Berlin Mathematics Research Center

MATH+

22th Newsletter – March 2022

Welcome from the Chair

Dear MATH+ Community,

Our thoughts are naturally with the people in Ukraine in these days; particularly with colleagues, scientists, and students. We have set up a small program to help Ukrainian mathematicians in need, who find themselves in Berlin – please see our website for details.

On a positive note: this month, **Claudia Schillings** has taken up her position as **MATH+ Professor** at FU Berlin, and the **Thomas McCormick** will join the MATH+ community as **MATH+ Distinguished Visiting Scholar** at the end of March, hosted by Martin Skutella. You can find short introductions of them both in the people section below.

You will probably all have seen the email announcing the new **call for research project proposals**! We are looking forward to your exciting ideas. For more details, please check the member's section of MATH+.

As a kind reminder, the **sociological project "MATH+ as a Research Object"** is still waiting for responses by MATH+ postdocs and BMS students in the ongoing survey. Please participate and, thus, influence the outcome and potentially the future.

Our last request also concerns the young scientists. In the coming months, we plan to participate in many events to introduce MATH+ projects to the general public. Thus, we are looking for interested MATH+ members who would like to present their research projects in plain words to non-math audiences. This is an excellent opportunity to enhance your résumé and demonstrate communication skills that are ever more in demand. For those interested, please get in touch with Beate Rogler.

If you have any news that you wish to share regarding your research, publications, prizes, or interesting guests in the other MATH+ communication formats or the next newsletter, please contact Beate Rogler with more details at rogler@mathplus.de.

With best regards,

MATH+ Chair

✚ 2022 Call For MATH+ Projects in the Application Areas, Emerging Fields, and the Transfer Unit

The project-oriented research of MATH+ aims at "Relevant Innovation in Application-Oriented Mathematics" with the overarching objective of "Transforming the World Through Mathematics". MATH+ will pursue this ambitious goal by funding projects that

(1) extend the scope of traditional research in modeling, simulation, and optimization by embracing data-driven approaches and models,

(2) lead to new applications via innovative approaches in new and existing application fields,

(3) progress theory by advancing fundamental mathematics or build new bridges within mathematics, and therefore result in the sustained impact of mathematics on other scientific disciplines, industry, and society.

Please check the members section of the MATH+ website for more details. The MATH+ Central Office will be happy to answer any questions you may have at calls@mathplus.de.

The submission deadline is 10 June 2022.

✚ Reminder to Join Second Online Survey of the Sociological Project "MATH+ as a Research Object"

The second survey round of the online survey for the [sociological project "MATH+ as a Research Object"](#) is still ongoing. We urge all young researchers to support this study and join in.

MATH+ strives to provide comprehensive information and opportunities for improvement in the career paths of its young scientists. Thus, the MATH+ partners at the Berlin Social Science Center (WZB) are currently conducting the second round of an online survey among the MATH+ postdocs as well as the Phase I and Phase II students. The survey is part of the sociological project "MATH+ as a Research Object" that studies MATH+ as an arena for career decisions and academic selection. The project aims to identify existing gender differences in the Cluster of Excellence and provide references for overcoming these differences.

Join in and win one of the MATH+ hoodies!

✚ Support for Ukrainian Mathematicians

MATH+ is offering support for mathematicians from academic institutions in Ukraine, who have recently left the country due to the ongoing Russian attack on Ukraine. This special fellowship program is an offer for refugees from Ukraine, who are already in the Berlin area and hold a master's degree or higher in mathematics or a closely related field and who have pursued mathematical research at a university or other academic institution in Ukraine within the past year (exceptions to this one-year rule may apply due to parental leave etc.). The aim of the program is to enable refugees to continue their research and start new collaborations at one of the mathematics institutes of the universities FU Berlin, HU Berlin, and TU Berlin, as well as the non-university institutes Weierstrass Institute for Applied Analysis and Stochastics (WIAS) and Zuse Institute Berlin (ZIB).

Details of the program

✚ Claudia Schillings: New MATH+ Professor of Numerical Analysis at FU Berlin

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We are delighted that Claudia Schillings has taken up her position as the new MATH+ Professor for Numerical Analysis of Deterministic and Stochastic Partial Differential Equations at FU Berlin this month. She already gave us a glimpse at her work when she spoke at the BMS Days in February about "Uncertainty Quantification and Inverse Problems".

Her research interests are the development and analysis of methods for the treatment of uncertainties within optimization and inverse problems, approximation of complex systems by machine learning techniques, and efficient methods in the high or infinite dimensional setting.

Claudia Schillings studied Applied Mathematics and Computer Science at the University of Trier, where she also received her PhD in 2008. Afterwards, she became a research assistant at the ETH Zurich from 2012 to 2014, followed by a research associate position at the University of Warwick (UK) from 2014-2016. She is also very familiar with the Berlin mathematical community because she was a Visiting Professor at Humboldt Universität twice, in 2015 and 2016. From 2017 until 2022, Claudia Schillings was Professor (W3) and Chair in Mathematical Optimization at the Institute of Mathematics at the University of Mannheim.

✚ MATH+ Distinguished Visiting Scholar Thomas McCormick

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We warmly welcome Professor Thomas McCormick of the Sauder School of Business at the University of British Columbia (UBC) as a MATH+ Distinguished Visiting Scholar at TU Berlin, hosted by Martin Skutella. McCormick has a long history of successfully working with researchers, doctoral students, and postdocs in Berlin.

Thomas McCormick's research interests are combinatorial optimization, network flows, operations management, and computational complexity. His work has a significant impact and covers many topics, yet goes deep within some of those topics, especially the subfields network flows, scheduling, and submodular function minimization. These fields are, in particular, closely related to the MATH+ projects.

The focus of the planned collaboration with Martin Skutella is on new applications of the Discrete Newton Methods (or "Danelagh's Algorithm") for parametrized problems in Combinatorial Optimization. Moreover, Tom McCormick is interested in working with further researchers and BMS students in Berlin, particularly in Discrete Mathematics, Geometry, and potentially also in Machine Learning (submodular function minimization is an important class of problems in this area).

Moreover, he will give a course on Discrete Optimization as part of the MATH+ Friday, and participate in further activities, such as the summer school or outreach activities of MATH+.

+ The Following BMS-Student Have Successfully Completed Their Doctorate

Sophia Sage Elia (FU Berlin)
"On Three Ehrhart Theories & Simplicial Hyperplane Arrangements"

Christoph Hertrich (TU Berlin)
"Facets of Neural Network Complexity"

Antareep Mandal (HU Berlin)
"Uniform sup-norm bounds for Siegel cusp forms"

Mattes Mollenhauer (FU Berlin)
"On the statistical approximation of conditional expectation operators"

Florian Nie (TU Berlin)
"The stochastic F-KPP Equation with dormancy and on/off branching coalescing Brownian motion"

Luis García Ramos (TU Berlin)
"Polynomial and Multilevel Preconditioners for the Helmholtz Equation based on the Shifted Laplacian"

Congratulations!

MATH+ Events

Review

+ BMS Days 2022 and BMS Student Conference

Due to the ongoing pandemic, the BMS Days took place online for the second time, from 21-22 February 2022. This year's online format presented new activities in a mixture of zoom talks, poster sessions, and virtual interactive encounters via the meetingland event platform. The invited 44 applicants were introduced to the graduate school's program and had the opportunity to ask questions about living and studying in Berlin. On the first day, the students received an overview of the BMS program and the students' life in Berlin. The second day gave an insight into different mathematical research topics.

Two mathematical lectures were held by Claudia Schillings, new MATH+ Professor at FU Berlin, on "Uncertainty Quantification and Inverse Problem" and Thomas Walpuski of HU Berlin on "Invariants of manifolds arising from partial differential equations".

The BMS Days were followed again by the BMS Student Conference from 23-25 February. Chris Wendl (HU Berlin) and Peter Schröder (Caltech) gave the plenary talks.

Read more

Preview

✚ Upcoming Thematic Einstein Semester (TES) in Summer Semester 2022
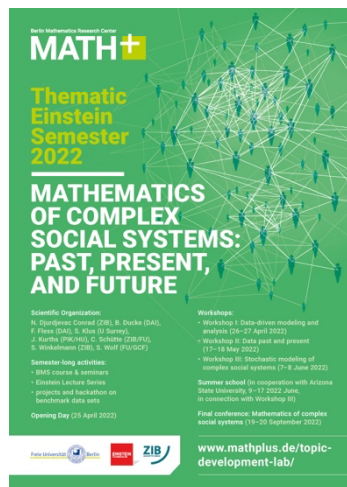
The upcoming TES "The Mathematics of Complex Social Systems: Past, Present, and Future" aims at unlocking the potential for mathematical modeling and reasoning within the extremely large and diversified fields of study that constitute modern social sciences and the humanities. The TES has a two-fold focus on agent-based models (ABMs) and data-driven methods.

To kick off the TES, **the Opening Day on 25 April** will introduce a spectrum of approaches to mathematical analysis of past and present social systems. Also, it will present a few characteristic data sets that will be objects of study in the TES. We invite interested students to participate and investigate these data sets throughout the semester in small interdisciplinary groups.

Registration for the TES events is open:

https://www.conftool.net/tes-summer-2022/

✚ Save the date: Millennium Festival (P vs. NP), Certificate Ceremony, and Summer Party on 01 July

MATH+ will be part of the "Millenium Festival" organized by the German Mathematical Society (DMV), commemorating the 20th anniversary of the Millenium problems in 2000 and what has happened in researching them since. In addition, we'll also take the opportunity to celebrate what's happening in MATH+ and the BMS by celebrating our alumni and awarding them their certificates. Mark your calendars; all of this will happen on **01 July**! More information will follow soon!

✚ MATH+ Fridays

20 May – Euler Lecture: Wolfgang Lück, Bonn
03 June – Tom McCormick, UBC
17 June – Von Mises Lecture: Christoph Reisinger, Oxford