

32nd Newsletter – July 2024

Welcome from the Chair

Dear MATH+ Community,

As the semester draws to a close, the writing team of the MATH+ Board is busy finishing the extension application, which is due on 22 August. Keep your fingers crossed!

Highlights from the past months were the **approvals** of [two Research Training Groups](#) (RTG) and a [new Transregio Collaborative Research Center](#): the RTG on Algebraic Geometry with Gavril Farkas (HU Berlin) as co-spokesperson, the second funding period for the International RTG Berlin-Oxford on Stochastic Analysis led by Peter Bank (TU Berlin), and the new TRR on “Rough Analysis, Stochastic Dynamics and Related Fields” with Peter K. Friz (TU Berlin) as spokesperson. Congratulations!

This newsletter includes a report on **Hanno Gottschalk’s research** (TU Berlin) on “[Automated driving using AI](#),” and the **conference** “[Empowering Women in Optimization](#)” (FAU Erlangen-Nürnberg). Furthermore, **TU students** excelled in a [mathematics competition in the Czech Republic](#).

In the People section, we introduce [MATH+ Distinguished Fellow Bruno Klingler](#) and welcome [Grigoriy A. Pavliotis](#) (ZIB) and **Aleksander Doan (HU) as Visiting Scholars**. [Zahra Mokhtari](#) was named as the **MATH+ Hanna-Neumann Fellow 2024**, [Ana Djurdjevac](#) received one of the “**Daimler and Benz Foundation Scholarships**,” and [Alexander Mielke](#) was awarded the **ISIMM Prize 2024**. The **MATH+ Dissertation Awards 2023** go to Andrei Bud, Toyomu Matsuda, and Arturo Merino. Congratulations!

Additionally, there are reports on the [TES research workshop "Quantum Optimal Control - From Mathematical Foundations to Quantum Technologies"](#) and the **BMS-BGSMath Junior meeting**.

The [MATH+ Advent Calendar](#) is being prepared for December 2024, and once again, we call on MATH+ members to contribute with a **mathematical challenge**. The [submission deadline is 31 August](#).

The “[Excellent Pub Quiz](#)” of the Berlin Clusters of Excellence at the LNDW 2024 was a resounding success with 39 teams and about 130 science enthusiasts. For the next event, we seek **PhD students and postdocs** to present their research to the general public at the **SCIENCE SLAM on 07 November**. The reward includes training by a science slam expert.

And as always, please share your research results, publications, prizes, or information about interesting guests with Beate Rogler at rogler@mathplus.de.

Enjoy your summer break!



MATH+ Chair Michael Hintermüller

MATH+ News

+ DFG Approved Two Research Training Groups (RTG) Headed by MATH+ Scientists



We are thrilled that the German Research Foundation (DFG) approved [two Research Training Groups with MATH+ scientists as group leaders](#): A new one in Algebraic Geometry titled “From Geometry to Numbers: Moduli, Hodge Theory, Rational Points” with Gavril Farkas (HU Berlin) as co-spokesperson, and a second funding period for the “International Research Training Group Berlin-Oxford” on

Stochastic Analysis, headed by Peter Bank (TU Berlin). Congratulations!

In the RTG on Algebraic Geometry another four MATH+ members are represented: [Gaetan Borot](#), MATH+ Distinguished Fellow [Bruno Klingler](#), [Thomas Krämer](#), and [Angela Ortega](#). The second funding period for the [IRTG Berlin-Oxford](#) allows the successful collaboration between Berlin and Oxford in this mathematical field to continue.

[Read more](#)

+ DFG Funds New “Collaborative Research Centre” in Mathematics, Hosted by TU Berlin, Headed by MATH+ Distinguished Fellow Peter K. Friz

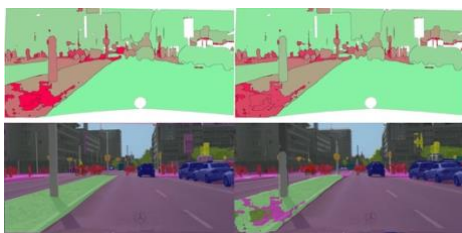


Another great success for Berlin’s mathematics: The [Collaborative Research Centre “Rough Analysis, Stochastic Dynamics and Related Fields”](#) (SFB/Transregio 388) will be financed by the German Research Foundation (DFG) over the next four years. TU Berlin is the leading university; FU Berlin and HU Berlin are co-applicants. Congratulations!

The spokesperson is [MATH+ Distinguished Fellow Peter K. Friz](#), Einstein Professor at TU Berlin, specializing in stochastic and financial mathematics and affiliated with the Weierstrass Institute for Applied Analysis and Stochastics (WIAS). The spokesperson team includes [Nicolas Perkowski \(FU Berlin\)](#) and [Ulrich Horst \(HU Berlin\)](#).

[Read more](#)

+ Hanno Gottschalk (TU Berlin) on Automated Driving Using AI



[Hanno Gottschalk](#) has been a professor of “Mathematical Modeling of Industrial Life Cycles” at the Institute of Mathematics at TU Berlin since April 2023. In an interview with MATH+, he described the primary focus of his research as the application of data-driven modeling using neural networks to automated driving, particularly specializing in its

safety. Gottschalk’s team focuses on identifying and addressing errors in perception systems, which are critical for ensuring the safety of automated driving.

[Read more](#)

+ Empowering Women in Optimization: Highly Successful Conference at FAU



The MATH+ supported conference, "Women in Optimization 2024," held at Friedrich-Alexander Universität Erlangen-Nürnberg (FAU) from 10-12 April 2024, marked the fifth meeting in this series. About 70 female researchers from industry and academia, as well as students in mathematical optimization attended the successful event.

The conference focused on professional development and networking within the optimization community. Expert presentations by distinguished invited speakers covered a wide range of topics in mathematical optimization. Additionally, the workshop provided ample space for scientific discussions and exchange of experiences. In an informal atmosphere, attendees discussed mathematical research topics but also found time to talk about career planning and work-life balance.

Students and junior researchers participated in poster sessions presenting and discussing their research topics.

[Read more](#)

+ Successful Participation by TU Berlin Students in an International Mathematics Competition



On 13 April, the [31st edition of the "Vojtech Jarnik International Mathematics Competition"](#) took place in Ostrava, Czech Republic, and was a highlight for undergraduates who enjoy solving mathematical problems and share a passion for mathematics. We are delighted to report that the MATH+ team consisting of Laurin Geyer, Yosime Flood, and Konstantin Roßberg (all from TU Berlin) achieved respectable scores. Laurin was among a group of top participants and won a special prize, while Konstantin received an honorable mention. Congratulations!

If you would like to support them, e.g., by accompanying them to a competition or by proposing a problem for one of the competitions, please feel free to contact their current team leader Ekin Ergen (TU) at ergen@math.tu-berlin.de.

+ Weekly Online Q&A sessions for Research Data Management (RDM)

There is a weekly opportunity to talk to the [Research Data Management \(RDM\)](#) Consultant of MATH+ online: **Every Tuesday from 14:00-15:00**, please register by email to <rdm@mathplus.de>

+ Save the Dates

- **12 July:** Dissertation Award Ceremony at the PTB Campus (next to TU Berlin) in combination with the MATH+ Friday and followed by the MATH+/BMS Summer Party
- **13 September:** [40th Anniversary of the Zuse Institute Berlin](#)
- **18 October:** MATH+ Day with General Assembly and Election of the new MATH+ Chairs

MATH+ People

+ MATH+ Distinguished Fellow Bruno Klingler (HU Berlin)



Bruno Klingler, Einstein Professor for Algebra at the Department of Mathematics of Humboldt-Universität zu Berlin since 2017, has been awarded the MATH+ Distinguished Fellowship. The [MATH+ Distinguished Fellowship Program](#) recognizes outstanding contributions to the mathematical sciences and supports the work of world-leading mathematicians in Berlin. Congratulations!

[Bruno Klingler](#) is a French mathematician specializing in arithmetic and algebraic geometry. Klingler's research focuses on the topology of varieties in relation to their algebraic and arithmetic structures. In 2021, [his project "Tame Geometry and Transcendence in Hodge Theory \(TameHodge\)" was awarded an ERC Advanced Grant](#) with over 1.8 million euros in funding.

[Read more](#)

+ MATH+ Distinguished Visiting Scholar Grigorios A. Pavliotis (Imperial College London) at ZIB



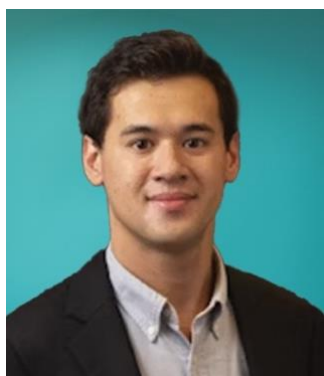
MATH+ welcomed [Grigorios A. Pavliotis of Imperial College London \(UK\)](#) as an MATH+ Distinguished Visiting Scholar in June, hosted by Christof Schütte (FU Berlin/ZIB). Pavliotis has been a professor of applied mathematics at Imperial College London (UK) since 2014.

His research interests focus on interacting multiagent systems, McKean-Vlasov-Fokker-Planck equations, inference for diffusion processes, Markov Chain Monte Carlo, and data-driven approaches to coarse-graining and statistical dynamics. Along with his collaborative research work at ZIB, Pavliotis will hold a Lecture Series on "Interacting particle systems, mean-field limits, phase transitions and fluctuations" from 26

June to 09 July, targeted at MSc and PhD students.

[Read more](#)

+ MATH+ Visiting Scholar Aleksander Doan (University College London) at HU Berlin



MATH+ is pleased to welcome [Aleksander Doan](#) as a MATH+ Visiting Scholar hosted by [Thomas Walpuski at HU Berlin](#) from May to July 2024. Having received his PhD from Stony Brook University in 2019, Aleksander Doan worked at Columbia University and at Trinity College, University of Cambridge. In 2022, he joined University College London as Lecturer in Pure Mathematics.

His research interests lie in differential geometry, gauge theory, and symplectic topology. During his stay in Berlin, he will collaborate with Thomas Walpuski on the analysis of gauge fields and their applications to the study of manifolds with special geometric structures such as

Calabi-Yau manifolds. In addition, he will give introductory lectures aimed at Master's and PhD students on the geometric and analytic aspects of the Seiberg-Witten equations.

+ Interview With MATH+ Hanna Neumann Fellow 2024: Zahra Mokhtari



We are delighted to announce that [Zahra Mokhtari, a postdoctoral researcher at FU Berlin](#), has been awarded the [Hanna Neumann Fellowship 2024](#). Congratulations!

Named after the outstanding Berlin mathematician Hanna Neumann, who made key contributions in group theory, the MATH+ Hanna Neumann Fellowship is advertised and awarded annually to female postdoctoral researchers in recognition of outstanding work. It is awarded to an early career researcher based in Berlin and provides funding for a research stay abroad or for inviting key collaborators for up

to six months.

In a candid and open **interview with MATH+**, Zahra Mokhtari discussed her career journey in Iran, Canada, and Göttingen, her supporters, and the individuals who influenced her career and passion for physics and mathematics.

[Read the entire interview](#)

+ Ana Djurdjevac Received “Daimler and Benz Foundation” Scholarship



We are delighted to announce that MATH+ member Ana Djurdjevac has been awarded the “Daimler and Benz Foundation” scholarship in support of junior professors for her new research initiative titled “Advances in Numerical Methods for Fluctuating Hydrodynamics and Hybrid Algorithms.” Congratulations!

[Ana Djurdjevac](#) is currently a junior professor (Tenure Track) in the Department of Mathematics and Computer Science at FU Berlin. Her research focuses on exploring discretization methods for the challenges presented in fluctuating hydrodynamics. This interdisciplinary field

addresses random fluctuations and noise within fluid systems, having applications ranging from molecular dynamics to social sciences.

[Read more](#)

+ ISIMM Prize 2024 (ISIMM Medal) Awarded to MATH+ Distinguished Fellow Alexander Mielke



WIAS honorary member and [MATH+ Distinguished Fellow Alexander Mielke](#) has received the prestigious [ISIMM Prize 2024 \(ISIMM Medal\)](#) from the International Society for the Interaction of Mechanics and Mathematics (ISIMM). Congratulations!

This award honors exceptional contributions to the field of mechanics and mathematics, particularly those that highlight the interplay between these disciplines. Mielke has been recognized for his outstanding work and contributions that have significantly impacted both the theoretical and applied aspects of mechanics and mathematics.

He is a retired professor for applied analysis of HU Berlin and a member of the research group “[Partial Differential Equations](#)” at the Weierstrass Institute for Applied Analysis and Stochastics (WIAS) in Berlin.

+ MATH+ Dissertation Award Winners 2023

In cooperation with the Einstein Foundation Berlin, the Berlin Mathematical School (BMS) of MATH+ awards up to three annual prizes to BMS graduates for outstanding dissertations. We are delighted to announce that the MATH+ Dissertation Awards 2023 will be presented to **Dr. Viorel Andrei Bud, Dr. Toyomu Matsuda, and Dr. Arturo Merino**. Congratulations!

The award ceremony will take place on 12 July in combination with the MATH+ Friday followed by the MATH+/BMS Summer Party.

+ The Following BMS Students Have Successfully Completed Their Doctorates

Oliver Gross (TU Berlin)

"Conformal Geometry in Ideal Magnetohydrodynamics"

Likai Jiao (HU Berlin)

"Infinite dimensional Markovian lifts of non-Markovian dynamics - Continuum seed-bank and price impact models"

Laura Claudia Körber (TU Berlin)

"Optimal trading with signals – A Meyer σ -fields framework for stochastic optimal control"

Federico Moretti (HU Berlin)

"Variational aspects of curves and K3 surfaces"

Tobias Paul (HU Berlin)

"The impact of Dormancy on the Ecological, Evolutionary and Pathogenic Properties of Microbial Populations"

Congratulations!

MATH+ Events

Review

+ Keen Interest in the TES Workshop "Quantum Optimal Control - From Mathematical Foundations to Quantum Technologies," 21-24 May 2024 at Zuse Institute Berlin



The [workshop "Quantum Optimal Control"](#) attracted numerous pioneers and young researchers. The program comprised a total of 30 talks and 36 posters on a broad range of current topics at the interface between applied mathematics and theoretical physics, e.g., numerical methods and algorithms for quantum optimal control problems, controllability of quantum systems, quantum thermodynamics

and control of open quantum systems, quantum computing algorithms, and quantum error correction as well as applications to specific model systems (cold atoms in optical lattices, Bose-Einstein condensates, superconductors). In addition, the participants were given the opportunity to learn about

state-of-the-art software tools for quantum optimal control problems within the framework of an integrated software tutorial.

The workshop received great interest and attracted about 100 registered on-site participants so that the registration had to be terminated early. In response to the considerable international interest, a hybrid option was set up at short notice, whereupon a further 50 participants registered for the online stream. The workshop was organized by [Tobias Breiten](#) (TU Berlin), [Patrick Gelß](#) (ZIB), [Markus Kantner](#) (WIAS), and [Christiane Koch](#) (FU Berlin) as a part of the [Thematic Einstein Semester on "Mathematics for Quantum Technologies."](#) The [video recordings of the presentations](#) are now available on the MATH+ YouTube channel.

[Read more](#)

+ [BMS-BGSMath Junior Meeting 2024 at Zuse Institute Berlin](#)



This year's [BMS-BGSMath Junior Meeting](#) took place in Berlin from 26-28 June at the Zuse Institute (ZIB) with 36 participants. BMS Chair Holger Reich welcomed everyone on behalf of BMS and MATH+. The [Berlin Mathematical School \(BMS\)](#) and the [Barcelona Graduate School of Mathematics \(BGSMath\)](#) alternate in organizing regular meetings to share their ambitions for excellent doctoral and

postdoctoral training programs.

The Plenary Talks were presented by [María Ángeles García Ferrero](#) (Instituto de Ciencias Matemáticas/ICMAT) on Partial Differential Equations, [Frank Trujillo](#) (Centre de Recerca Matemàtica/CRM) on Dynamical Systems, [Thibaut Mazuir](#) (HU Berlin) on Symplectic Geometry and Homotopical Algebra, and [Giulia Codenotti](#) (FU Berlin) on Discrete Geometry. Additionally, students introduced their topics of interest with casual elevator talks of 3-5 minutes. The talks were diverse, covering all major areas of mathematics as reflected by the eight areas of the BMS. The event concludes on Friday with the participants joining in the MATH+ Friday. The informal dinner, where the participants got to know each other, was a most enjoyable part of the entire event. Following the usual rotating principle, the next [BMS-BGSMath Junior Meeting](#) will be held in Barcelona in 2026.

Preview

+ [MATH+ Fridays](#)

12 July 2024: [Martin Burger](#) (DESY, Helmholtz Imaging) - [Particle Methods in Machine Learning and Inverse Problems](#) plus [BMS Certificate Ceremony](#) and [Summer Party](#) @PTB Campus (next to TU Berlin)

+ **Spotlight Talks:** every two weeks during the lecture period from April to July.

17 July 2024: [Kamillo Ferry \(AA3-16\)](#) on [Likelihood Geometry of Max-Linear Bayesian Networks](#)

+ [Other events](#)

18 October: MATH+ Day with General Assembly and Election of the new MATH+ Chairs

MATH+ Outreach

+ Excellent Pub Quiz at the “Long Night of the Sciences” (LNDW2024) at TU Berlin



As part of the Long Night of the Sciences (LNDW) on 22 June, MATH+, together with the other six Berlin Cluster of Excellence,



hosted the “Excellent Pub Quiz” at TU Berlin. More than 39 teams and around 130 participants competed for the great prizes. There were many engaging questions, a lot of discussion, and plenty of laughs. The questions covered a variety of research areas representing each cluster, including applied-oriented mathematics, catalysis/green chemistry, AI, neuroscience, active materials, world literature, and liberal democracy.

[Read more](#)

+ WANTED: Your Challenge for the MATH+ Advent Calendar 2024



While most of you enjoy the summer, the MATH+ team has started organizing the next MATH+ Advent Calendar. We cordially invite you to actively participate by **submitting your tricky puzzle**. And as you might have noticed, we have a new Advents Calendar logo!

We strongly encourage you to submit your challenge and present your research to a young and bright audience. Engage your group members and (PhD) students as well! Please consider mathematical puzzles for students in the 10th grade and higher. For inspiration, you can look at previous challenges and solutions on the [Calendar homepage](#). You can send your proposal, including a solution in German and/or English, by 31 August to schools@mathplus.de. If you have any questions or need assistance regarding the MATH+ Advent Calendar, please contact [<schools@mathplus.de>](mailto:schools@mathplus.de).

+ Slammer wanted! Science Slam on 07 November: Present Your Research in a Funny Event!



We are looking for BMS PhD students and MATH+ Postdocs to join our **Science Slam** on **07 November**, which is hosted by the seven Berlin Clusters of Excellence as part of the Berlin Science Week.

This is a fantastic opportunity to present your research in a 10-minute English talk to the general public and compete with PhD students and postdocs from the six other Berlin Clusters of Excellence, each covering different topics. Moreover, it's a great way to practice science communication. Here is a [short video from last year](#). As a bonus, all participating presenters will receive **excellent preparation** from a science slam expert. Plenty of fun is guaranteed, and we would be delighted if you represent MATH+.

If you are interested, please contact Beate Rogler at rogler@mathplus.de as soon as possible.