

# Science & Technology in Germany



*Eyes into space: The two MAGIC telescopes provided valuable information about the captured*

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JULY 2018



PUBLICATION OF THE EMBASSY OF INDIA, BERLIN  
SCIENCE AND TECHNOLOGY WING

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**EDITORIAL****Dear Readers,**

Researchers from India and Germany have shown keen interest to work jointly in the area of health research. Chronic viral disease, AMR and infectious diseases are some of the topic of societal importance which are being looked at. Max Plank Institute for Infection Biology had been working closely with several institutes in India in multidisciplinary research concerning molecular and cellular mechanisms of infection. Some of the researchers from this institute were at the Embassy to express their desire to promote this joint collaboration comprising concepts and methodologies of molecular genetics, immunology, cell biology, epidemiology, clinical research and protein chemistry.

They have been advised to look for opportunities through the calls published by IGSTC and through government initiated schemes like VAJRA. It will also be apt to encourage and support such initiatives through separate calls for projects with committed funding.

**R. Madhan**

science.berlin@mea.gov.in

**INDIAN SCIENTISTS VISITING GERMANY****Dr. S. K. Maiti**

*Host Institute:* ICAR-Indian Veterinary Research Institute (IVRI), New Delhi

*Guest Institute:* University of Cologne

*Duration:* 1 to 30 Septmeber 2018

*Topic:* To avail research fellowship under INSA Bilateral Exchange Programme 2018

**Mr. Debdutta Ghosh**

*Host Institute:* CBRI-Roorkee, Uttarakhand

*Guest Institute:* In Germany

*Duration:* 27 June to 3 July 2018

*Topic:* For attending the workshop and training on NDT&E-CE Nondestructive Testing and Evaluation in Civil Engineering

**CONFERENCES****02.09.18 - 04.09.18**

*"6. International Influenza Meeting"* in Münster

**Organiser:** Professor Dr. Stephan Ludwig, Westfälische Wilhelms-Universität Münster, Institut für Molekulare Virologie, Von-Esmarch-

Straße 56, 48149 Münster, Tel.:  
(+49) 251/8357791

**02.09.18 - 05.09.18**

*“European Natural Substances Conference 2018”*, in Frankfurt am Main

**Organiser:** Dr.-Ing. Karsten Schürle, DECHEMA Gesellschaft für Chemische Technik und Biotechnologie e.V., Theodor-Heuss-Allee 25, 60486 Frankfurt, Tel.: (+49) 69/7564162

Externer

Link<http://www.dechema.de/en/ECNP2018.html>

**02.09.18 - 06.09.18**

*“2<sup>nd</sup> Frankfurt Conference on Quality control in Life processes”* in Frankfurt am Main

**Organiser:** Professor Dr. Ivan Dikic, Goethe-Universität Frankfurt am Main, Institut für Biochemie II, Theodor-Stern-Kai 7, 60596 Frankfurt, Tel.: (+49) 69/63015652  
Externer

Link<http://www.biochem2.com/FCQC2018>

**02.09.18 - 06.09.18**

*“63. Annual Meet of the German Society for Medical Informatics, Biometrics and Epidemiology (GMDS)*

*e.V. The learning health system: research based, innovative, networking”* in Osnabrück

**Organiser:** Professor Dr. Ursula Hübner, Hochschule Osnabrück, Fakultät Wirtschafts- und Sozialwissenschaften, Caprivistraße 30 A, 49076 Osnabrück, Tel.: (+49) 541/802642, Externer  
Link<http://www.gmds2018.de>

**02.09.18 - 07.09.18**

*“International Conference Rodents biology and Management”* in Potsdam

**Organiser:** Dr. Jens Jacob, Julius Kühn-Institut (JKI) - Bundesforschungsinstitut für Kulturpflanzen, Arbeitsgruppe Wirbeltierforschung, Toppheideweg 88, 48161 Münster, Tel.: (+49) 251/8710645,

Externer Link<http://www.icrbm.org>

**02.09.18 - 07.09.18**

*“2018 Potsdam Thinkshop on the function of feedback in the origin of galaxies: from small scale winds to big scale outflows”* in Potsdam

**Organiser:** Professor Dr. Christoph Pfrommer, Leibniz-Institut für Astrophysik Potsdam (AIP), An der Sternwarte 16, 14482 Potsdam, Tel.: (+49) 331/7499513

**03.09.18 - 06.09.18**

*"KogWis 2018 - 14. Conference of the Society for Cognitive Sciences "* in Darmstadt

**Organiser:** Professor Dr. Constantin Rothkopf, Technische Universität Darmstadt, Institut für Psychologie, Alexanderstraße 10, 64283 Darmstadt, Tel.: (+49) 6151/1623367  
 Externer Link [http://www.gk-ev.de/?page\\_id=15](http://www.gk-ev.de/?page_id=15)

### **03.09.18 - 06.09.18**

*"20. International Symposium on Principals and Practices of Declarative Programs and 28 International symposium on logic-based Program synthesis and -transformation about logic-based program synthesis and -transformation"* in Frankfurt am Main

**Organiser:** Privatdozent Dr. David Sabel, Goethe-Universität Frankfurt am Main, Lehrstuhl für Künstliche Intelligenz und Softwaretechnologie, Robert-Mayer-Straße 11-15, 60325 Frankfurt, Tel.: (+49) 69/79828691,  
 Externer Link <http://ppdp-lopstr-18.cs.uni-frankfurt.de/>

### **03.09.18 - 06.09.18**

*"LANE 2018 - 10. Conference on Photonic Technologies"* in Fürth

**Organiser:** Professor Dr.-Ing. Michael Schmidt, Bayerisches

Laserzentrum (BLZ) GmbH, Konrad-Zuse-Straße 2-6, 91052 Erlangen, Tel.: (+49) 9131/8523456

Externer Link <http://www.lane-conference.org/>

### **03.09.18 - 06.09.18**

*"9. International Workshop on Spinell-Nitride and related materials"* in Rüdesheim

**Organiser:** Professor Dr. Ralf Riedel, Technische Universität Darmstadt, Fachgebiet Disperse Feststoffe, Jovanka-Bontschits-Straße 2, 64287 Darmstadt, Tel.: (+49) 6151/16-21624,  
 Externer Link <http://www.hotmaterials.tu-darmstadt.de>

### **03.09.18 - 07.09.18**

*"NUMDIFF-15: Numeric Treatment of differential equations and differential-algebraic equations (DAEs)"* in Halle/Saale

**Organiser:** Professor Dr. Martin Arnold, Martin-Luther-Universität Halle-Wittenberg, Institut für Mathematik, Theodor-Lieser-Straße 5, 06120 Halle, Tel.: (+49) 345/5524653

Externer

Link <http://www.sim.mathematik.uni-halle.de/numdiff/Numdiff15/>

### **03.09.18 - 07.09.18**

*"International Conference on two-dimensional materials "Flatlands Beyond Graphene" 2018 in Leipzig*

**Organiser:** Professor Dr. Thomas Heine, Technische Universität Dresden, Arbeitsgruppe für Theoretische Chemie, 01062 Dresden, Externer Link <http://www.woi.chemie.uni-leipzig.de/flatlands2018/>

### 03.09.18 - 07.09.18

*"The common European magnetic symposiums" in Mainz*

**Organiser:** Professor Dr. Jairo Sinova, Johannes Gutenberg-Universität Mainz, Institut für Physik, Staudingerweg 7, 55128 Mainz, Tel.: (+49) 6131/3923633, Externer Link <http://www.jems2018.org/>

### 04.09.18 - 06.09.18

*"European Conference on Mechanism Science - EuCoMeS 2018" in Aachen*

**Organiser:** Professor Dr.-Ing. Burkhard Corves, Rheinisch-Westfälische Technische Hochschule Aachen, Institut für Getriebetechnik und Maschinendynamik (IGM), Kackertstraße 16-18, 52072 Aachen, Tel.: (+49) 241/80-95553 Externer Link <http://www.eucomes.eu>

### 04.09.18 - 07.09.18

*"The heart in numbers: Integration of Theory, Simulation and Experiment for the progress of Research and Therapy" in Berlin*

**Organiser:** Professor Dr. Martin Falcke, Max-Delbrück-Centrum für Molekulare Medizin (MDC) in der Helmholtz-Gemeinschaft, Robert-Rössle-Straße 10, 13125 Berlin, Tel.: (+49) 30/9406 2753, Externer Link <http://www.biophysics.org/upcoming-thematic-meetings>

### 04.09.18 - 07.09.18

*"19<sup>th</sup> International Conference on Membrane Computing (CMC19)" in Dresden*

**Organiser:** Privatdozent Dr.-Ing. Thomas Hinze, Friedrich-Schiller-Universität Jena, Fakultät für Biowissenschaften, Bachstraße 18k, 07743 Jena, Tel.: (+49) 3641/946463 Externer Link <http://cmc19.uni-jena.de>

### 05.09.18 - 07.09.18

*"10th International Conference on Virtual Worlds and Games for Serious Applications (VS-GAMES 2018)" in Würzburg*

**Organiser:** Professor Dr. Sebastian von Mammen, Julius-Maximilians-Universität Würzburg, Institut für

Informatik, Am Hubland, 97074  
Würzburg, Tel.: (+49) 931/86381  
Externer  
Link<http://vs-games.org/2018/>

### 05.09.18 - 08.09.18

*"28<sup>th</sup> Congress of European Chemoreception Research Organisation"* in Würzburg  
**Organiser:** Professor Dr. Wolfgang Meyerhof, Universität des Saarlandes, Center for Integrative Physiology and Molecular Medicine (CIPMM), Kirrberger Straße, 66424 Homburg, Externer  
Link<http://www.ecro.online/meetings/annual-meeting-2018/>

### 06.09.18 - 08.09.18

*"Innenohrbiology 2018"* in Berlin  
**Organiser:** Dr. Agnieszka Szczepek, Charité - Universitätsmedizin Berlin, Klinik für Hals-, Nasen- und Ohrenheilkunde, Charitéplatz 1, 10117 Berlin, Tel.: (+49) 30/450 555224  
Externer  
Link<http://www.ieb2018.com>

### 06.09.18 - 08.09.18

*"Surgical Research Days 2018"* in Erlangen  
**Organiser:** Dr. Maximilian Brunner, Friedrich-Alexander-Universität

Erlangen-Nürnberg, Chirurgische Klinik, Krankenhausstraße 12, 91054 Erlangen, Tel.: (+49) 9131/8542269

### 06.09.18 - 08.09.18

*"2. International Symposium - Innovative Concepts of Molecular Pharmacology and Toxinology"*, in Freiburg  
**Organiser:** Professor Dr. Klaus Aktories, Albert-Ludwigs-Universität Freiburg, Abteilung I, Albertstraße 25, 79104 Freiburg, Tel.: (+49) 761/203-5301  
Externer Link<http://portal.uni-freiburg.de/pharmakologie/>

### 06.09.18 - 08.09.18

*"18. Annual Meet of SRNT Europe"* in Munich  
**Organiser:** Dr. Tobias Rütther, Ludwig-Maximilians-Universität München (LMU), Klinik für Psychiatrie und Psychotherapie (Campus Innenstadt), Nussbaumstraße 7, 80336 München, Tel.: (+49) 89/440055707, Externer  
Link<http://www.srnt-e-munich.com>

### 06.09.18 - 09.09.18

*"New Concepts of Immunology on control of desired and undesired immune reactions"* in Ettal  
**Organiser:** Professor Dr. Andreas Radbruch, Deutsches Rheuma-

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Forschungszentrum Berlin (DRFZ),  
Charitéplatz 1, 10117 Berlin, Tel.:  
(+49) 30/28460601

Tel.: (+49) 40/7410-52828, Externer  
Link <http://www.ecs2018.eu>

**09.09.18 - 12.09.18**

*"Annual Meet of German Society for  
DNA Repair (DGDR)"* in Karlsruhe

**Organiser:** Professor Dr. Andrea  
Hartwig, Karlsruher Institut für  
Technologie (KIT), Abteilung  
Lebensmittelchemie und Toxikologie,  
Adenauerring 20, 76131 Karlsruhe,  
Tel.: (+49) 721/608-47645

**09.09.18 - 13.09.18**

*"11. International Symposium on  
special topics of chemical motor and  
energetic materials (11-ISICP)"* in  
Stuttgart und Lampoldshausen

**Organiser:** Dr.-Ing. Helmut Konrad  
Ciezki, Deutsches Zentrum für Luft-  
und Raumfahrt (DLR), Institut für  
Raumfahrtantriebe, Langer Grund,  
74239 Hardthausen, Tel.: (+49)  
6298/28321, [http://](http://www.dlr.de/ISICP2018) Externer  
Link [www.dlr.de/ISICP2018](http://www.dlr.de/ISICP2018)

**09.09.18 - 12.09.18**

*"28. International CEA-Symposium"*  
in Würzburg

**Organiser:** Professor Dr. Süleyman  
Ergün, Julius-Maximilians-Universität  
Würzburg, Lehrstuhl Anatomie und  
Zellbiologie II, Koellikerstraße 6,  
97070 Würzburg, Tel.: (+49) 931/31-  
82707

**09.09.18 - 14.09.18**

*"ICUIL2018 Conference"* in Lindau

**Organiser:** Professor Dr. Christian  
Spielmann, Friedrich-Schiller-  
Universität Jena, Institut für Optik und  
Quantenelektronik, Max-Wien-Platz 1,  
07743 Jena, Tel.: (+49) 3641/947-230,  
Externer Link [http://www.icuil.org/icuil-  
2018-conference-in-lindau-germany](http://www.icuil.org/icuil-2018-conference-in-lindau-germany)

**09.09.18 - 13.09.18**

*"15<sup>th</sup> International Meet of the  
European Calcium Society "Calcium  
2018"* in Hamburg

**Organiser:** Professor Dr. Andreas H.  
Guse, Universität Hamburg, Institut  
für Biochemie und  
Signaltransduktion, Martinstraße 52,  
20251 Hamburg,

**10.09.18 - 12.09.18**

*"26. Lecture Conference on  
Photochemistry"* in Garching near  
Munich

**Organiser:** Professor Dr. Thorsten  
Bach, Technische Universität München  
(TUM), Lehrstuhl für Organische



Chemie I, Lichtenbergstraße 4,  
85748 Garching, Tel.: (+49) 89/289-  
13330

### 10.09.18 - 12.09.18

*"9th European Silicon Days 2018"* in  
Saarbrücken

**Organiser:** Dr. André Schäfer,  
Universität des Saarlandes, Lehrstuhl  
für Anorganische Festkörperchemie,  
Postfach 15 11 50, 66041  
Saarbrücken, Tel.: (+49) 681/302-  
70668, Externer  
Link<http://www.9esd.de/>

### 10.09.18 - 13.09.18

*"CoSeRa 2018 Workshop on  
Compressed Sensing Theory and its  
Applications to Radar, Multimodal  
Sensing and Imaging"* in Siegen

**Organiser:** Professor Dr.-Ing. Otmar  
Loffeld, Universität Siegen, Zentrum  
für Sensorsysteme (ZESS), Paul-  
Bonatz-Straße 9-11, 57076 Siegen,  
Tel.: (+49) 271/7403125

### 10.09.18 - 15.09.18

*"111. Annual Meet of German  
Zoological Society (DZG)"* in  
Greifswald

**Organiser:** Professor Dr. Jan-Peter  
Hildebrandt, Universität Greifswald,  
Lehrstuhl für Physiologie und  
Biochemie der Tiere, Johann-

Sebastian-Bach-Straße 11/12,  
17489 Greifswald, Tel.: (+49)  
3834/864295, Externer  
Link[http://https://dzg-  
meeting.de/de/home/](http://https://dzg-meeting.de/de/home/)

### 12.09.18 - 14.09.18

*"Kieler Symposium on Discrete  
Algorithms and their Applications in  
Marine- and Life Sciences (Meeres- und  
Lebenswissenschaften) -- an Indian-  
German Perspective"* in Kiel

**Organiser:** Professor Dr. Anand  
Srivastav, Christian-Albrechts-  
Universität zu Kiel, Arbeitsgruppe  
Diskrete Optimierung, Christan-  
Albrechts-Platz 4, 24118 Kiel, Tel.:  
(+49) 431/8801172

### 13.09.18 - 15.09.18

*"StressNet - Scientific workshop on  
models and databanks for multiple  
stressors"* in Landau

**Organiser:** Professor Dr. Ralf B.  
Schäfer, Universität Koblenz-Landau,  
Institut für Umweltwissenschaften,  
Fortstraße 7, 76829 Landau, Tel.: (+49)  
6341/280-31536 Externer

Link[http://www.landscapeecology.uni-  
landau.de](http://www.landscapeecology.uni-landau.de)

### 14.09.18 - 14.09.18

*"9th Annual Scientific Symposium on  
Ultrahigh Field Magnetic Resonance:*

*Clinical Needs, Research Promises and Technical Solutions”* in Berlin

**Organiser:** Professor Dr. Thoralf Niendorf, Max-Delbrück-Centrum für Molekulare Medizin (MDC) in der Helmholtz-Gemeinschaft,

Forschungsgruppe Experimentelle Ultrahochfeld-MR, Robert-Rössle-Straße 10, 13125 Berlin, Tel.: (+49) 30/9406-4504

Externer Link <http://www.uhf-mr.de>

#### **14.09.18 - 15.09.18**

*“Constructon of a retina out of stemcells: Basics, human organoids and cholinerge effects”* in Darmstadt

**Organiser:** Professor Dr. Bodo Laube, Technische Universität Darmstadt, Arbeitsgruppe

Neurophysiology and Neurosensory Systems, Schnittspahnstraße 3, 64287 Darmstadt, Tel.: (+49) 6151/1620970

#### **14.09.18 - 15.09.18**

*“Luxemburg-German-Indian Consortium for the Research on neurodegenerative diseases and their therapy”* in Tübingen

**Organiser:** Dr. Manu Sharma, Eberhard Karls Universität Tübingen, Institut für Klinische Epidemiologie und angewandte Biometrie, Silcherstraße 5, 72076 Tübingen, Tel.: (+49) 7071/29 81968

## **INFORMATION & COMMUNICATION TECHNOLOGY**

### **BIH COOPERATES WITH STARTUPBOOTCAMP DIGITAL HEALTH BERLIN**

*Berlin Institute of Health (BIH) Press news, 25 July 2018*

After a successful cooperation in 2017, the Berlin Institute of Health (BIH) is working together with the accelerator program Startupbootcamp Digital Health Berlin again this year. The program supports ten international start-ups annually. The aim is to promote innovations in the field of digital medicine and to make them more easily accessible for patients. Last Friday the participating start-ups were announced in Berlin.

Startupbootcamp Digital Health is with more than 400 mentors from the health industry one of the largest Startup Accelerator programs in Europe. In addition to Berlin, the program is also implemented in Miami, USA, Chengdu and China. During the early-stage of their development, the digital health start-ups will get hands-on mentoring for the development of their products and services based on digital technologies for improved health care. In addition to BIH, Boehringer Ingelheim, Deutsche Apotheker- und Ärztebank, Dentons, Munich Re, Sanofi and Vilva support the program.

Contact: Berliner Institut für Gesundheitsforschung/Berlin Institute of Health (BIH), Anna-Louisa-Karsch-Str. 2, 10178 Berlin, Tel: +49 30 450 543 049

## **MAGNETIC ANTIPARTICLES OFFER NEW HORIZONS FOR INFORMATION TECHNOLOGIES**

Johannes Gutenberg University Mainz  
Press news, 20 August 2018

Computer simulations reveal new behavior of antiskyrmions in gradually increased electric currents.

Nanosized magnetic particles called skyrmions are considered highly promising candidates for new data storage and information technologies. Now, physicists have revealed new behavior involving the antiparticle equivalent of skyrmions in a ferromagnetic material. The researchers demonstrated their findings using advanced computer simulations that can accurately model magnetic properties of nanometer-thick materials. The results, which were obtained by scientists at Uppsala University in Sweden, at Kiel University and Johannes Gutenberg University Mainz in Germany, and at Université Paris-Saclay in France, were recently published in *Nature Electronics*.

Moving electrons around in circuits is the basis for creating useful functions in electronics. But would their guiding principles still apply for positrons, i.e., the antiparticle

version of electrons? Besides their scarcity in nature, basic electrodynamics suggests that everything would essentially function the same way with positive charges as it does with the negative ones of electrons – up to a difference in sign, since electrons and positrons move in opposite directions in electromagnetic fields.

However, this question remains open for nanoscale magnetic particles called skyrmions. Skyrmions represent whirls of magnetic moments that extend across a few nanometers and can be found in magnetic films a few atoms thick. In the same way that spheres and doughnuts have different topologies, skyrmions possess a special property called topological charge which plays a similar role to electric charges when their dynamics are concerned. For example, if an applied force causes skyrmions to be deflected toward the left, then that same force will lead antiskyrmions, their antiparticle counterpart, to deflect toward the right. Since the first experimental observations in 2009, skyrmions have been the focus of intense research because they offer new ways to store data and process information.

Contact: Dr. Bertrand Dupé, Institut of Physics, Johannes Gutenberg University Mainz, 55099 Mainz, Tel.: 06131 39-25921

## **NEW EXPERTISE IN ARTIFICIAL INTELLIGENCE**

*Bernstein Network Computational Neuroscience Press news, 25 July 2018*

At the University of Tübingen five more professors are investigating Machine Learning from a wide variety of perspectives. The University of Tübingen is extending its expertise in artificial intelligence: the university appointed five new professors all active in the field of machine learning. Anna Levina investigates the organization of neuronal processes and develops methods to test their computing capacities.

At the Faculty of Medicine, Philipp Berens is working on implementing machine learning algorithms into clinical diagnostics with a special focus on degenerative eye diseases. Together with Anna Levina and Philipp Berens, both active members of the Bernstein Network Computational Neuroscience, the University of Tübingen appointed Andreas Geiger, Philipp Hennig and Michael Krone.

*Contact: Eberhard Karls Universität Tübingen, Geschwister-Scholl-Platz, 72074 Tübingen, Tel: +49 7071 29-0*

## **MEDICAL SCIENCES & HEALTH**

### **ALZHEIMER'S DISEASE AND DIABETES: HOPE FOR INHIBITORS AGAINST AMYLOID PLAQUES**

*Technical University Munich Press news, 8 August 2018*

Designed peptides as potential inhibitors of amyloid plaques.

Effective therapeutics to counteract the formation of amyloid plaques in Alzheimer's disease and type 2 diabetes are not yet available. Scientists at the Technical University of Munich (TUM) have now come a little bit closer to a solution: They have described a new class of designed macrocyclic peptides that are highly potent inhibitors of amyloid formation.

Amyloid plaques, which are protein deposits, play a crucial role in the development of Alzheimer's disease and type 2 diabetes. Several teams of scientists around the world are working on finding ways to prevent amyloid plaque formation in the human brain.

The research team of Aphrodite Kapurniotu, Professor for Peptide Biochemistry (TUM) has been working on an idea for some time now in collaboration with the teams of

Professor Martin Zacharias (TUM), Professor Gerhard Rammes (TUM Rechts der Isar Hospital) and Professor Jürgen Bernhagen (Institute for Stroke and Dementia Research (ISD) at Ludwig Maximilian University (LMU)). The researchers present now macrocyclic peptides (MCIPs) as potent inhibitors of amyloid formation; they reported their results in the journal "Angewandte Chemie".

*Contact: Prof. Dr. Aphrodite Kapurniotu, Technical University of Munich Division of Peptide Biochemistry, Tel: 0049/8161/713542*

## **POSSIBLE TREATMENT FOR CHARCOT-MARIE-TOOTH DISEASE DISCOVERED**

*MPI Press news, 9 August 2018*

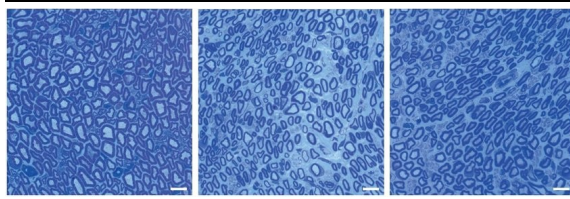
The dietary supplement Lecithin improves the myelination of diseased Schwann cells.

Charcot-Marie-Tooth disease is the most common hereditary neuropathy and affects more than two million people worldwide. Researchers at the Max-Planck-Institute for Experimental Medicine and the University Medical Center of Göttingen now hope to use lecithin, a harmless dietary supplement to treat the incurable illness.

In Germany alone, at least 30,000 people suffer from Charcot-Marie-Tooth neuropathy, which belongs to

the class of rare diseases. Due to a genetic defect that causes a duplication of the PMP22 gene, patients develop a slowly progressive impairment of their peripheral nerves. Early symptoms, like walking difficulties or deformed feet can already occur during childhood. Later, muscle weakness in legs and arms occurs, but also numbness, prickling or pain. In rare cases, patients may be forced to use wheelchairs.

The axons, projections of nerve cells in the peripheral nervous system, are surrounded by supporting cells over their entire length. These Schwann cells produce a fatty layer, the myelin, around the axons, which allows for a faster transfer of electric signals. Using genetically modified rats, scientists at the Max-Planck-Institute for Experimental Medicine, the University Medical Center in Göttingen, as well as neuroscientists from Leipzig, Würzburg, Heidelberg and Aachen now discovered that diseased Schwann cells show a decreased fat metabolism during their development which causes the impaired myelination. "The production of myelin is extremely laborious for Schwann cells. A disruption, like the one the Charcot-Marie-Tooth disease causes, leaves the nerve fibers without myelin, which limits their functionality," explains Robert Fledrich, the first author of the study.



Compared to healthy rats (left), rats with the Charcot-Marie-Tooth disease (central) show less myelin surrounding the axons, visible as missing blue rings. Animals treated with Lecithin (right) show an increase in myelinated filaments.

© Max-Planck-Institute for Experimental Medicine

Contact: Dr. Robert Fledrich, Max Planck Institute for Experimental Medicine, Göttingen, Tel+49 341 97150-37

## **SURFACE ACOUSTIC WAVES ORCHESTRATE NEURONAL NETWORKS**

*nim - nano initiative munich Press news, 7 August 2018*

Biophysicists from Augsburg and Santa Barbara report in *Physical Review E* on the first successful outcome in the targeted dynamic positioning of nerve cells on a chip. The proven Augsburg surface acoustic wave technology now opens up new ways of understanding and influencing neuronal networks.

The junior research group led by biophysicist Dr Christoph Westerhausen at the Chair of Experimental Physics I at the University of Augsburg, in cooperation with colleagues from the University of California at Santa

Barbara, has succeeded for the first time, using surface acoustic waves (sound waves induced by high-frequency signals which propagate on the surface of chips), in the targeted positioning of live neuronal cells on a biochip at periodic intervals and even in influencing the growth of the neuronal cells. "This is an important step towards so-called brain-on-a-chip systems and could fundamentally contribute to understanding the processes in the human brain," says Professor Achim Wixforth.

Contact: Dr Christoph Westerhausen, Lehrstuhl für Experimentalphysik I, Universität Augsburg, Universitätsstraße 1, 86159 Augsburg, Tel: +49 821 598 - 3311, [www.physik.uni-augsburg.de/exp1/mitarbeiter/02\\_seniors/westerhausen\\_christoph/](http://www.physik.uni-augsburg.de/exp1/mitarbeiter/02_seniors/westerhausen_christoph/)

## **RESEARCH FOR A HEALTHY NUTRITION**

*Technical University Munich Press news, 25 July 2018*

Else Kröner-Fresenius Foundation supports TUM with another five million euros.

Once again, the Else Kröner-Fresenius Foundation is funding nutritional medicine research at the Technical University of Munich (TUM) with five million euros. The well-established Else Kröner-Fresenius Center of the TUM is to investigate current issues of nutritional medicine in-depth and provide the public with practical

information about nutrition.

Whether someone will develop type 2 diabetes, cardiovascular disease or certain forms of cancer over the course of their life depends largely on their lifestyle and diet. However, the precise correlations between nutrition and disease are far from being fully clarified. Therefore, in the next five years TUM's Else Kröner-Fresenius Center will break new ground in the field of communication about nutrition, by, among other things, preparing well-founded scientific information about nutrition for the population.

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## **A JOURNEY THROUGH THE HISTORY OF MICROSCOPY - NEW EXHIBITION OPENS AT THE MDC**

*Max Delbrück Centre for Molecular Medicine, Berlin-Buch (MDC) Press news, 26 July 2018*

A permanent medical history exhibition at the Berlin-based Max Delbrück Centre for Molecular Medicine (MDC) impressively shows that microscopes have always been part of medical advances. Manufacturers and scientists in Berlin and Brandenburg have played a key role in this success story. The

future of medicine is also linked to the microscope.

Progress in medicine and science would be unthinkable without microscopes. Today, structures can be visualized to the millionth of a millimeter, and living cell processes can be studied in fascinating detail. Based on historical microscopes from Berlin and Brandenburg, an exhibition at the MDC shows the path that has led to this point, demonstrating the enormous power of modern microscopes and their significance for medical research, both now and in the future.

On July 25, 2018, the permanent exhibition "Invisible - Visible - Transparent" officially opened at the MDC with a lecture event. The exhibition encompasses various objects, including some 30 historical microscopes from historic factories in Berlin and Brandenburg. These were assembled by Prof. Helmut Kettenmann, a neuroscientist at the MDC. He collected the historically significant microscopes and designed the exhibition, which bridges 19th century to present-day microscopy.

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## **CAN RADAR REPLACE STETHOSCOPES ?**

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*Friedrich-Alexander-Universität  
Erlangen-Nürnberg Press news, 14  
August 2018*

FAU researchers develop procedure for touch-free monitoring of heart sounds.

In conjunction with researchers at Brandenburg University of Technology (BTU) in Cottbus and the Department of Palliative Medicine at Universitätsklinikum Erlangen, electronic engineers at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) have developed a procedure for reliably detecting and diagnosing heart sounds using radar. In future, mobile radar devices could replace conventional stethoscopes and permanent touch-free monitoring of patients' vital functions could be possible using stationary radar devices.

Along with a white coat, a stethoscope is the hallmark of doctors everywhere. Stethoscopes are used to diagnose the noises produced by the heart and lungs. Used in the conventional way, vibrations from the surface of the body are transmitted to a membrane in the chest-piece and then to the user's eardrum where they are perceived as sounds. Acoustic stethoscopes are comparatively inexpensive and have been used reliably for several decades, but they

have one drawback. The diagnosis of heart murmurs, such as the assessment of heart valve function, is carried out subjectively and is directly dependent on the experience of the doctor conducting the examination.

In a joint project funded by the Federal Ministry of Education and Research, FAU researchers at the Institute of Electronics Engineering (LTE) have now developed a procedure that could eventually replace conventional phonocardiology. Using a six-port continuous wave radar system, they measured the vibrations on the skin caused by the heartbeat. 'In principle, we're using a similar method to detecting speed in road traffic,' explains Christoph Will, a doctoral candidate at LTE. 'During this process, a radar wave is aimed at the surface of an object and reflected. If the object moves, the phase of the reflecting wave changes. This is used to calculate the strength and frequency of the movement - of the chest in our case.' In contrast to radar systems for traffic monitoring, the biomedical radar system can detect changes in movement that measure a few micrometres, which is an important prerequisite to diagnosing even the smallest anomalies such as insufficiency, stenoses or heart valves that do not close properly.

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## **MICROBIAL COMPOSITION INFLUENCES GENES LINKED TO SKIN BARRIER MAINTENANCE**

*Technical University Munich Press news,  
14 August 2018*

Atopic eczema: staphylococci dominant bacterial species.

Certain bacteria occur frequently and foremost on the skin of people with atopic dermatitis, and it is known that this disease seriously compromises the skin's barrier function. Researchers from the Technical University of Munich (TUM) and Helmholtz Zentrum München have now discovered how the two facts become correlated. Their study results are accessible via the 'Journal of Allergy and Clinical Immunology'.

Modern Medicine considers atopic dermatitis or atopic eczema as the portal of entry for allergies because sensitization and manifest allergy often develop in consequence to a damaged skin barrier. "Recent studies have shown that the bacterial composition of the skin influences the inflammatory process in atopic dermatitis," explains Dr. Matthias Reiger. He is co-author of the recently published paper and a member of the research team headed by Professor Claudia Traidl-Hoffmann, Institute Director and

Professor for Environmental Medicine at TUM and Helmholtz Zentrum München. "Moreover, the research into the cellular system of the skin barrier led to new findings on the function of specific genes responsible for maintaining a healthy skin."

In their study, the scientists wanted to find out what possible correlations exist between bacteria and those genes that maintain the skin barrier.

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## **RESEARCHERS DISCOVER SYSTEM THAT REDUCES NEURODEGENERATION IN HUNTINGTON'S DISEASE**

*University of Cologne Press news, 26 July  
2018*

Mechanism that could reduce the toxic aggregation of huntington protein discovered / new therapies possible in the long run.

The neuroscientist Dr David Vilchez and his team at CECAD, the University of Cologne's Cluster of Excellence for Aging Research, have made an important step towards understanding the mechanisms that cause the neurodegenerative disorder Huntington's disease. Particularly, they identified a system blocking the accumulation of toxin protein

aggregates, which are responsible for neurodegeneration.

Huntington's disease is a neurodegenerative disorder that results in the death of brain cells, leading to uncontrolled body movement, loss of speech and psychosis. Mutations in the huntingtin gene cause the disease, resulting in the toxic aggregation of the huntingtin protein. The accumulation of these aggregates causes neurodegeneration and usually leads to the patient's death within twenty years after the onset of the disease.

To examine the mechanisms underlying Huntington's disease, Vilchez and his team used so-called induced pluripotent stem cells (iPSC) from Huntington's disease patients, which are able to differentiate into any cell type, such as neurons. Induced pluripotent stem cells derived from patients with Huntington's disease exhibit a striking ability to avoid the accumulation of toxic protein aggregates, a hallmark of the disease. Even though iPSCs express the mutant gene responsible for Huntington's disease, no aggregates were found.

The researchers identified a protein called UBR5 as a protective mechanism for the cells, promoting

the degradation of mutant huntingtin. These findings can contribute to a better understanding of Huntington's disease and could be a step stone to developing further treatment in patients.

CECAD is the Cluster of Excellence at the University of Cologne and Cologne University Hospital conducting research on diseases associated with aging.

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## **DISRUPTED TRANSPORT ROUTES IN NERVE CELLS ARE A CAUSE OF PARKINSON'S DISEASE**

*Friedrich-Alexander University Erlangen-Nürnberg Press news, 26 July 2018*

'Traffic jams' can also occur in the brain and they can be damaging. Researchers at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) have been able to confirm that this is the case. They have been able to prove that disrupted transportation routes in nerve cells are a significant cause of Parkinson's disease.

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## **DO BACTERIA AFFECT THE SKIN BARRIER IN A TOPIC ECZEMA ?**

*Helmholtz Zentrum München - German Research Center for Environmental Health Press news, 14 August 2018*

Certain bacteria occur frequently and foremost on the skin of people with atopic dermatitis, and it is known that this disease seriously compromises the skin's barrier function. Researchers from the Helmholtz Zentrum München and the Technical University of Munich have now discovered how the two facts become correlated. Their study results are accessible via the 'Journal of Allergy and Clinical Immunology'.

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## JOINING FORCES FOR IMMUNE RESEARCH

German Cancer Research Centre (DKFZ)  
Press news, 14 August 2018

The initiative "Immunology & Inflammation" unifies efforts in immunological research within the Helmholtz Association. 23 working groups from five Helmholtz Centers are joining forces to address some of the most complex problems in today's immunology in ways that can only be explored in collaboration.

"What we have learned about the immune system and its role in many widespread diseases over the last ten years opens up countless perspectives for research," says Professor Martin Lohse, Scientific Director of the Max Delbrück Center for Molecular Medicine (MDC), the center that coordinates the initiative.

"Our initiative's projects combine the centers' research topics," says Professor Pierluigi Nicotera, Vice-President of the Helmholtz Association and Coordinator of the Field of Health Research. "They address key questions such as: How do the immune and nervous systems interact? How does the microenvironment of tissue influence the development of immune cells and what consequences does it

have for cancer? How do we use this knowledge for therapies?"

Scientists working in more than 20 projects address these and other questions. Six of those are designed as tandem projects, which are special cooperative ventures involving teams from different centers. Additionally, researchers will meet and exchange knowledge in regularly. The first "Immunology & Inflammation" Conference will take place 24th-26th February 2019 in Berlin, and will host world-leading scientists as speakers.

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## LASER TECHNOLOGY & APPLICATIONS

### A NOVEL SYNTHETIC ANTIBODY ENABLES CONDITIONAL "PROTEIN KNOCKDOWN" IN VERTEBRATES

Technical University Dresden Press news, 20 August 2018

The research groups led by Dr. Jörg

Mansfeld of the Biotechnology Center of the TU Dresden (BIOTEC) and Dr. Caren Norden of the Max Planck Institute for Molecular Cell Biology and Genetics (MPI-CBG) have developed a novel synthetic antibody that paves the way for an improved functional analysis of proteins. They combined auxin-inducible "protein knockdown" with a synthetic antibody to not only observe fluorescent proteins in living cells but also to rapidly remove them in a temporally controlled manner.

Perhaps the most important basic component of all cells are proteins that perform a wide variety of functions in cells and tissues. In order to clarify the physiological roles of proteins, they are often linked to a green fluorescent protein (GFP) via targeted genetic manipulation, which makes them visible under the microscope. The observation of such GFP-linked proteins in living cells allows initial conclusions about the function of the protein. However, the exact function of a protein can often only be determined when the protein is removed and the resulting consequences become visible in cells, tissues or model organisms.

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## NATURAL SCIENCES

### HYBRIDISATION EVOLUTION

*University of Konstanz Press news, 9 August 2018*

International collaboration involving researchers from the University of Konstanz sheds new light on animal speciation.

Animals that have either migrated to or been introduced in Central Europe – such as the Asian bush mosquito or the Asian ladybeetle – feel extremely comfortable in their new homes due to changing climatic conditions. If these newcomers are genetically compatible with local species, they may crossbreed and produce hybrids, which can continue to evolve under local environmental conditions – a process that has been shown to have taken place during human evolution, between *Homo sapiens* and Neanderthals for example. New genes contributed by foreign species provide new genetic combinations that can be beneficial and are thus favoured by natural selection. According to hybrid swarm theory, interbreeding between hybrid species and parent species may then lead to divergent populations and even to new species with novel characteristics. But how can modern day science substantiate this theory

### BOOSTS

and identify fundamental mechanisms behind such speciation?

*Contact: University of Konstanz, Communications and Marketing, 78457 Konstanz, Tel: +49 7531 88-3603*

### PERILOUS PUDDLES

*MPI for Evolutionary Biology Press news, 10 July 2018*

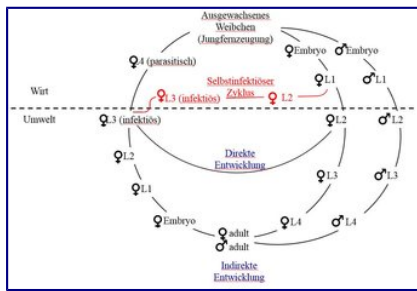
Admittedly, the research subject isn't particularly appetizing: *Strongyloides stercoralis* – small parasitic worms that live in their host's intestines and have the potential to cause severe problems. Nevertheless, Adrian Streit from the Max Planck Institute for Developmental Biology in Tübingen is fascinated by this threadworm. It has a unique life cycle, and to this day, no one really understands why

Referring to nematodes as unusual is almost an understatement, as strange behavior is completely normal for them. *Pristionchus pacificus*, which lives, among other places, on the Pacific island of La Réunion, seeks out a beetle larva, climbs up onto it and then stops developing. As soon as the beetle dies, the worm continues its development, gorges itself on the carcass and multiplies (*MaxPlanckResearch 2/2014*).

But compared with *Strongyloides*, that's almost boringly conventional. At the Max Planck Institute for Developmental Biology, Adrian Streit explores how this worm can survive in

two worlds. Between parasitic generations, *Strongyloides* can also form free-living generations. Parasites are exclusively females that multiply in the host's intestines by parthenogenesis. "They produce both male and female eggs, which are excreted with the feces," explains Streit. "Either infectious larvae develop from the female eggs, which then immediately crawl back into the host, or free-living worms that mate with males are produced."

*Parasitic females*



*Strongyloides stercoralis* life cycle: In a host, all worms are female. They produce female and male progeny by parthenogenesis (L1 to L4: larval stages 1 to 4). Females can enter one of three cycles: direct, indirect or auto-infectious. In the latter, the host is reinfected by parasites already present in the body. Males, in contrast, live exclusively in the indirect cycle and are free-living. All progeny from the indirect cycle are female and become parasites.

© MPI for Evolutionary Biology

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**HOW IONS GATHER WATER MOLECULES AROUND THEM**

Ruhr University, Bochum Press news, 10 August 2018

Seemingly simple questions about the hydration shell of charged particles remained unanswered for a long time. Until this new analysis arrived.

Charged particles in aqueous solutions are always surrounded by a shell of water molecules. However, much is still unknown about the nature of this so-called hydration shell. Using spectroscopic methods developed in-house, chemists from the Excellence Cluster Ruhr Explores Solvation have gained new insights into how an ion affects the water molecules in its environment. The team succeeded in determining the number of water molecules in different hydration shells.

Prof Dr Martina Havenith, Dr Gerhard Schwaab and Dr Federico Sebastiani provide an overview of the results of the experiments in the journal *Angewandte Chemie* in July 2018.

Using terahertz spectroscopy, the team investigated 37 different salts consisting of positively and negatively charged ions in aqueous solution. The result: the hydration shells of the different ions contain between two and 21 water molecules. The exact number depends, for instance, on the size of the ion and its valency.

However, the Bochum group not only dealt with individual ions, but also with ion pairs. These can either have a common hydration shell or separate shells around the positively and negatively charged ion. "In order to know how many water molecules surround an iron chloride, it is not enough to know how many water molecules are affected by a single chloride ion and how many by a single iron ion", explains Havenith. This is not a simple additive process.

"In general, our results clearly show that cooperative effects rather than individual ion properties are decisive", sums up the researcher. How an ion affects the water molecules in its environment depends on several ion properties.

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## CHEMISTS PRESENT NEW REACTION PATH

University of Münster Press news, 8 August 2018

Symmetrical cleavage of disulphides is fast and biocompatible.

A team of researchers led by Prof. Frank Glorius and Michael Teders from the University of Münster and by Prof. Dirk Guldi from the University of Erlangen-Nuremberg have presented a new chemical

reaction path which may prove to be of interest both for research and for the production of active ingredients in medicines. The new reaction leads to a splitting of bonds between two sulphur atoms. The chemists use a light-driven catalysis method (photocatalysis) to enable it.



The team of researchers led by Frank Glorius uses photocatalysts and visible light for the selective cleavage of sulphur-sulphur bonds. The colour of the reaction mixture after the reaction can give a first indication of the products formed (the photo shows a plate with different reaction mixtures).

© WWU/Michael Teders

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## HOMO SAPIENS' SECRET OF SUCCESS

Max Planck Institute for the Science of Human History Press news, 1 August 2018

As global "generalist specialists", modern humans differed fundamentally from other hominids.

A new study argues that the greatest defining feature of our species is not 'symbolism' or dramatic cognitive change, but rather its unique ecological position as a global 'general

specialist'. Our species' ability to occupy diverse and 'extreme' settings around the world stands in stark contrast to the ecological adaptations of other hominin taxa, and may explain how our species became the last surviving hominin on the planet.



*Our species is ecologically unique in its ability to occupy, and specialize in, a variety of different environments as homo sapiens began to colonize the entire planet between approximately 300 and 60 thousand years ago.*

© Image by John Klausmeyer, concept by Brian Stewart, University of Michigan. Aerial view of reindeer herd from zanskar / iStock.

The paper, by scientists from the Max Planck Institute for the Science of Human History and the University of Michigan suggests investigations into what it means to be human should shift from attempts to uncover the earliest material traces of 'art', 'language', or technological 'complexity' towards understanding what makes our species ecologically unique. In contrast to our ancestors

and contemporary relatives, our species not only colonized a diversity of challenging environments, including deserts, tropical rainforests, high altitude settings, and the palaeoartic, but also specialized in its adaptation to some of these extremes.

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### **A NOVEL SYNTHETIC ANTIBODY ENABLES CONDITIONAL „PROTEIN KNOCKDOWN“ IN VERTEBRATES**

Technical University Dresden Press news, 17 August 2018

The research groups led by Dr. Jörg Mansfeld of the Biotechnology Center of the TU Dresden (BIOTEC) and Dr. Caren Norden of the Max Planck Institute for Molecular Cell Biology and Genetics (MPI-CBG) have developed a novel synthetic antibody that paves the way for an improved functional analysis of proteins. They combined auxin-inducible "protein knockdown" with a synthetic antibody to not only observe fluorescent proteins in living cells but also to rapidly remove them in a temporally controlled manner.

Perhaps the most important basic component of all cells are proteins that perform a wide variety of functions in cells and tissues. In order to clarify the physiological roles of proteins, they are often linked to a green fluorescent protein (GFP) via targeted genetic



manipulation, which makes them visible under the microscope. The observation of such GFP-linked proteins in living cells allows initial conclusions about the function of the protein. However, the exact function of a protein can often only be determined when the protein is removed and the resulting consequences become visible in cells, tissues or model organisms.

This is usually achieved by knockout of the protein on the genetic level. However, the functions of essential proteins cannot be examined in this way, because the cell or the model organism would not be viable. Instead, an approach is needed that allows removing proteins from cells only at a specific time. Such a targeted temporary degradation of proteins occurs naturally in plants and is mediated by the plant hormone auxin. After genetic manipulation, the underlying mechanism can also be applied to animal and human cells.

Dr. Jörg Mansfeld's research group has developed a novel AID-nanobody in order to not only observe GFP-linked proteins in living cells, but to also rapidly degrade them in a targeted manner for functional analysis. For this purpose, the auxin recognition sequence (AID) was linked to a GFP recognizing antibody

that is structurally-related to camelid antibodies (nanobody). It could be shown that this so-called AID-nanobody allows the almost complete degradation of GFP-linked proteins in human cell culture after the addition of auxin. The possibility to follow the degradation of the protein "live" under the microscope makes functional analysis much easier.

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## MICRO & NANOTECHNOLOGY

### SMART LIGHT SYSTEMS FOR WOUND HEALING: BLUE-LIGHT TREATMENT FOR CHRONIC WOUNDS

*IVAM Microtechnology Network Press news, 9 August 2018*

Within the framework of the European project MEDILIGHT, CSEM and six partners have developed a new solution for treating chronic wounds. A portable device uses blue light to improve and accelerate the healing process. The prototype was presented at the final project event on July 2, 2018 at the URGO laboratories in Dijon.

Chronic wounds are notoriously challenging to treat, because they do not follow the typical healing process or time-frame. The resulting burden is

significant, affecting over 40 million patients and costing healthcare systems €40 billion annually. Blue light is already known for its anti-microbial and anti-inflammatory effects in the initial stages of the healing process; it does not damage tissue, contrary to hazardous UV light. However, clear evidence of the beneficial effects of blue-light irradiation in the later stages of wound healing was still missing, thus hindering the development of effective solutions for complete therapy.

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## **WORLD RECORD: FASTEST 3D TOMOGRAPHIC IMAGES AT BESSY II**

*Helmholtz Centre Berlin for Materials and Energy Press news, 9 August 2018*

An HZB team has developed an ingenious precision rotary table at the EDDI beamline at BESSY II and combined it with particularly fast optics. This enabled them to document the formation of pores in grains of metal during foaming processes at 25 tomographic images per second - a world record.

The quality of materials often depends on the manufacturing process. In casting and welding, for

example, the rate at which melts solidify and the resulting microstructure of the alloy is important. With metallic foams as well, it depends on exactly how the foaming process takes place. To understand these processes fully requires fast sensing capability. The fastest 3D tomographic images to date have now been achieved at the BESSY II X-ray source operated by the Helmholtz-Zentrum Berlin.

Dr. Francisco Garcia-Moreno and his team have designed a turntable that rotates ultra-stably about its axis at a constant rotational speed. This really depends on the highest precision: Any tumbling around the rotation axis or even minimal deviations in the rotation speed would prevent the reliable calculation of the 3D tomography. While commercially available solutions costing several hundred thousand euros allow up to 20 tomographic images per second, the Berlin physicists were able to develop a significantly cheaper solution that is even faster. "My two doctoral students at the Technische Universität Berlin produced the specimen holders themselves on the lathe", says Garcia-Moreno, who not only enjoys working out solutions to tricky technical problems, but possesses a lot of craftsman skill himself as well. Additional components were produced

in the HZB workshop.

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### **TOURING IPP'S FUSION DEVICES PER VIRTUAL-REALITY VIEWER**

*Max-Planck Institute for Plasmaphysics  
Press news, 8 August 2018*

ASDEX Upgrade and Wendelstein 7-X – as if you were there / 360° view of fusion research.

You seem to be standing in the plasma vessel looking around: Where otherwise plasmas with temperatures of several million degrees are being investigated, with a virtual-reality viewer you can now roam around there.

The viewer gives access at any time to the plasma vessel of the ASDEX Upgrade fusion device at Max Planck Institute for Plasma Physics (IPP) in Garching, upstairs, downstairs and in the control room. The plasma vessel of IPP's Wendelstein 7-X device at Greifswald is likewise always open for a virtual visit, as well as the experimentation hall and the facilities for microwave heating.

Here's the way to ASDEX Upgrade and Wendelstein 7-X:  
[www.sonnenmaschine-vr.de](http://www.sonnenmaschine-vr.de) and  
[www.sternenmaschine-vr.de](http://www.sternenmaschine-vr.de)

A virtual-reality viewer or a VR headset provides virtual access by smartphone (with gyro function and

acceleration sensor) or directly on the screen of a PC or tablet, depending on the type of viewer used\*. And here's how it works: Select the web address of the device wanted and click there the viewer symbol to select the virtual-reality mode. The screen then splits in two, one bit for each eye, thus providing a spatial image. Now put on the headset or attach the smartphone to the viewer and then you can look in any direction. The VR Setup link on the split screen adapts the image to the smartphone or headset used. Selector switches put you through to the various sites.

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### **OCEAN TECHNOLOGY, MARINE & GEOLOGICAL SCIENCES**

#### **QUESTIONING CONVENTIONAL UNDERSTANDING OF ANTIFREEZE PROTEINS**

*Alfred Wegener Institute Press news, 30  
July 2018*

Scientists describe new phenomenon possibly expanding application.

Scientists have discovered that an ice-binding protein (fcIBP) from the sea ice microalga does not fit in the conventional classification of ice-binding proteins, suggesting unknown mechanisms behind its antifreeze property. This finding could lead to a

broader application of the antifreeze protein in food and medical industries.

Organisms living in cold zones produce ice-binding (antifreeze) proteins to prevent themselves from freezing to death. Such proteins have been classified in two groups; the hyperactive type attaches to the hexagonal basal faces of ice crystals to inhibit ice crystal growth and lowers the freezing temperature by up to six degrees C while the moderate type does not attach to the basal faces and lowers the freezing temperature by not more than 1 degree C.

“Many studies on ice-binding proteins have centered on biochemical perspectives, but these proteins have only recently been researched from the viewpoint of crystal growth physics,” says Professor Gen Sasaki of the research team at Hokkaido University.

The researchers used their original chamber developed at Hokkaido University’s Institute of Low Temperature Science, that allowed them to observe in detail the growth of ice crystals in water. The morphology of ice crystals to which fclBP had attached was observed under microscopes and their growth rates were precisely measured.



*A pure ice crystal, Copyright: Alfred Wegener Institute*

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## **MARINE LITTER IN REMOTE REGIONS OF THE OCEANS**

*GEOMAR Helmholtz Centre for Ocean Research Kiel Press news, 13 August 2018*

Chilean-German researchers show impressive effects on the marine ecosystem.

The Easter Island in the South Pacific is one of the most remote regions of our planet. Although thousands of miles away from the continents, the waste of human civilization in the form of plastic can be detected here as well as in the entire South Pacific. In a review paper published in the journal *Frontiers in Marine Science*, a Chilean-German research team impressively demonstrates the extent of the pollution and the impact on the marine ecosystem.

Since several decades, plastics dominate many product and packaging sectors. Unfortunately, more and more

of these very durable products are polluting our oceans. Due to the drift with ocean currents they reach the remotest areas of our planet. There, the litter is ingested by many marine organisms as impressive images of a scientific study show which have now been published in the scientific journal *Frontiers in Marine Science*.

The researchers from various institutions in Chile, including the Millennium Nucleus ESMOI (Ecology and Sustainable Management of Oceanic Islands) and from the GEOMAR Helmholtz Centre for Ocean Research Kiel have taken water samples and documented that nearly 100 different species are affected by plastic pollution in the South Pacific between the Easter Island and South America.

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## **“BRANDENBURG“ IS A HUB OF CUTTING-EDGE SCIENCE**

*German Research Centre for Geosciences Press news, 15 August 2018*

The twin satellites of the GRACE Follow-On mission, launched into Earth orbit in May, „showcase the long-term and deep U.S.-German partnership in scientific endeavors“, U.S. Ambassador Richard Grenell said during a visit to GFZ German

Research Centre for Geosciences in Potsdam. This Friday, as a guest of Brandenburg’s State Prime Minister Dietmar Woidke, Ambassador Grenell met with GFZ’s scientific director and scientists to discuss joint projects. He also took a short walk to the Potsdam Telegrafenberg and learned about its rich history in Earth Science.

The Earth observation mission GRACE FO is a joint project of the National Aeronautics and Space Administration (NASA), the GFZ, NASA’s Jet Propulsion Laboratory JPL, and the German Aerospace Center DLR. The acronym stands for “Gravity Recovery and Climate Experiment Follow-On” – Follow-On because the new mission continues ongoing research of the Earth’s gravity fields. From 2002-2017, two nearly identical GRACE satellites surveyed gravity fields. By looking at the monthly changes, scientists are able for instance to identify groundwater loss with great accuracy, as well as measure ice melting on Greenland and Antarctica. “Brandenburg is a hub of cutting-edge scientific research, and our cooperation and investments in science aim to make the lives of our citizens better. We must continue to work at the state and federal levels in both Germany and the U.S. on science and technology issues”, said Ambassador Grenell.

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## PRODUCTION TECHNOLOGY

### DETECTING DAMAGE IN NON-MAGNETIC STEEL WITH THE HELP OF MAGNETISM

Johannes Gutenberg University Mainz  
Press news, 25 July 2018

Researchers at JGU and the University of Kaiserslautern publish results of study of materials testing.

Wear, corrosion, material fatigue are signs of degradation that are common to most materials. This makes it all the more important to detect damage early, preferably on the micrometer scale. Magnetic test methods are often used for this purpose, which was previously impossible with non-magnetic steel. Researchers from Kaiserslautern and Mainz have now developed a process in which they apply a thin magnetic layer to steel. Changes in the microstructure can thus be detected by changes in magnetic effects. Materials such as aluminum can also be tested in this way. The corresponding paper has been published recently in the *Journal of Magnetism and Magnetic Materials*.

Steel is one of the most frequently used materials. We use it in many variants, for example in the form of stainless steel, high-strength quenched and tempered steel, or low-priced structural steel. Steels can be magnetic or non-magnetic. They are used in cutlery, in automotive components, in steel girders of buildings, and in bridges. At times, steel is exposed to high temperatures and stress. "This can result in microstructural changes, cracks, or component failure," said Dr. Marek Smaga, a researcher at the Department of Materials Science at Technische Universität Kaiserslautern (TUK). This is what experts refer to as material fatigue. Initially, such damage is only visible on the micrometer level. With magnetic testing methods, however, it is not yet possible to detect changes in this scale in non-magnetic steel at an early stage. Engineers from TUK and physicists from Johannes Gutenberg University Mainz (JGU) are working on this problem and are presenting a solution in their current study. The unique feature of their method is that it makes use of magnetic effects, even if the material being tested is non-magnetic.

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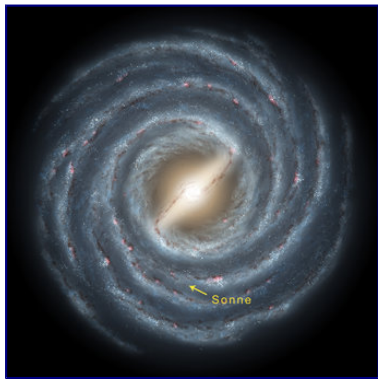
## SPACE NEWS

### THE BACKBONE OF THE NIGHT

*MPI for Extraterrestrial Physics Press news, 27 July 2018*

Like a huge spiral, the Milky Way floats in space.

For thousands of years, people have been puzzling over the milky strip that extends across the entire firmament. In the modern era, Galileo Galilei discovered that this Milky Way consists of countless stars. However, it was not until the 20th century that astronomers succeeded in deciphering its form and its true nature.



*Fire wheel: The Milky Way system, called galaxies, resembles a gigantic spiral with an estimated 200 billion stars. One of them is our Sun.*

© Robert Hurt/SSC/Caltech/JPL/NASA Robert Hurt

“My third observation relates to the nature of the Milky Way (...) No matter which part of it one targets with the telescope, one finds a huge number of stars, several of which are

quite large and very striking; yet, the number of small stars is absolutely unfathomable.” These words were written in 1610 by a man who with his self-constructed telescope studied unknown lands that were not of this world. It was this work that earned him a place in history: Galileo Galilei.

After the discovery made by Galilei, however, nearly 150 years would pass before this celestial structure would again become the subject of scientific study.

But how were the astronomers to find out whether the apparent view of the Milky Way in the sky reflected its actual spatial structure?

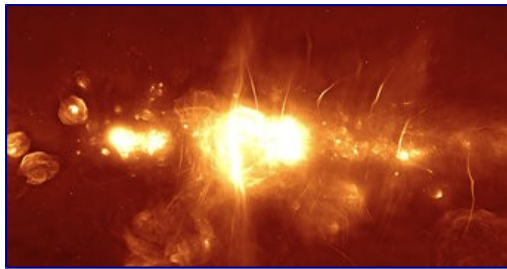
The breakthrough did not come until the middle of the 20th century, when astronomers learned to look at the sky with different eyes using radio telescopes.

Hydrogen is the most common element in the universe. As part of interstellar matter, neutral hydrogen (H1) fills the space between the stars, and thus also fills the Milky Way.

This means that the distribution of clouds of hydrogen gas trace the shape of the whole system, similar to the way in which bones shape the human body.

But how can these cosmic “bones” be made visible? The answer is provided by the nanouniverse: in the ground state of hydrogen, the direction of spin

of the atomic nucleus and the electron that orbits around it are antiparallel.



*Close view: this image of the central part of the Milky Way shows a region of 1000 x 500 light years and was taken with the MeerKAT telescope stationed in South Africa, a system consisting of 64 radio antennas.*

© SARA0

If two hydrogen atoms collide, the direction of spin of the nucleus and the electron may be flipped to end up parallel to each other – and after a certain time, they return to their basic antiparallel state.

This process releases energy, which is radiated as an electromagnetic wave. This line lies in the radio range of the electromagnetic spectrum. Despite the extremely low density of interstellar matter, atoms are constantly colliding, causing the H 1 areas to glow in the light of this hydrogen line.

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## **RYUGU- AN ASTEROID WITH EDGES, RIDGES AND BIG BOULDERS**

*German Aerospace Centre (DLR) Press news, 26 July 2018*

Asteroid Ryugu was imaged for the first time from a distance of just six kilometres.

Among other things, the images serve as preparation for the landing site selection. The MASCOT lander, which was developed and built at DLR, is due to land on the asteroid in October.

As the Japanese Hayabusa2 spacecraft closes in on asteroid Ryugu, more details become visible to the planetary scientists. On 20 July 2018, from a distance of just six kilometres, the spacecraft's Optical Navigation Camera - Telescopic (ONC-T) acquired an image of the asteroid's surface, with its largest crater. "We see that the entire surface of Ryugu is strewn with large boulders – we have not yet seen this on an asteroid," says Ralf Jaumann, a planetary scientist at the German Aerospace Center DLR and Principal Investigator for the MASCOT (Mobile Asteroid Surface Scout) lander aboard the Japanese spacecraft. It is anticipated that on 3 October 2018, MASCOT will land on Ryugu and examine the asteroid surface using four instruments.

Since Hayabusa2's arrival at the asteroid on 27 June 2018, the Japanese Aerospace Exploration Agency (JAXA) had operated it at a height of 20 kilometres (the Home Position) above the surface. But on 16 July, the JAXA engineers slowly lowered Hayabusa2



from this observation position, until it was six kilometres above Ryugu. The resolution of the images is approximately 3.4 times greater than in the pictures acquired from the Home Position – one pixel now corresponds to about 60 centimetres. A particularly large crater is visible near the centre of the image.

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## CAN RADAR REPLACE STETHOSCOPES ?

Friedrich-Alexander University Erlangen-Nürnberg Press news, 14 August 2018

FAU researchers develop procedure for touch-free monitoring of heart sounds.

In conjunction with researchers at Brandenburg University of Technology (BTU) in Cottbus and the Department of Palliative Medicine at Universitätsklinikum Erlangen, electronic engineers at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) have developed a procedure for reliably detecting and diagnosing heart sounds using radar. In future, mobile radar devices could replace conventional stethoscopes and permanent touch-free monitoring of patients' vital functions could be possible using stationary radar devices. The results have now

been published in the renowned journal 'Scientific Reports'

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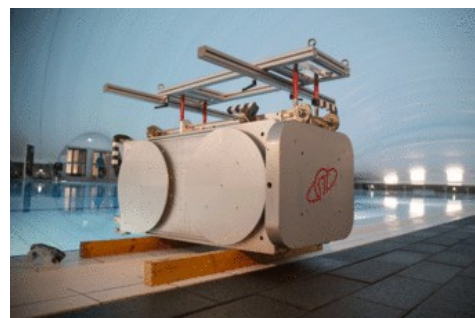
Medical information: Prof. Dr. Christoph Ostgathe, Tel+49 9131 8534063

## SPACEWALK FOR ICARUS

Max Planck Institute Press news, 15 August 2018

Antenna for Russian-German experiment installed on International Space Station.

On 15 August 2018, the two Russian cosmonauts Sergei Valeriyevich Prokopyev and Oleg Germanovich Artemyev unfolded the Icarus antenna on the International Space Station (ISS). This was the highlight of their extravehicular activity, which saw them carry out work on the exterior of the Russian Zvezda module for several hours.



Before the Icarus antenna was launched into space in February 2018, the cosmonauts of the ISS practiced the installation of the antenna on a model in a water basin. The now installed antenna modules consist of three up to two-metre long receiving antennas and one transmitting antenna.

© MPI f. Ornithology

The two colleagues were supported in

their work by the German astronaut Alexander Gerst, who monitored the activity from inside the station. The antenna's installation marks the completion of the International Cooperation for Animal Research Using the Space (Icarus) system of the Max Planck Institute for Ornithology, the Russian space agency (Roscosmos) and the German Aerospace Center (DLR) Space Administration. Icarus will allow the worldwide tracking of all kinds of animal migration flows and will be brought into service over the coming days and weeks.

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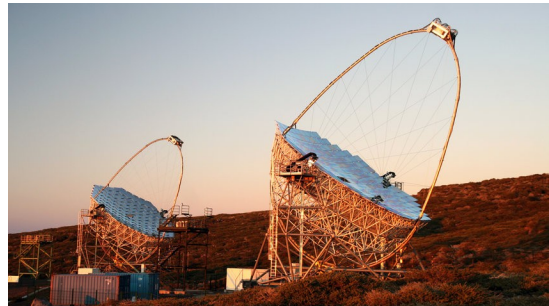
## NEUTRINO FROM A REMOTE GALXY

MPI for Physics Press news, 12 July 2018  
MAGIC telescopes detect the origin of a particle that appears to come from a black hole of a blazar.

Astrophysicists have succeeded for the first time in locating the source of a high-energy cosmic neutrino. It is highly likely that the neutrino comes from a blazar, an active black hole in the center of a distant galaxy in the constellation of Orion. The discovery was made possible through the combination of several telescopes. This so-called multi-messenger observation was also able

to provide the key to an unsolved mystery: the origin of cosmic radiation.

Neutrinos are elementary particles that hardly interact with the surrounding world at all. Although difficult to detect, neutrinos are important cosmic messengers since they carry unique information about the regions where they are produced.



Eyes into space: The two MAGIC telescopes provided valuable information about the captured neutrino from the distant Blazar TXS 0506+056.

© Robert Wagner / MAGIC Collaboration

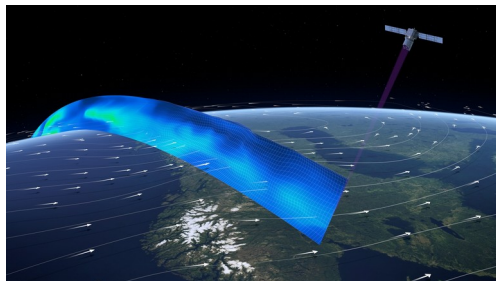
The largest detector specialized in hunting the shy particle species is IceCube, which is located at the South Pole. It detects about 200 neutrinos per day, although most of them have low energy and are produced by cosmic rays interacting with the Earth's atmosphere.

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## EUROPEAN EARTH OBSERVATION SATELLITE TO LAUNCH ON 22 AUGUST 2018

DLR Press news, 21 August 2018

ADM Aeolus – Measuring the wind from space with a laser for the first time. For anyone who watches TV weather reports, the satellite images of cloud formations and winds that play such a crucial role in our weather will be a familiar sight. No direct information about winds has been collected until now, but that is set to change with the advent of Aeolus. This European Space Agency (ESA) mission will generate vertical wind profiles by 2021 using an innovative, high-performance laser system, thus enabling the highly accurate, real-time measurement of global wind fields in the atmosphere for the first time.



*Profiling global winds*

*Focus: Space, Earth observation, weather forecast, climate change*

Scientists and meteorologists can use this data to extract high-resolution information to better understand our weather systems and climate.

The 1.4-tonne Earth observation satellite will be launched from the European spaceport in French Guiana on 22 August 2018 at 23:20 CEST on board a European Vega launcher, and will orbit Earth at an altitude of 320 kilometres.

*Contact: Elisabeth Mittelbach Deutsches Zentrum für Luft- und Raumfahrt (DLR) Raumfahrtmanagement, Gruppenleiterin Kommunikation, Tel: +49 228 447-385*

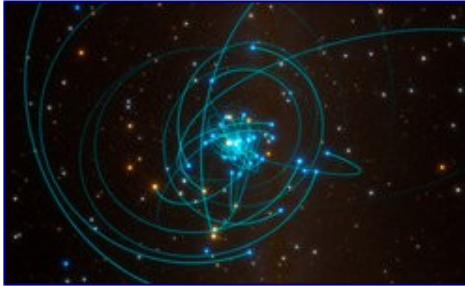
## **FIRST SUCCESSFUL TEST OF EINSTEIN'S GENERAL RELATIVITY NEAR SUPERMASSIVE BLACK HOLE**

*MPI for Extraterrestrial Physics Press news, 26 July 2018*

Observations of the Galactic Centre team at the Max Planck Institute for Extraterrestrial Physics (MPE) have for the first time revealed the effects predicted by Einstein's general relativity on the motion of a star passing through the extreme gravitational field near the supermassive black hole in the centre of the Milky Way. This long-sought result represents the climax of a 26-year-long observation campaign using ESO's telescopes in Chile.

Obscured by thick clouds of absorbing dust, the closest supermassive black hole to the Earth lies 26 000 light-years away at the centre of the Milky Way.

This gravitational monster, which has a mass four million times that of the Sun, is surrounded by a small group of stars orbiting around it at high speed.



*This simulation shows the orbits of stars very close to the supermassive black hole at the heart of the Milky Way.*

© ESO/L. Calçada/spaceengine.org

This extreme environment — the strongest gravitational field in our galaxy — makes it the perfect place to explore gravitational physics, and particularly to test Einstein's general

theory of relativity.

New infrared observations from the exquisitely sensitive GRAVITY, SINFONI and NACO instruments, developed under the lead of the Max Planck Institute for Extraterrestrial Physics (MPE), have now allowed astronomers to follow one of these stars, called S2, as it passed very close to the black hole during May 2018.

At the closest point this star was at a distance of less than 20 billion kilometres from the black hole and moving at a speed in excess of 25 million kilometres per hour — almost three percent of the speed of light.

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