling towards the higher concentration.

To prove the concept, the scientists out-competed the chemokine gradients by applying excess chemokine from the outside, which confuses the cells on their way to the lymphatic vessel. When they released the anchoring of the chemokine to the tissue, cells also got confused, demonstrating that the gradients are not soluble but bound to the tissue.

Michael Sixt points out: "This is the first time someone could directly visualize and quantify a chemokine gradient, and show how these gradients guide migratory cells."

Interstitial Dendritic Cell Guidance by Haptotactic Chemokine Gradients | Weber M et al. 2013 | *Science* 339, 328-332

Microscopical image of blood vessels (red), lymphatic vessels (green) and Chemokine CCL21 (blue). © IST Austria / Sixt



HONORS

Michael Sixt received the **Ignaz L. Lieben-Prize 2012** of the Austrian Academy of Sciences (ÖAW) for his research into the morphodynamics of immune cells. Endowed in 1863, the Ignaz L. Lieben-Prize is the oldest award of the ÖAW, with previous recipients including Marietta Blau and Lise Meitner, as well as the Nobel Prize laureates Viktor Hess and Otto Loewi. The prize was suspended after 1938, and reinstated in 2004 thanks to the support of Dr. Alfred and Isabel Bader. It is awarded to scientists for extraordinary achievements in the fields of molecular biology, chemistry or physics.

UPCOMING EVENTS

April 24 | IST Lecture 5.00pm

Mathematician Steven Smale, recipient of the 1966 Fields Medal and professor at the City University Hong Kong, presents the first IST Lecture of 2013. IST Lectures are aimed at the scientifically interested general public.

April 26 | Young Scientist Symposium

The PhD students and Postdocs of IST Austria organize the second YSS, entitled "Understanding shape - *In silico* and *in vivo*". The interdisciplinary meeting aimed at young scientists in the Vienna region features 6 world-class speakers from various research areas.

HONORS

Florian Pausinger, PhD student in Herbert Edelsbrunner's group, is one of six recipients of this year's **Hans Stegbuchner Prize**. Endowed by the University of Salzburg in 2000, the Hans Stegbuchner Prize honors excellent bachelor, master and PhD theses in the field of mathematics.

Pausinger was given the prize for his MSc thesis on "Discrepancy of generalised van der Corput sequences".

GRANTS

Melinda Pickup, postdoc in Nick Barton's group, received a **Lise Meitner Grant** of the Austrian Science Fund (FWF) for her project "Mating systems and the evolutionary dynamics of hybrid zones".

Aparna Ratheesh, postdoc in Daria Siekhaus' group, received a **Marie Curie International Incoming Fellowship (IIF)** of the European Commission for her project "Breaking barriers: Investigating the junctional and mechanobiological changes underlying the ability of *Drosophila* immune cells to invade an epithelium."

GRANTS

Daria Siekhaus, Assistant Professor at IST Austria, was awarded a **Marie Curie Career Integration Grant (CIG)** of the European Commission. The grant supports her project "Investigating the role of transporters in invasive migration through junctions". CIG grants support top-level experienced researchers establishing a research career in Europe.

COLLOQUIUM SPEAKERS

PAST SPEAKERS (NOVEMBER-JANUARY): **Jan Peters**, Technical University Darmstadt (Nov 12) | **Brian Charlesworth**, The University of Edinburgh (Nov 19) | **Gábor Tamás**, University of Szeged (Nov 26) | **Virgil Widrich**, University of Applied Arts Vienna (Dec 3) | **Ilya Nemenman**, Emory University (Dec 10) | **Martina Havenith**, Ruhr University Bochum (Jan 14) | **Jiri Matas**, Czech Technical University Prague (Jan 21) | **Elad Schneidmann**, Weizmann Institute of Science (Jan 28)

UPCOMING SPEAKERS (FEBRUARY-APRIL): **Ruth Lehmann**, The Skirball Institute. NYU (Feb 11) | **Immanuel Bloch**, Max Planck Institute of Quantum Optics (Feb 25) | **Anne Ridley**, King's College London (Mar 4) | **Enrico Coen**, John Innes Centre (Mar 11) | **John P. Adelman**, Oregon Health and Science University (Apr 8) | **Niels Bierbaumer**, University of Tübingen (Apr 15) | **Steve Smale**, City University of Hong Kong (Apr 22) | **Stephan Sigrist**, Freie Universität Berlin (Apr 29)

SELECTED RECENT PUBLICATIONS

Neurulation coordinating cell polarisation and lumen formation | Compagnon J & Heisenberg C, 2013 | *EMBO Journal* 1-3

A counterexample to the chain rule for conditional HILL entropy, and what deniable encryption has to do with it | Krenn S, Pietrzak K & Wadia A, 2013 | *TCC: Theory of Cryptography Conference 2013*

Controllable-choice message sequence graph | Chmelik M & Rehak V, 2013 | *MEMICS: Mathematical and Engineering Methods in Computer Science* 7721

Hippocampal place cells can encode multiple trial-dependent features through rate remapping | Allen K, Rawlins JNP, Bannerman DM & Csicsvari J, 2012 | *Journal of Neuroscience* 32, 14752-14766

Forces driving epithelial spreading in zebrafish gastrulation | Behrndt M, Salbreux G, Campinho P, Hauschild R,

Oswald F, Roensch J, Grill SW & Heisenberg C, 2012 | *Science* 338, 257-260

Equivalence of games with probabilistic uncertainty and partial observation games | Chatterjee K, Chmelik M & Majumdar R, 2012 | *ATVA: Automated Technology for Verification and Analysis* 7561, 385-399

On the optimality of functionals over triangulations of Delaunay sets | Dolbilin NP, Edelsbrunner H & Musin OR, 2012 | *Russian Mathematical Surveys* 67, 781-783

A likelihood based comparison of population histories in a parasitoid guild | Lohse K, Barton NH, Melika G & Stone GN, 2012 | *Molecular Ecology* 21, 4605-4617

Adhesion functions in cell sorting by mechanically coupling the cortices of adhering cells | Maitre J, Berthoumieux H, Krens SFG, Salbreux G, Julicher F, Paluch E & Heisenberg C, 2012 | *Science* 338, 253-256

Multi-task Unaligned Shared Knowledge Transfer | Tommasi T, Quadrianto N, Caputo B & Lampert CH, 2012 | *ACCV: Asian Conference on Computer Vision*

Ants disinfect fungus-exposed brood by oral uptake and spread of their poison | Tragust S, Mitteregger B, Barone V, Konrad M, Ugelvig LV & Cremer S, 2012 | *Current Biology* 23, 76-82

Geometry of maximum likelihood estimation in Gaussian graphical models | Uhler C, 2012 | *Annals of Statistics* 40, 238-261

Interactive labeling of image segmentation hierarchies | Zankl G, Haxhimusa Y & Ion A, 2012 | *Pattern Recognition* 7476, 11-20

A full list of publications from IST Austria can be found at publist.ist.ac.at

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