

## EXCELLENCE NEWSLETTER

4<sup>TH</sup> SEPTEMBER 2020

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## Dear Readers,

on 18<sup>th</sup> August, Professor Ursula M. Staudinger took over as Rector of TU Dresden. The most important goal of her five-year term is to defend the Excellence Status of TU Dresden and thus secure the future development of our university. The basis for successful applications for Clusters of Excellence shall be created spanning all **five research priority areas** of TUD.

"We will strive to develop TU Dresden to become a global university for the 21<sup>st</sup> century and I consider the 200<sup>th</sup> anniversary in 2028 as an important milestone in this process," said Professor Staudinger. For TU Dresden, this means increased worldwide visibility, the educational formation of world citizens, and excellent research that will allow TU Dresden to make important contributions to mastering the challenges of humanity locally as well as globally.

This new issue of the Excellence Newsletter will again give you a small insight into our excellent research. Enjoy!

The editorial team of the Excellence Newsletter can be contacted by email: [exzellenz@tu-dresden.de](mailto:exzellenz@tu-dresden.de). We look forward to your questions, suggestions and comments. You are also welcome to recommend our Excellence Newsletter, which can be [subscribed to with just a few clicks](#).

## TUD 2028 – SYNERGY AND BEYOND

### Commitment to researchers at risk and to cosmopolitanism

TU Dresden is reaffirming its commitment to cosmopolitanism and academic freedom. Following the invitation of the New School (New York), TUD is the first German university to join the *New University in Exile Consortium*. The Consortium builds upon The New School's legacy as the original University in Exile. It was established in 1933 to provide a safe intellectual home for scholars fleeing the growing threat of Nazism in Europe. 85 years later, the consortium was created to meet the challenges of the present. Joining the consortium underlines the close connection between the two universities, which was initiated by TU Dresden's Honorary Senate member Henry Arnhold, who died in 2018, and which is being continued in many different ways, not least through the exchange of students, lecturers and doctoral candidates. In this way, TUD is also continuing its long-standing commitment as a founding member of the German section of "Scholars at Risk". Contact: [Katharina Schmitt](#) [↗ More](#)

TU Dresden has also been successful again in the seventh round of the *Philipp Schwartz Initiative (PSI)*, which means that it will be hosting six researchers at risk at the same time starting this summer. [Natalie Brindle](#) advises potential applicants and supports the fellowship holders together with the DRESDEN-concept Welcome Center at TUD. [↗ More](#)

Cosmopolitanism and a welcoming culture thrive above all on the daily commitment of all university members and contribute significantly to the attractiveness of Dresden as a science hub. In order to make the multifaceted commitment visible and to honour it, the *Internationalisation Award* is putting the focus on welcome culture for the first time this year. A total of 25 applications showed the breadth of the commitment to a cosmopolitan and international TU Dresden campus. Two initiatives and two individuals received the award. [↗ More](#)

### GA writing week<sup>Digital</sup> in September

The 5<sup>th</sup> Retreat of the Graduate Academy (GA) to the St. Marienthal Monastery had to be cancelled due to Covid-19 this year. Nevertheless, with the GA Writing Week <sup>Digital</sup> from 14<sup>th</sup> to 18<sup>th</sup> September 2020, the GA offers its [members](#) concentrated digital support for their academic writing process. The intensive programme includes joint writing as well as motivating exchanges in a writing group with individual writing advice, online workshops and digital events on science communication. [↗ More](#)

## New TUD Young Investigators appointed

In July and August, the University Executive Board appointed Dr. Igor Zlotnikov (Faculty of Mechanical Science and Engineering), Dr.-Ing. Sascha Heitkam (Faculty of Mechanical Science and Engineering) and Dr. Lukas Janssen (Faculty of Physics) as TUD Young Investigators.

The status of TUD Young Investigator strengthens the position of excellent, independent young research group leaders in Dresden as a science hub by integrating them more closely into the faculties. The next module of FAST FORWARD - the continuing education programme specifically tailored to the TUD Young Investigator - will take place online in September 2020 and is dedicated to the topic "Leadership in Science: Leading teams harmoniously". [↗ More](#)

## EXCELLENCE AND RESEARCH CLUSTERS

### ct.qmat in the Technische Sammlungen Dresden

What does a hairy donut have to do with quantum physics? Can you comb a ball without creating a single vortex? From 12<sup>th</sup> September 2020, you can try this and much more with your whole family. The Technische Sammlungen Dresden are launching the "Showcase of Research" („*Schaufenster der Forschung*") - a new permanent exhibition in which Dresden's scientific institutions present their research. The Cluster of Excellence [Complexity and Topology in Quantum Matter \(ct.qmat\)](#) will be one of the first to do so.



Seven interactive exhibits help visitors to decipher the still mysterious quantum world. In the future, this area of research promises ground-breaking possibilities such as mega-fast quantum chips and gigantic storage capacities. For this exhibition, what is otherwise often hidden in high-performance laboratories has been translated into family-compatible topics.

Technische Sammlungen Dresden is the museum for science and technology of the state capital of Dresden. [↗ More](#)

### Counter-rotating flows drive cell movement during cell division

Every living organism grows from one single cell. During development, the one-cell embryo undergoes numerous rounds of cell division to generate a fully functional organism. The embryo needs to position the newly dividing cells correctly to ensure that they are in contact with the right neighbour cells and receive the right signals. Only then, they can properly develop and differentiate further.

The cell cortex - a layer of actin fibres and myosin motor proteins just below the cell membrane - is known to play an important role in cell positioning. The interaction of actin and myosin generates "tug-of-war like" forces that give rise to flows of the cell cortex. These flows in turn can reposition cells as they divide to form two daughter cells. However, prior to this study it was not clear how common cells are repositioned by these rotating flows.

Researchers from the group of [Stephan Grill](#), director at the [Max Planck Institute of Molecular Cell Biology and Genetics](#), and group leader at the [Center for Systems Biology Dresden \(CSBD\)](#), the Cluster of Excellence [Physics of Life \(PoL\)](#) and the [Biotechnology Center \(BIOTEC\)](#), have now found that counter-rotating flows in the cortex of the *Caenorhabditis elegans* roundworm drive the movement of specific cells during development, but not of all cells. In their recently published work in [eLife](#), the scientists show that counter-rotating flows are only observed in cells undergoing symmetric cell divisions. [↗ More](#)

### Tumour characterisation using mass spectrometry – new community

Mass spectrometry is a versatile and powerful analytical method that is becoming increasingly important for tumour characterisation in addition to common DNA and RNA analyses. To make the highly complex mass spectrometric analysis possibilities more accessible for research, scientists from various Dresden institutions – [Max Planck Institute of Molecular Cell Biology and Genetics](#), [Center for Molecular and Cellular Bioengineering \(CMCB\)](#), [Lipotype GmbH](#), [National Center for Tumor Diseases Dresden \(NCT/UCC\)](#), [University Hospital Carl Gustav Carus Dresden](#) – have joined forces to form the "MS Community Dresden". [↗ More](#)

### Dr. Anna Poetsch starts as a new MSNZ fellow and BIOTEC group leader

[Biotechnology Center \(BIOTEC\)](#) welcomes Dr. Anna Poetsch as a new research group leader. Her group "Biomedical Genomics" will focus on the development of mutations in cancer. As trained biochemist with bioinformatics expertise, she wants to apply machine learning approaches to analyse clinically relevant data sets.



Dr. Anna Poetsch is supported by the [BIOTEC](#), the [National Center for Tumor Diseases Dresden \(NCT/UCC\)](#) and the [Mildred Scheel Early Career Center Dresden \(MSNZ\)](#). At the moment, the Poetsch group consists of two scientists and is currently recruiting for several new positions. [↗ More](#)

### BIOTEC and PharmAI analyse active substances that could cure Covid-19

The goal: Identify new drugs for a Covid-19 therapy in the fastest possible way, conduct clinical tests and win the battle against the virus.

The method: A large-scale research competition that screens billions of molecules in order to find those blocking interactions on SARS-CoV-2, identifying those that can be used therapeutically very quickly thanks to their existing FDA-approval.

The [Biotechnology Center \(BIOTEC\)](#) of TU Dresden with its [bioinformatics group](#) and the spin-off [PharmAI GmbH](#) participate in such a competition. The Dresden team led by [Prof. Michael Schroeder](#) (BIOTEC) and Dr. Joachim Haupt (PharmAI) used proprietary screening algorithms to screen several drug libraries containing five million substances for candidates against Covid-19. They submitted three promising protein targets to The Joint European Disruptive Initiative (JEDI).

"We are pleased that our DiscoveryEngine has also been successful with Covid-19 and that we can now make good drug candidates available to the global scientific community via the competition – following the spirit of Open Science," explains Prof. Schroeder. [↗ More](#)

## Genetic basis of bats' superpowers revealed

Bats can fly and use echolocation to orient themselves effortlessly in complete darkness; they survive deadly diseases and are amazingly resistant to aging and cancer. Using the latest technologies of the [DRESDEN-concept Genome Center \(DcGC\)](#), researchers have now – for the first time – almost completely decoded the genome of bats, which is responsible for the unique adaptations and superpowers of these animals.

[Bat1K](#), a global consortium of scientists dedicated to sequencing the genomes of every one of the 1421 living bat species, has generated and analysed six highly accurate bat genomes that are ten times more complete than any bat genome published to date, in order to uncover bats' unique traits. [↗ More](#)

## W2 Professor for CRTD research group leader Nikolay Ninov

Effective 1<sup>st</sup> August 2020, [Nikolay Ninov](#) has been appointed Chair of Cell Biology and Regeneration of Beta Cells at the [Center for Regenerative Therapies TU Dresden \(CRTD\)](#). His research group is part of the CRTD and affiliated with the [Paul Langerhans Institute Dresden \(PLID\)](#).



Prof. Nikolay Ninov focuses his research on the beta cells of the pancreas as the key metabolic sensors and regulator for glycaemic control. In particular, he and his team are investigating the molecular and cellular events required for pancreatic beta cell regeneration. [↗ More](#)

## First POInT child Eddie completed the "active part" of the study

Shortly after birth, risk factors for the development of type 1 diabetes were discovered in Eddie as part of the [Freder1k study](#). The risk that Eddie could develop this autoimmune and metabolic disease was thus 25 times higher. One chance to prevent the development of the disease was the participation in the [POInT study](#) (Primary Oral Insulin Trial). In this study,

it is being tested whether the administration of insulin trains the immune system of very young children with diabetes risk genes and thus prevents the development of the disease. That was almost three years ago. Today, Eddie laughs and plays just like all his kindergarten friends.

Meanwhile, 107 children are already participating in Dresden in the international POInT study. In total, 188 places are available here. With Eddie's visit today, the phase of insulin intake is completed. "We will continue to see Eddie on a regular basis over the next three years and will carefully monitor him to see if we can actually succeed in preventing the development of diabetes in this way," says Prof. Berner, who, along with [Prof. Ezio Bonifacio \(Center for Regenerative Therapies TU Dresden \(CRTD\)\)](#), is the head of the POInT study in Dresden. [↗ More](#)

## B CUBE investigates possibilities of cystic fibrosis therapy

Cystic fibrosis is a genetic disorder that causes viscous mucus in the lungs and other organs, leading to breathing problems and digestive disorders. Cystic fibrosis is not curable. However, therapies can slow down the course of the disease. The [Mukoviszidose e.V.](#) association has now announced that it will fund a project of the [Center for Molecular Bioengineering \(B CUBE\)](#) for the next three years.

The project is carried out by [Prof. Michael Schlierf's research group](#) in collaboration with Dr. Georg Krainer (University of Cambridge, Centre for Misfolding Diseases) and focuses on rare mutations in the CFTR protein derived from cystic fibrosis patients. The aim of the project is to establish an automated screening platform that will enable the search for modulators for the therapy of rare mutations. [↗ More](#)

## Mobility of the future: automated and networked, environmentally friendly and safe

This is the mission of the [Friedrich List Faculty of Transport and Traffic Sciences](#) and the Emerging Field "Automated and Networked Mobility". Together, they are developing cross-faculty project ideas. By 2022, unique test rigs, such as a new type of a highly immersive driving simulator, will be developed. [↗ More](#)

[NFDI4Ing](#) will develop research data management services for the engineering sciences. [Prof. Regine Gerike \(Faculty of Transport and Traffic Sciences\)](#) is member of the Steering Committee and Co-Spokesperson.

For the first time, TU Dresden has been included among the 101-150 places in the Shanghai Ranking "Transportation Science & Technology", marking a

major achievement. This places TUD among the three best German universities in the area of transport. [↗ More](#)

### Online summer university at the B CUBE

On 27<sup>th</sup> July, school children interested in the STEM subjects (science, technology, engineering, and mathematics) were given the opportunity to immerse themselves in molecular bee research with [Dr. Anja Buttstedt](#) during TUD's online summer university. She is researching the dietary proteins of honey bee larvae at the [Center for Molecular Bioengineering \(B CUBE\)](#) and is particularly interested in the royal jelly, the food of the honey bee queens, which has very special molecular characteristics.



Afterwards, the students were given an overview of the degree programmes offered by the [Center for Molecular and Cellular Bioengineering \(CMCB\)](#). [Anne Chesneau](#) presented the three international [Master's degree programmes of the CMCB](#): Molecular Bioengineering, Nanobiophysics, and Regenerative Biology and Medicine. In this way, the goal of the annual summer university could be implemented equally well online: Getting school children in contact with researchers at TU Dresden and supporting them in their choice of a career and studies, especially in the STEM subjects. [↗ More](#)

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Fig. 2: [Dr. Anna Poetsch](#) © [Hagen Gebauer](#)

Fig. 3: [Prof. Nikolay Ninov](#) © [CRTD](#)

Fig. 4: Collage of the summer university and a swarm of bees © [Wikimedia](#)

### Funding agencies

Funded by the Federal Ministry of Education and Research (BMBF) and the Free State of Saxony under the Excellence Strategy of the Federal Government and the Länder

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