



## Humboldt research award for Antonio DeSimone

*Press release of the University of Bonn*

### **Italian mathematician and engineer cooperates with the Hausdorff Center of the University of Bonn**

Prof. Dr. Antonio DeSimone from the Scuola Superiore S. Anna in Pisa and the SISSA-International School for Advanced Studies Trieste (Italy) receives the Alexander von Humboldt Foundation Research Award. Prof. Dr. Stefan Müller from the Hausdorff Center for Mathematics at the University of Bonn has nominated the scientist for the award. Both will now intensify their cooperation. The prize is endowed with 60,000 euros.

For many years, Prof. DeSimone has been linking numerous research interests with scientists from the Hausdorff Center for Mathematics at the University of Bonn. About 20 years ago, he worked particularly intensively with Prof. Dr. Stefan

Müller and Prof. Dr. Sergio Conti when they were still conducting research at the Max Planck Institute for Mathematics in Leipzig. Several scientific publications emerged. "Over the past ten years, we have all developed new research interests," says DeSimone. "I am now looking forward to working with the two scientists again and to tackling new, joint fields of research".

Prof. Dr. Stefan Müller from the Hausdorff Center for Mathematics has nominated the scientist for the Humboldt Research Award. "Prof. Antonio DeSimone is known to me for his outstanding research achievements in the field of mathematical modelling of complex phenomena in the natural and engineering sciences," says Müller. These include work on materials with shape memory, liquid crystals and locomotion mechanisms in biological and artificial systems (robotics). >>

## HAUSDORFF SPECIALS

### New physical phenomena

Over the next few months, the scientists plan to jointly tackle two research projects. One is the reduction of dimensions. How does one get from a three-dimensional representation and model of a body (for example a tube) to a two-dimensional (the surface of a cylinder) or even to a one-dimensional one (a straight line representing the axis of the cylinder)? “There is already a large arsenal of mathematical techniques for this,” says DeSimone. “However, new understanding of physical phenomena sometimes occurs when the step from the three-dimensional to the two-dimensional or one-dimensional model is performed mathematically.” Mathematicians are particularly interested in this new field.

In addition, the scientists want to work on further applied questions from biological mechanics. DeSimone: “We would like to find out how form in nature is related to function”. In living organisms, the shape of muscle fibers, for example, determines how forces are transmitted. These studies are to be transferred to the material sciences.

### Multiple awards

DeSimone is professor both at of Scuola Superiore S. Anna in Pisa and at SISSA-International School for Advanced Studies in Trieste. There the SISSA-MathLab has been the place where he has conceived and developed a research programme on the mathematics and biophysics of cell locomotion. Pisa (The Biorobotics Institute) is the place where he plans to transfer concepts revealed by mathematical analysis to biomedical engineering applications and devices. He has published more than 140 papers, including on mathematical modelling of the mechanical properties of new materials and biological tissues. The scientist has received several awards, including one from Istituto Nazionale dell’Alta Matematica F. Severi, the Keith Medal of the Royal Society of Edinburgh and the Prix La Recherche.

The Humboldt Research Award honours the entire oeuvre of scientists from abroad. With their findings or new theories, they have had a lasting influence on their own discipline. The award winners are invited to carry out research projects of their own choice in Germany in cooperation with their peers for a period of up to one year.



## Frank den Hollander receives the Humboldt Research Award

At around the same time as Antonio DeSimone, the Dutch mathematician Frank den Hollander received the Humboldt Research Award in Bamberg. His research focuses on the areas of probability theory, statistical physics, ergodic theory, population genetics, and complex networks. In the next two months he will be active as a guest researcher at the HCM. Click [here](#) for an in-depth report.

## Math teacher internships in Burkina Faso

Jessica Schmidt, member of the HCM school team, recently did two exciting internships in Burkina Faso, where she also worked as a math teacher. Click [here](#) for the interview, conducted by Stefan Hartmann.



## HAUSDORFF SPECIALS



## HCM supports student teams in international math competitions

In 2019, HCM supports three student teams in international math competitions. In corporation with “Bildung & Begabung”, we sponsored a team for the European Girls’ Mathematical Olympiad (EGMO), which took place April 7-13, 2019, in Kiev. Our team returned with two bronze medal, won by Hanna Boß and Ester Rimmelspacher.

Moreover, HCM supported a team of Bonn students for the Vojtěch Jarník International Mathematical Competition (VJIMC) in the Czech Republic, led by And Dung Le. Frequently social media postings of the team allowed all students and supporters at home to follow the competition almost in real-time. With an outstanding 11th rank, Lukas Bonfert was our most successful participant. Another Bonn-based team, including several former IMO participants, will compete in the International Mathematics Competition for University Students (IMC) in Bulgaria from July 28-August 3, 2019. We wish our teams all the best!



**Top:** The German girls’ team at the EGMO. **Down:** The members of the student teams during a preparation seminar.

## HAUSDORFF PEOPLE



**Emad Alamoodi** is working since May this year as a PhD student at the HCM. 2018 he finished his master’s degree in Computer Science at the King-Abdulaziz-University in Saudi Arabia. His fields of interest lie in Bio-computer Science, Parallel Computing and Artificial Intelligence.

Herzlich  
Willkommen!

## HAUSDORFF PEOPLE

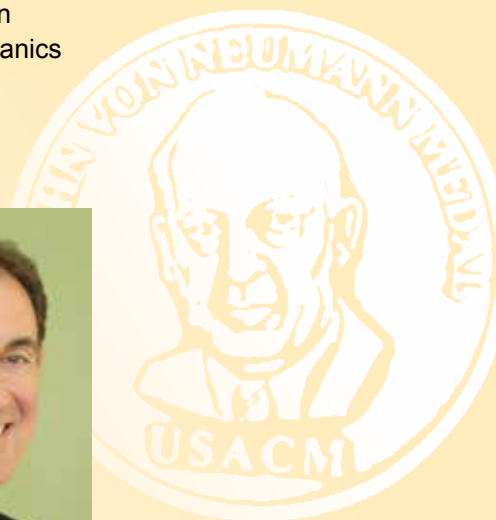
## A new Executive Director: Sonja Dames

Starting this August, Sonja Dames will be the new Executive Director of the HCM. Along with her family, she will move to Bonn to succeeding previous Executive Director Michael Meier. After her studies in biochemistry at the University of Bayreuth, Sonja Dames received a PhD in biophysics at the Biozentrum at the University of Basel. Afterwards she worked for around two years as a postdoctoral fellow at the Scripps Research Institute. Then she came back to Basel as a postdoctoral fellow with own projects to gain a lecturer degree. In 2008 she received the *venia legendi* for structural biology at the University of Basel and became a research group leader. In 2010, Sonja Dames went to the TU Munich as head of a research group and received the *venia legendi* for biochemistry. Between 2013 and 2017 she also was employed at the Helmholtz-Zentrum Munich. Between 2012 and 2014 she had additionally an appointment as lecturer at the University of Hannover. Since 2017, she works as managing director of the Cluster of Excellence Universe based in Munich and of the following Cluster Origins, which has been running since the beginning of this year. The HCM is excited to welcome and work with Sonja Dames!



## Michael Ortiz receives the John von Neumann Medal

The U.S. Association for Computational Mechanics (USACM) awarded the John von Neumann Medal to HCM's Bonn Research Chair Michael Ortiz. The award ceremony will be held during the 15th U.S. National Congress on Computational Mechanics in August.



## Festkolloquium for Sergio Albeverio

On May 2, 2019, the Mathematikzentrum was the site of an honorary colloquium on the occasion of Sergio Albeverio's 80th birthday. Albeverio is known as one of the most productive mathematicians of all times, and he has supported young scientists throughout his life. Even in the age of 80 he still counts as one of the most active researchers at the HCM.

## HAUSDORFF EVENTS

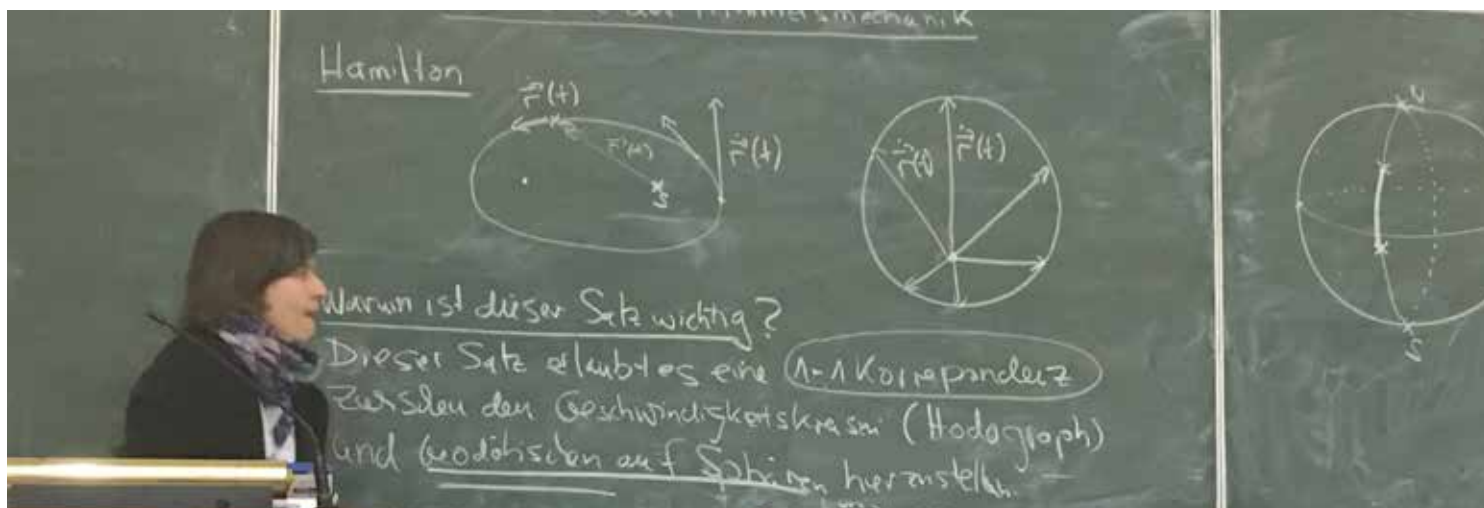
## Girls' Day 2019

This year around 30 girls explored the world of fractals, studied Eulerian paths („Haus vom Nikolaus“) and learned about knot theory. They were also given the opportunity to discuss with various female students and professors. [Here](#) is more information on this project.



## Mathematical Salon

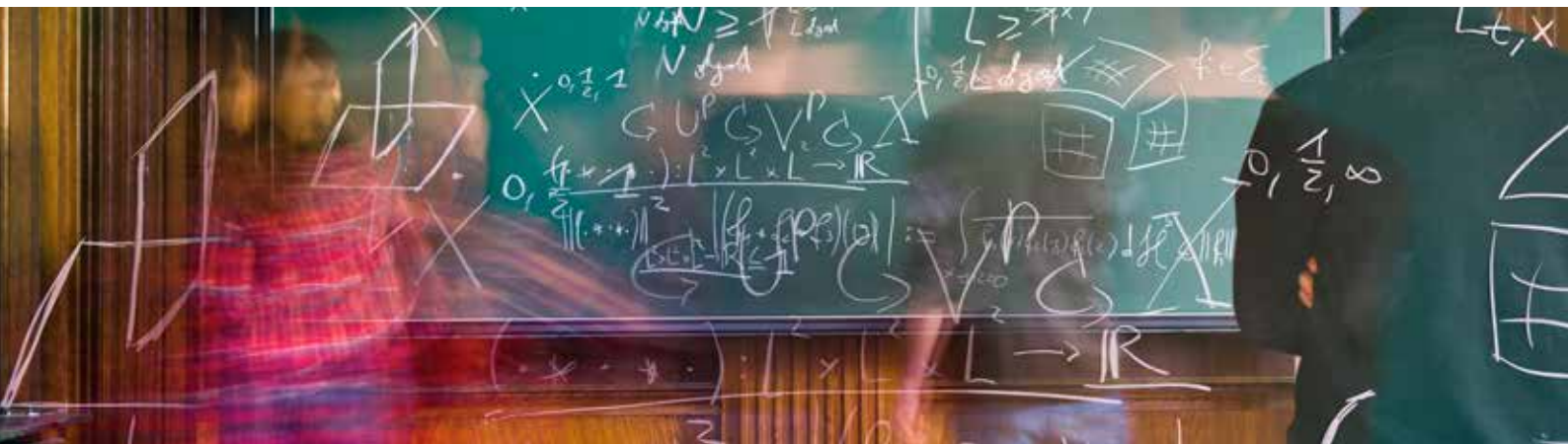
Michael Korey, mathematician and chief conservator of the mathematical-physical salon of the national art gallery of Dresden, lectured about “Fürstliche Lust und mathematische Macht in der Frühen Neuzeit” and presented the so-called geomancy. During the era of the renaissance in some House of Lords important decisions were made based upon random patterns with usage of mathematical algorithms, whose decryptions have the character of a puzzle. The musical accompany was formed by the “Trio con Canto” with Ingeborg Kodama-Rieger (mezzo-soprano), Heinz Baumgartner (cello), Sylvia Holzapfel (violin) and the mathematician Katrin Tent (viola). Click [here](#) for a description of the event.



## Inaugural Lectures at the Dies Academicus

On May 15, the Dies Academicus of the University of Bonn, three HCM members held their inaugural lectures: Matthias Erbar from the Institute of Applied Mathematics lectured on “Model-independent mathematics of finance”. In her lecture “Geometry on Celestial mechanics” Anna Siffert from the MPIM presented amongst other topics proofs for the famous Kepler Problems, and Pavel Zorin-Kranich presented some results from the Ramsey Theory and related topics.

## HAUSDORFF CALENDAR

**Hausdorff Colloquium***Jesper Grodal (Copenhagen),**Bénédicte Haas (Paris)***June 3, 15:15 – 19 pm****Women in Topology****August 26 – 30****Randomness, PDEa and Nonlinear Fluctuations**

Junior Trimester program

**September 2 – December 19****HCM Workshop: Automorphismus of Manifolds****September 2 – 6****Summer School: The Emerton-Gee stack and related topics**(for more information see the [Poster](#))**September 9 – 13****Summer School: Stability conditions in representation theory**(for more information see the [Poster](#))**September 16 – 20****Summer School: Modeling and analysis of evolutionary problems in materials science**(for more information see the [Poster](#))**September 23 – 27****Summer School: New Frontiers in Singular SPDEs and Scaling Limits**

Activity within the Junior Trimester Program

(for more information see the [Poster](#))**September 23 – 27****Workshop: SPDE day – recent progress on quasilinear equations**

Activity within the Junior Trimester Program

**18. Oktober****Workshop: Singular SPDEs and Related Topics**

Activity within the Junior Trimester Program

**October 21 – 25****Workshop: Stochastic Fluid Dynamics**

Activity within the Junior Trimester Program

**November 11 -15****Workshop: Problems of roughness, geometry and random fluctuations**

Activity within the Junior Trimester Program

**November 9-12**

## IMPRESSUM

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