

Mathematisches
Forschungsinstitut
Oberwolfach

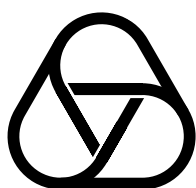
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Jahresbericht Annual Report

2024





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Jahresbericht
Annual Report

2024



Gerhard Huisken (Photo: Gerd Fischer)

Vorwort des Direktors

Im Zentrum unserer Arbeit standen wie jedes Jahr die wissenschaftlichen Veranstaltungen in Oberwolfach – Workshops, Miniworkshops, Seminare und Arbeitsgemeinschaften – sowie die Forschungsaufenthalte unserer Oberwolfach Research Fellows und Oberwolfach Leibniz Fellows. 2024 haben Anträge und Teilnahmen das Niveau der Vor-Corona Zeit wieder vollständig erreicht. So fand ein hochkarätiges Programm statt, wovon Sie sich auf den nachfolgenden Seiten überzeugen können.

In 2024 haben wir in Zusammenarbeit mit unserer Partnerfirma kippdata die webbasierte Evaluierung der Anträge zu unseren wissenschaftlichen Programmen weiter professionalisiert, um den Mitgliedern der wissenschaftlichen Kommission ihre Aufgabe zu erleichtern. Für die Auswahl der Veranstaltungen ist die ehrenamtliche Arbeit der wissenschaftlichen Kommission der Gesellschaft für Mathematische Forschung (GMF) von essentieller Bedeutung. Ich bedanke mich ganz herzlich bei den Mitgliedern der Kommission, die dem Institut ihre wertvolle Zeit und Expertise zur Verfügung stellen, sowie bei den Mitgliedern der GMF für ihren langjährigen Rückhalt.

Ebenso gilt mein Dank den Mitgliedern des Verwaltungsrats und des wissenschaftlichen Beirats

Director's foreword

As every year, our work focused on the scientific events in Oberwolfach – Workshops, Mini-Workshops, Seminars, and Study Groups – as well as the research stays of our Oberwolfach Research Fellows and Oberwolfach Leibniz Fellows. In 2024, applications and participations fully returned to pre-pandemic levels. This resulted in a high-quality program, as you can see on the following pages.

In 2024, we worked with our partner company kippdata to further professionalize the web-based evaluation of proposals for our scientific programs in order to make the work of the members of the Scientific Committee easier. The voluntary work of the Scientific Committee of the Gesellschaft für Mathematische Forschung (Society for Mathematical Research, GMF) is essential for the selection of scientific events. I would therefore like to express my sincere thanks to the members of the Committee, who give their valuable time and expertise to the Institute, as well as to the members of the GMF for their long-standing support.

I would also like to thank the members of the Administrative Council and the Scientific Advisory

für die fachliche Begleitung der langfristigen Entwicklung des Instituts.

„Happy Birthday, Snapshots!“, so titelten wir zu Beginn des Jahres 2024 auf unserer Webseite. In den 10 Jahren seit dem Start des Projekts sind mehr als 130 kurze Artikel aus unterschiedlichen mathematischen Gebieten erschienen und es werden noch viele weitere folgen. Mein Dank gilt allen Forscherinnen und Forschern der wissenschaftlichen Programme in Oberwolfach, die in ihren Beiträgen einen „Schnappschuss“ ihrer aktuellen Forschungsarbeit zeigen, sowie dem Redaktionsteam, das sie dabei unterstützt, komplexe Sachverhalte einem interessierten, mathematikaffinen Publikum verständlich zu machen. Stellvertretend möchte ich die Chefredaktorinnen des Projekts nennen: Carla Cederbaum, die das Projekt im Jahr 2013 mit geplant und aufgebaut hat, Sophia Jahns, die 2019 den Staffelfstab übernahm und Anja Randecker, die das Redaktionsteam seit Ende 2021 leitet.

Grund zur Freude bot auch ein weiteres Projekt unserer Wissenschaftskommunikation: Nach anderthalbjähriger Schließzeit wegen Anbaumaßnahmen durch die Gemeinde Oberwolfach wurde das MiMa – Museum für Mineralien und Mathematik im Juli 2024 wiedereröffnet. Die neu angegliederte Touristeninformation verspricht zunehmende öffentliche Aufmerksamkeit für unsere Mathematikausstellung, was sich in den Besucherzahlen für die zweite Jahreshälfte 2024 bereits niedergeschlagen hat. Gemeinsam mit IMAGINARY haben wir die Ausstellung außerdem inhaltlich weiterentwickelt und ein neues Exponat zu den mathematischen Grundlagen von künstlicher Intelligenz eingerichtet.

Im Rahmen der jährlichen Treffen der Gremien und der Mitgliederversammlung der GMF fand mit der Oberwolfach Vorlesung im Oktober ein Höhepunkt des Jahres statt. Maryna Viazovska von der EPFL Lausanne sprach über „Random Lattices with Symmetries“. Ein herzliches Dankeschön für den spannenden Vortrag!

Ich danke auch unseren Zuwendungsgebern aus Bund und Ländern sowie unseren Drittmittelgebern, der Carl Friedrich von Siemens Stiftung, der National Science Foundation der USA, der Simons Foundation, der Oberwolfach Stiftung und dem Förderverein, für ihre großzügige Unterstützung. Die Drittmittel helfen insbesondere vielen Nachwuchstalenten an unseren Programmen teilzunehmen. Sie helfen dem Institut aber auch dabei, die Aufenthalte für alle Forscherinnen und Forscher weiterhin attraktiv zu gestalten.

Board for their expert guidance in the long-term development of the Institute.

„Happy Birthday, Snapshots!“ was the headline on our website at the beginning of 2024. In the 10 years since the project was launched, more than 130 short articles from various areas of mathematics have been published, and many more will follow. My thanks go to all the researchers in the scientific programs in Oberwolfach who provide a “snapshot” of their current research work in their contributions, as well as to the editorial team who support them in making complex topics understandable to an interested audience with an affinity for mathematics. On behalf of the team, I would like to mention the project’s senior editors: Carla Cederbaum, who helped plan and establish the project in 2013, Sophia Jahns, who took over the baton in 2019, and Anja Randecker, who has been leading the editorial team since the end of 2021.

Another project of our science communication also gave us reason to celebrate: after a year and a half of closure due to expansion work by the municipality of Oberwolfach, the MiMa – Museum of Minerals and Mathematics reopened in July 2024. The newly affiliated tourist information center promises increased public attention for our mathematics exhibition, which has already been reflected in visitor numbers for the second half of 2024. Together with IMAGINARY, we have also further developed the content of the exhibition and added a new exhibit on the mathematical foundations of artificial intelligence.

The Oberwolfach Lecture in October was a highlight of the year, taking place as part of the annual meetings of the committees and the GMF General Assembly. Maryna Viazovska from EPFL Lausanne spoke on “Random Lattices with Symmetries”. Many thanks for the exciting lecture!

I would also like to thank our federal and state funding agencies, as well as our third-party funding providers, the Carl Friedrich von Siemens Foundation, the US National Science Foundation, the Simons Foundation, the Oberwolfach Foundation, and the Friends of Oberwolfach, for their generous support. Third-party funding in particular helps many talented early-career researchers to participate in our programs. It also helps the Institute to continue to make stays here attractive for all researchers.

Besondere Erwähnung verdienen gemeinsame Anstrengungen der Simons Foundation, der Oberwolfach Stiftung und des Landes Baden-Württemberg, dem Institut zusätzlichen finanziellen Freiraum zu schaffen, der für einen Anbau an den Speisesaal genutzt werden wird. Die Planung dazu konnte 2024 auf den Weg gebracht werden. Durch den Anbau gewinnen wir Platz für die Einrichtung eines Buffets und können das Essensangebot besser an die unterschiedlichen Bedürfnisse unserer Gäste anpassen, bei gleichzeitiger Arbeitserleichterung für unsere Hauswirtschaft.

Abschließend danke ich allen Mitarbeiterinnen und Mitarbeitern, die mit ihrem täglichen Engagement den reibungslosen Betrieb des MFO gewährleisten und den Aufenthalt für unsere Gäste so angenehm gestalten.

Special mention should be made of the joint efforts of the Simons Foundation, the Oberwolfach Foundation, and the state of Baden-Württemberg to provide the Institute with additional financial resources, which will be used for an extension to the dining hall. Planning for this project began in 2024. The extension will give us space to set up a buffet and allow us to better tailor the food on offer to the different needs of our guests, while also making work easier for our housekeeping staff.

Finally, I would like to thank all our employees, whose daily commitment ensures the smooth running of the MFO and makes our guests' stay so pleasant.

A handwritten signature in blue ink, reading "Richard Winkler". The signature is written in a cursive style with a large, stylized 'R' and 'W'.

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1. Über das Institut

Auf einen Blick ...

Das Mathematische Forschungsinstitut Oberwolfach (MFO)

- organisiert und fördert mathematische Forschung,
- stärkt die internationale wissenschaftliche Zusammenarbeit,
- organisiert Fortbildungen in der Mathematik und ihren Grenzgebieten,
- und fördert den wissenschaftlichen Nachwuchs.

Das Institut ist Mitglied der Leibniz-Gemeinschaft und wird gemeinsam von Bund und Ländern finanziert.

Was wir tun ...

Das MFO bringt Forschende der Mathematik aus allen Teilen der Welt für einen kurzen, aber intensiven Zeitraum zusammen. Pro Jahr kommen mehr als 2500 Wissenschaftlerinnen und Wissenschaftler, die weltweit zu den führenden Köpfen in ihren Spezialgebieten zählen. Das Institut bietet für sie ideale Bedingungen, um gemeinsam zu forschen, aktuelle Entwicklungen zu diskutieren und neue Ideen zu entwickeln.

Das Programm umfasst hauptsächlich einwöchige Forschungsveranstaltungen für größere und mittlere Gruppen. Daneben gibt es längerfristige Forschungsaufenthalte für kleine Gruppen und Einzelpersonen. Einwöchige Fortbildungsveranstaltungen helfen dabei, sich unter Anleitung von Experten in neue, hoch spezialisierte Gebiete einzuarbeiten.

Wie wir arbeiten ...

Das jeweilige Jahresprogramm wird in einem kompetitiven Verfahren nach streng wissenschaftlichen Kriterien ausgewählt. Forscherinnen und Forscher aus der ganzen Welt können Anträge für Veranstaltungen oder Forschungsaufenthalte einreichen. In der Regel übersteigt die Zahl der Anträge die Kapazität des MFO bei Weitem. Alle Anträge werden von einer wissenschaftlichen Kommission begutachtet. Dieser Kommission gehören circa 20-25 international herausragende Mathematiker und Mathematikerinnen an, welche die gesamte Breite der Mathematik vertreten. Auf der Grundlage ihrer Begutachtung wird das Jahresprogramm festgelegt.

1. About the Institute

At a glance ...

The Mathematisches Forschungsinstitut Oberwolfach (MFO, Oberwolfach Research Institute for Mathematics)

- organizes and promotes mathematical research,
- intensifies international scientific collaboration,
- organizes training activities in mathematics and related areas,
- and promotes early career scientists.

The Institute is a member of the Leibniz Association and is funded jointly by the German federal government and the state governments.

What we do ...

The MFO brings researchers in mathematics from all parts of the world together for a short but intense period. Each year more than 2500 scientists – leading experts in their field – meet at the Institute which provides them with ideal conditions under which to pursue collaborative research, discuss recent developments and to generate new ideas.

The program mainly includes one-week research meetings for large and medium-sized groups. There are also longer-term research stays for small groups and individuals. One-week training events help to quickly immerse yourself with new, highly specialized areas under the guidance of experts.

How we work ...

The annual schedule is chosen in a competitive procedure according to strictly scientific criteria. Researchers from all over the world can submit proposals for scientific events or research stays. The number of proposals usually far exceeds the capacity of the MFO. All proposals are reviewed by a scientific committee. This committee is made up of around 20-25 internationally outstanding mathematicians who together represent the entire spectrum of mathematics. The annual schedule is decided on the basis of their assessment.

2. Neuigkeiten

2.1. Oberwolfach Vorlesung 2024

Jedes Jahr im Oktober findet anlässlich der Zusammenkunft der Gremien des Instituts eine besondere Vorlesung statt. Diese traditionelle Oberwolfach Vorlesung wurde in diesem Jahr von Prof. Dr. Maryna Viazovska (EPFL Lausanne) gehalten. Ein herzliches Dankeschön für den spannenden Vortrag! Eine Videoaufzeichnung ist auf der Webseite des Instituts verfügbar.

2. News

2.1. Oberwolfach Lecture 2024

Every year in October, a special lecture takes place on the occasion of the meeting of all committees of the Institute. This year, the traditional Oberwolfach Lecture was given by Prof. Dr. Maryna Viazovska from EPFL Lausanne. Many thanks for the exciting lecture! The video recording of the lecture is available at the MFO's website.



Maryna Viazovska

Random lattices with symmetries

What is the densest lattice sphere packing in the d -dimensional Euclidean space? In this talk we will investigate this question as dimension d goes to infinity and we will focus on the lower bounds for the best packing density, or in other words on the existence results. I will give a historical overview of the existence of dense lattice packings by H. Minkowski, E. Hlawka, C. L. Siegel, C. A. Rogers, and more recently by S. Vance and A. Venkatesh. For a long time the best asymptotic lower bounds on packing density were known for lattice packings. Recently, a new asymptotic lower bound for sphere packings in high dimensions was proven by M. Campos, M. Jensen, M. Michelin, and J. Sahasrabudhe. This new bound is proven by a combinatorial method and a dense packing guaranteed by their theorem is not necessarily a lattice packing. In the final part of the lecture I will present a recent work done in collaboration with V. Serban and N. Gargava, and Ilaria Viglino on the moments of the number of lattice points in a bounded set for random lattices constructed from a number field.



<https://www.mfo.de/outreach-media/oberwolfach-lectures>

2.2. Nachrufe

Heinz König (1929–2024)

Die Gesellschaft für Mathematische Forschung e.V. und das Mathematische Forschungsinstitut Oberwolfach trauern um Heinz König. Er starb im Frühjahr 2024 im Alter von 94 Jahren. Heinz König war dem MFO viele Jahre eng verbunden und sein Engagement für das Institut war ihm stets wichtig. Er war Mitglied der GMF und im Förderverein des Instituts und hat das MFO auch im hohen Alter noch gerne zu verschiedenen Anlässen besucht.

Die nachfolgende Würdigung der akademischen Leistungen von Heinz König entstammt dem Nachruf der Fakultät für Mathematik und Informatik der Universität des Saarlandes (im Original zuerst veröffentlicht auf der Webseite der Fakultät für Mathematik und Informatik der Universität des Saarlandes: <https://www.uni-saarland.de/fachrichtung/mathematik/single-news/nachruf-der-fakultaet-zum-tod-von-herrn-prof-dr-dr-hc-heinz-koenig-31317.html>). Wir danken den Autoren Prof. Dr. Ernst Albrecht und Prof. Dr. Roland Speicher für die freundliche Genehmigung zur Verwendung.

Professor Dr. Dr. h.c. Heinz König

*Officier de l'Ordre Grand-Ducal de la Couronne de Chêne (Luxembourg)
und korrespondierendes Mitglied der Société Royale des Sciences de Liège*

** 16. Mai 1929*

† 31. März 2024

Der Verstorbene wirkte von 1965 bis zu seiner Emeritierung 1994 als ordentlicher Universitätsprofessor für Mathematik an der Fakultät für Mathematik und Informatik der Universität des Saarlandes. 1970/71 war er Dekan der Mathematisch-Naturwissenschaftlichen Fakultät und 1971 bis 1973 Prorektor und für viele Jahre Senatsbeauftragter für internationale Beziehungen. Zwei ehrenvolle Rufe an die Universitäten Kiel und Heidelberg lehnte er ab.

Prof. Dr. Dr. h.c. König studierte in Kiel, wo er 1952 mit einer Dissertation zur damals sehr neuen und aktuellen Distributionentheorie promoviert wurde. Nach einem anschließenden DFG-Forschungsstipendium in Paris und Assistentenzeit an der Universität Würzburg habilitierte er sich in Würzburg mit einer Schrift zur Multiplikationstheorie der verallgemeinerten Distributionen. 1957 wechselte er nach Aachen, wo er rasch außerplanmäßiger und 1960 außerordentlicher Professor wurde. Von 1962 bis zu seinem Ruf nach Saarbrücken war er ordentlicher Professor an der Universität zu Köln.

In seinen wissenschaftlichen Arbeiten und Büchern entwickelte er originelle Zugänge zu vielen Bereichen der reellen, komplexen und abstrakten Analysis mit Anwendungen in der physikalischen Theorie linearer Systeme bis hin zur Mathematischen Wirtschaftstheorie. 1979 wurde ihm der Dr. rer. pol. h.c. der Universität Karlsruhe verliehen. Nach seiner Emeritierung blieb er weiterhin sehr aktiv und erarbeitete einen neuen Zugang zur Integrationstheorie, der in zwei Monografien zusammengefasst ist.

Die Lehre sowie die Begabtenförderung lagen Professor König sehr am Herzen. Bei seinen stets wohl organisierten Vorlesungen ging er häufig neue Wege, wie auch aus seinen Skripten und Lehrbüchern ersichtlich bleibt. 25 Jahre lang war er Vertrauensdozent der Studienstiftung des deutschen Volkes.

In fachwissenschaftlichen Gremien war Professor König sehr aktiv: So war er von 1964 bis 1980 Mitglied des Wissenschaftlichen Beirates des Mathematischen Forschungsinstituts Oberwolfach. Seit 1967 hat er dort auch 27 Tagungen geleitet oder



mit geleitet. In der Deutschen Forschungsgemeinschaft war er als leitender Fachgutachter für Mathematik und Gründungsmitglied des Auswahl Ausschusses für das Heisenberg-Programm tätig. Er war 1977 bis 1981 Gründungsvorsitzender der Gesellschaft für Mathematik, Ökonomie und Operations Research und anschließend noch sechs Jahre Mitglied im Wissenschaftlichen Beirat dieser Gesellschaft. Von 1965 bis 1994 war er einer der Herausgeber des „Archivs der Mathematik“.

Prof. Dr. Ernst Albrecht
Prof. Dr. Roland Speicher

Eduard Zehnder (1940–2024)

Am 22. November 2024 starb Eduard Zehnder im Alter von 84 Jahren in Greifensee bei Zürich. Mit ihm verliert die mathematische Gemeinschaft eine herausragende Persönlichkeit, die die Forschung auf dem Gebiet der Theorie der dynamischen Systeme und der symplektischen Geometrie maßgeblich geprägt hat.

Eduard Zehnder wurde am 10. November 1940 im schweizerischen Leuggern geboren. Er studierte von 1960 bis 1965 Mathematik an der ETH Zürich und war anschließend als Assistent am Seminar für Theoretische Physik tätig. 1971 promovierte er bei Res Jost mit einer Arbeit *Über das restringierte Drei-Körper-Problem*. Es folgten prägende Jahre am Courant Institute in New York sowie am Institute for Advanced Study in Princeton. Nach Stationen an den Universitäten Erlangen-Nürnberg, Bochum und Aachen wurde Eduard Zehnder 1988 als Professor an die ETH Zürich berufen, wo er bis zu seiner Emeritierung im Jahr 2006 wirkte.

Sein wissenschaftliches Werk umfasst bedeutende Beiträge zur Theorie dynamischer Systeme und zur symplektischen Geometrie. Gemeinsam mit Charles Conley gelang ihm 1983 mit dem Beweis der Arnold-Vermutung ein Durchbruch in einem zentralen Problem der symplektischen Topologie. 1988 definierte er zusammen mit Helmut Hofer die nach beiden benannte Hofer-Zehnder-Kapazität, die eine entscheidende Verbindung zwischen symplektischer Topologie und Hamiltonscher Dynamik darstellte und wichtige neue Entwicklungen vorantrieb.

Die internationale mathematische Gemeinschaft ehrte seine Verdienste unter anderem mit der Einladung zum Plenarvortrag auf dem International Congress of Mathematicians (ICM) 1986 in Berkeley. Seit 1999 war Eduard Zehnder außerdem Mitglied der Deutschen Akademie der Naturforscher Leopoldina.

Neben zahlreichen Fachartikeln verfasste Zehnder mehrere einflussreiche Bücher, die heute als Standardwerke gelten. Das Mathematics Genealogy Project verzeichnet 25 Doktorandinnen und Doktoranden unter seiner Betreuung – einige von ihnen sind inzwischen selbst führende Wissenschaftlerinnen und Wissenschaftler.



Mit dem Mathematischen Forschungsinstitut Oberwolfach war Eduard Zehnder über Jahrzehnte eng verbunden. Seit 1987 nahm er regelmäßig an Tagungen teil und organisierte von 1989 bis 2005 mehrfach den Workshop „Dynamische Systeme“. Er war Mitglied der Gesellschaft für Mathematische Forschung und im Förderverein des Instituts, sowie von 1993 bis 2001 Mitglied der wissenschaftlichen Kommission.

Die Gesellschaft für Mathematische Forschung und das Mathematische Forschungsinstitut Oberwolfach werden ihm ein ehrendes Andenken bewahren.

3. Wissenschaftliches Programm

Das wissenschaftliche Programm wird vom Direktor in Zusammenarbeit mit der wissenschaftlichen Kommission der Gesellschaft für Mathematische Forschung entschieden. Dieses Gremium basiert auf der ehrenamtlichen Arbeit von circa 20-25 hochkarätigen Mathematikern und Mathematikerinnen, welche die gesamte Breite der Mathematik vertreten. Die wissenschaftliche Kommission begutachtet alle wissenschaftlichen Veranstaltungen des Instituts vor ihrer Genehmigung. Das Programm wird in einem wettbewerblichen Verfahren nach streng wissenschaftlichen Kriterien gestaltet. Wie in den Vorjahren erhielt das MFO wesentlich mehr Anträge als genehmigt werden konnten.

3.1. Überblick der Aktivitäten

Die Aktivitäten des MFO gliedern sich in drei Teilbereiche: Kurzzeitige Forschungsveranstaltungen, längerfristige Forschungsaufenthalte und Fortbildungsveranstaltungen. Diese drei Bereiche sind in sechs zentralen wissenschaftlichen Programmen konkretisiert: Workshops und Mini-workshops, Oberwolfach Research Fellows und Oberwolfach Leibniz Fellows sowie Oberwolfach Arbeitsgemeinschaft und Oberwolfach Seminare.

Im Rahmen der sechs wissenschaftlichen Programme gibt es finanzielle Fördermöglichkeiten für den wissenschaftlichen Nachwuchs und etablierte Forscherinnen und Forscher. Einige dieser Fördermöglichkeiten werden durch Drittmittel finanziert.

In Zusammenarbeit mit der Oberwolfach Stiftung fördert das MFO darüber hinaus herausragende Forschungsleistungen von Mathematikern und Mathematikerinnen am Beginn ihrer Karriere durch die Verleihung des Oberwolfach Preises und des John Todd Awards.

Zur Sicherung und weiteren Verbreitung der Ergebnisse aus den Forschungs- und Fortbildungsaktivitäten pflegt das Institut vier Publikationsreihen mit unterschiedlichen Zielgruppen.

Kurzzeitige Forschungsveranstaltungen

Workshops. Der Hauptteil des Jahresprogramms besteht aus etwa 40 einwöchigen Workshops pro Jahr, an denen jeweils bis zu 48 Personen teilnehmen. Alternativ können zwei Workshops halber Größe parallel stattfinden. Die Workshops werden von international führenden

3. Scientific program

The Director of the Institute decides on the scientific program in cooperation with the Scientific Committee of the Gesellschaft für Mathematische Forschung. The committee is based on the honorary work of about 20 to 25 top-class mathematicians, covering all areas of mathematics. The Scientific Committee examines all scientific events at the Institute prior to their approval. The program is fixed in a competitive procedure according to strictly scientific criteria. As in the preceding years, the MFO received many more proposals than could be approved.

3.1. Overview of activities

The activities of the MFO are organized in three subdivisions: short-term research meetings, longer-term research stays and training. These subdivisions are specified in six central scientific programs: Workshops and Mini-Workshops, Oberwolfach Research Fellows and Oberwolfach Leibniz Fellows, as well as Oberwolfach Arbeitsgemeinschaft and Oberwolfach Seminars.

Within these programs, there are special funding opportunities for early career researchers and established researchers. Several of these grants are financed by third party funds.

In cooperation with the Oberwolfach Foundation, the MFO also promotes outstanding research achievements by early career mathematicians by awarding the Oberwolfach Prize and the John Todd Award.

To document and further disseminate the results of its research and training activities, the Institute maintains four publication series with different target groups.

Short-term research meetings

Workshops. The main scientific program consists of about 40 week-long Workshops per year, each with up to 48 participants. Alternatively, there can be two parallel Workshops of half size (24 participants). The Workshops are organized by internationally leading experts in the relevant

Expertinnen und Experten der jeweiligen Fachgebiete organisiert. Teilnehmen kann nur, wer auf ihre Empfehlung hin vom Direktor persönlich eingeladen wurde. Das Ziel der Workshops ist es, gleichermaßen die jüngsten Entwicklungen in einem bestimmten Fachgebiet zu diskutieren und daran anknüpfend neue Forschungsaktivitäten anzustoßen.

Miniworkshops. Ergänzend zu den großen Workshops können an festgelegten Wochen im Jahr jeweils bis zu drei einwöchige Miniworkshops mit jeweils bis zu 16 Teilnehmenden parallel veranstaltet werden. Das Programm richtet sich besonders an den wissenschaftlichen Nachwuchs. Da über die Themen erst ein halbes Jahr im Voraus entschieden wird, ist es möglich, auf aktuelle Entwicklungen schnell zu reagieren.

Tandem-Workshops. Die Idee der Tandem-Workshops ist es, dass zwei Gruppen zu je 16-24 Personen an zwei, üblicherweise weit entfernten Orten über Videokonferenz miteinander interagieren. Vor Ort können sich die Teilnehmenden auf die übliche intensive, direkte Weise austauschen. Zusätzlich können Vorträge mit der Tandem-Gruppe geteilt und gemeinsame Diskussionsrunden veranstaltet werden.

Längerfristige Forschungsaufenthalte

Oberwolfach Research Fellows (OWRF). Dieses Programm ermöglicht es Gruppen von 2-4 Forschenden für einen Zeitraum von 1-4 Wochen an einem vorher festzulegenden Projekt gemeinsam zu arbeiten. Projekte aus allen Gebieten der Mathematik können gefördert werden.

Oberwolfach Leibniz Fellows (OLWF). Nachwuchsforschende können sich zusätzlich für eine Oberwolfach Leibniz Fellowship bewerben. Dies ermöglicht ihnen eine Aufenthaltsdauer von bis zu 3 Monaten, als Einzelperson oder als Teil einer OWRF-Gruppe, sowie eine finanzielle Förderung bis zur Höhe eines Postdoc-Gehalts.

Fortbildungsveranstaltungen

Oberwolfach Arbeitsgemeinschaft. Die Idee der Arbeitsgemeinschaft ist es, sich unter Anleitung international anerkannter Spezialisten durch eigene Vorträge in ein neues, aktuelles Gebiet einzuarbeiten. Die Arbeitsgemeinschaft findet dreimal jährlich für jeweils eine Woche statt. Sie richtet sich sowohl an den wissenschaftlichen Nachwuchs als auch an etablierte Forscherinnen und Forscher. Das Thema einer Arbeitsgemeinschaft wird im Gespräch mit den Teilnehmenden

fields. Participation is subject to a personal invitation by the Director after recommendation of the organizers. The aim of the Workshops is at the same time to discuss the latest developments in a specific subject area and, based on this, to initiate new research activities.

Mini-Workshops. In addition to the large Workshops, up to three one-week Mini-Workshops can be held in parallel on specific weeks of the year, each with up to 16 participants. The Mini-Workshops are aimed especially at early career researchers. Since the subjects are fixed only half a year before the Mini-Workshops take place, they allow to react to very recent developments.

Tandem-Workshops. The idea of Tandem-Workshops is that two groups of 16-24 people in two, usually distant locations interact with each other via video conference. On site, participants can exchange ideas in the usual intensive, direct way. In addition, a number of lectures or discussion sessions can be shared with the tandem group.

Longer-term research stays

Oberwolfach Research Fellows (OWRF). The program enables groups of 2-4 researchers to work together on a previously defined project for a period of 1-4 weeks. Projects from all areas of mathematics can be supported.

Oberwolfach Leibniz Fellows (OLWF). Early career researchers may additionally apply for an Oberwolfach Leibniz Fellowship. This enables them to stay for up to 3 months, as an individual or as part of an OWRF group, as well as financial support up to the amount of a postdoctoral salary.

Training activities

Oberwolfach Arbeitsgemeinschaft. The idea of the Oberwolfach Arbeitsgemeinschaft (study group) is to learn about a new active topic by giving a lecture on it, guided by leading international specialists. The Arbeitsgemeinschaft meets three times per year for one week each time. It is aimed both at established and early career researchers. The topic of an Arbeitsgemeinschaft is chosen in discussion with participants of the previous meeting one year in

der Arbeitsgemeinschaft des Vorjahres festgelegt. Die Arbeitsgemeinschaft wird von Prof. Dr. Martin Hairer, Prof. Dr. Peter Scholze und Prof. Dr. Andreas Thom koordiniert.

Oberwolfach Seminare. Die Oberwolfach Seminare sind einwöchige Veranstaltungen, die sechsmal im Jahr stattfinden. Sie werden von führenden Experten der jeweiligen Fachgebiete organisiert und wenden sich an Promovierende und Postdoktoranden aus aller Welt. Das Ziel ist es, 24 Teilnehmerinnen und Teilnehmer in ein besonders aktuelles Arbeitsgebiet einzuführen.

Banach Center – Oberwolfach Graduate Seminare. In Ergänzung zu den sechs jährlichen Oberwolfach Seminaren starteten im Jahr 2019 die „Banach Center – Oberwolfach Graduate Seminars“. Sie werden in Zusammenarbeit mit dem Forschungsinstitut für Mathematik (Banach Center) der Polnischen Akademie der Wissenschaften (IMPAN) organisiert und finden im Konferenzzentrum Będlewo statt. Die Seminare richten sich an Promovierende und Postdoktoranden aus der ganzen Welt.

IMO Vorbereitungswoche. Das Institut beherbergt traditionell die abschließende Trainingswoche für besonders begabte Schülerinnen und Schüler zur Vorbereitung auf die Internationale Mathematik-Olympiade (IMO).

Finanzielle Fördermöglichkeiten

Simons Visiting Professors. Das Simons Visiting Professors (SVP) Programm wird durch die Simons Foundation finanziert. Das Programm unterstützt jährlich bis zu 40 führende Forscherinnen und Forscher von außerhalb Europas, die eine Teilnahme an einem Oberwolfacher Workshop mit einem Aufenthalt an einer europäischen Universität kombinieren möchten. Die Höhe der Förderung beträgt 135 € pro Tag des Gastaufenthalts an der Universität und wird für bis zu zwei Wochen gezahlt. Die beteiligten Universitäten stellen Unterkünfte für die Dauer des Besuchs an der Universität zur Verfügung und tragen die Reisekosten innerhalb Europas zwischen Oberwolfach und der Universität. Über die Förderung entscheidet der Direktor auf Vorschlag der Organisatorinnen und Organisatoren eines Workshops.

Oberwolfach Leibniz Graduate Students. Das MFO unterstützt die Teilnahme von im Durchschnitt fünf Oberwolfach Leibniz Graduate Students (OWLG) an den Oberwolfach Workshops. Gefördert werden exzellente Promovierende oder frisch Promovierte bis zu zwei Jahre nach der Promotion, insbesondere durch

advance. The Arbeitsgemeinschaft is coordinated by Prof. Dr. Martin Hairer, Prof. Dr. Peter Scholze and Prof. Dr. Andreas Thom.

Oberwolfach Seminars. The Oberwolfach Seminars are week-long events taking place six times per year. They are organized by leading experts in the field and are meant for postdocs and Ph.D. students from all over the world. They aim at introducing 24 participants to a particularly hot development.

Banach Center – Oberwolfach Graduate Seminars. In addition to the six annual Oberwolfach seminars, the “Banach Center – Oberwolfach Graduate Seminars” started in 2019. The seminars are organized in cooperation with the Institute of Mathematics (Banach Center) of the Polish Academy of Sciences (IMPAN) and take place at the conference center in Będlewo. They are aimed at doctoral candidates and postdocs from all around the world.

IMO training week. The Institute traditionally hosts the final training week for especially gifted pupils to prepare for the International Mathematical Olympiad (IMO).

Grants

Simons Visiting Professors. The Simons Visiting Professors (SVP) program is funded by the Simons Foundation. The program annually supports up to 40 Simons Visiting Professors, distinguished scientists from outside Europe, who wish to combine an invitation to an Oberwolfach Workshop with a research visit to a European university of up to two weeks. The program provides support to each Simons Visiting Professor by Oberwolfach amounting to 135 € per day of the university visit. Additionally, the participating universities are required to provide accommodation for the duration of the visit at the university as well as travel expenses within Europe between Oberwolfach and the university as a matching of this support. The SVP awards are decided by the Director on suggestion of the organizers of a Workshop.

Oberwolfach Leibniz Graduate Students. The MFO supports the participation of an average of five doctoral students per Oberwolfach Workshop. This program fosters excellent graduate students and recent postdocs (the Ph.D./Dr. degree must be received not more than two years ago), in particular by the reimbursement

Reisekostenunterstützung. Es handelt sich um fünf zusätzliche Plätze pro Workshop, die für die OWLG reserviert sind und nicht durch etablierte Forscher besetzt werden dürfen.

US Junior Oberwolfach Fellows. Das MFO fördert die Teilnahme von herausragenden Nachwuchsforscherinnen und -forschern US-amerikanischer Universitäten in allen einwöchigen Programmen des Instituts. Diese Förderung ist möglich dank der Unterstützung der amerikanischen National Science Foundation (NSF).

Oberwolfach Foundation Fellows. Dieses Förderprogramm der Oberwolfach Stiftung erlaubt es dem MFO, eingeladene exzellente Nachwuchsforscherinnen- und -forscher bei ihren Reisekosten zu unterstützen. Das MFO kann durchschnittlich einer Person pro Woche bis zu 1000 € der Reisekosten erstatten. Bewerben können sich alle eingeladenen Teilnehmerinnen und Teilnehmer, deren Promotion nicht länger als 10 Jahre zurückliegt, und die nachweislich von Orten mit unzureichender Unterstützung für den wissenschaftlichen Nachwuchs kommen.

Förderung der Oberwolfach Seminare. Die Carl Friedrich von Siemens Stiftung unterstützt die Oberwolfach Seminare seit 2008 mit einem substanziellen Beitrag. Dank dieser Unterstützung können Teilnehmende auf Antrag einen Zuschuss zu ihren Reisekosten erhalten.

Publikationen

Das MFO veröffentlicht vier Publikationsreihen und unterstützt dabei die Idee von Open Access. Mit Ausnahme der Buchreihe „Oberwolfach Seminars“ sind alle Veröffentlichungen elektronisch frei verfügbar.

Oberwolfach Reports. Um die Ergebnisse der Workshops einem international weiteren Kreis zugänglich zu machen wurde 2004 die Buchserie „Oberwolfach Reports“ (OWR) gegründet. In Zusammenarbeit mit EMS Press erscheint sie jährlich mit vier Ausgaben von insgesamt mehr als 3.000 Seiten als Print- und Onlineversion. Die OWR beinhalten erweiterte Kurzfassungen aller Vorträge der Workshops, Miniworkshops und Arbeitsgemeinschaften im Umfang von jeweils ein bis drei Seiten.

Oberwolfach Seminars. Diese Buchreihe entsteht in Zusammenarbeit mit dem Birkhäuser Programm des Springer Verlags (Basel) und macht den Inhalt der Oberwolfach Seminare für ein größeres Publikum zugänglich.

of travel costs. For this program, each Oberwolfach Workshop is given an extra capacity of five places which may not be taken by established researchers.

US Junior Oberwolfach Fellows. The MFO supports the participation of outstanding early career researchers from US universities in all weekly programs of the Institute. This is possible thanks to the support of the US National Science Foundation (NSF).

Oberwolfach Foundation Fellows. This grant financed by the Oberwolfach Foundation enables the MFO to support invited excellent early career researchers with regard to their travel. It allows to reimburse travel expenses up to an amount of 1000 € for one early career researcher on average in every week. Invited participants coming from places with insufficient support for early career researchers to the MFO, with Dr./Ph.D. not longer than 10 years ago, can apply.

Support of the Oberwolfach Seminars. The Carl Friedrich von Siemens Foundation has been supporting the Oberwolfach Seminars with a substantial contribution since 2008. Thanks to this support, participants can apply for a subsidy for their travel expenses.

Publications

The MFO has four distinct publication series and supports the idea of open access. Hence, all publications are freely available, with the exception of the book series “Oberwolfach Seminars”.

Oberwolfach Reports. The Oberwolfach Reports (OWR) were initiated in 2004 to make the results of the workshops accessible to an even broader international audience. In collaboration with EMS Press they appear quarterly as print and online edition. The four issues comprise more than 3,000 pages per year. The OWR contain extended abstracts of all given talks of every Workshop, Mini-Workshop and Arbeitsgemeinschaft, with one to three pages per talk.

Oberwolfach Seminars. This is a book series in collaboration with the Birkhäuser program of Springer (Basel). In this series, the material of the Oberwolfach Seminars is made available to an even larger audience.

Oberwolfach Preprints. In den Oberwolfach Preprints (OWP) werden hauptsächlich Resultate von längerfristigen Forschungsaufenthalten (OWRF und OWLF) publiziert.

Schnappschüsse moderner Mathematik aus Oberwolfach. In den „Schnappschüssen“ werden aktuell diskutierte mathematische Ideen, Konzepte und Probleme für die mathematisch interessierte Öffentlichkeit zugänglich gemacht.

In Kapitel 3.11 sind sämtliche im Berichtsjahr erschienen Publikationen aufgelistet.

Preise

Oberwolfach Preis. Der Oberwolfach Preis wird etwa alle drei Jahre von der Oberwolfach Stiftung in Kooperation mit dem MFO an exzellente Nachwuchsforscherinnen und -forscher verliehen. Der Preis ist für ausgezeichnete Errungenschaften in jeweils wechselnden Gebieten der Mathematik ausgelobt und mit 10.000 Euro dotiert. Die Auswahl aus den Nominierten trifft die wissenschaftliche Kommission der Gesellschaft für Mathematische Forschung.

John Todd Award. Das MFO verleiht ebenfalls etwa alle drei Jahre zusammen mit der Oberwolfach Stiftung den John Todd Award für Nachwuchsforscherinnen und -forscher auf dem Gebiet der numerischen Analysis. Der John Todd Award ist mit 1.000 Euro dotiert.

Teilnahme am Leibniz MMS Netzwerk

Als Mitglied der Leibniz-Gemeinschaft nimmt das MFO am Netzwerk „Mathematical Modelling and Simulation“ (MMS) teil. Das Thema spielt in vielen Aktivitäten des Instituts eine Rolle. Im Jahr 2024 fanden insgesamt 27 einwöchige Veranstaltungen statt, die verschiedene Aspekte dieses Forschungsfeldes aufgriffen.

3.2. Jahresprogramm 2024

Im Jahr 2024 wurden 43 Workshops während 40 Wochen, 12 Mini-Workshops während 4 Wochen, 3 Arbeitsgemeinschaften während 3 Wochen, 6 Oberwolfach Seminare während 3 Wochen und 6 weitere Fortbildungsveranstaltungen während 6 Wochen durchgeführt. Alle kurzzeitigen Veranstaltungen sind jeweils mit einer kurzen Beschreibung in den Kapiteln 3.3 – 3.8. dargestellt.

Im Programm Oberwolfach Research Fellows wurden 33 Projekte mit einem Forschungsaufenthalt am MFO gefördert. Sieben Personen

Oberwolfach Preprints. The Oberwolfach Preprints mainly contain research results related to a longer stay in Oberwolfach (OWRF and OWLF).

Snapshots of modern mathematics from Oberwolfach. In the “snapshots”, currently discussed mathematical ideas, concepts and problems are made accessible to the mathematically interested public.

Chapter 3.11 lists all publications published in the reporting year.

Prizes

Oberwolfach Prize. The Oberwolfach Prize is awarded by the Oberwolfach Foundation in cooperation with the MFO to excellent early career researchers. The prize is awarded for excellent achievements in changing fields of mathematics. It amounts to 10,000 Euro. The selection from the nominees is made by the Scientific Committee of the Gesellschaft für Mathematische Forschung.

John Todd Award. The Oberwolfach Foundation awards in cooperation with the MFO approximately every three years the John Todd Award to early career scientists in numerical analysis. The John Todd Award amounts to 1,000 Euro.

Participation in the Leibniz MMS Network

As a member of the Leibniz Association, the MFO participates in the Leibniz network “Mathematical Modelling and Simulation” (MMS). The topic is present in many activities at Oberwolfach. In 2024 a total of 27 week-long events which covered various aspects of the MMS area of research took place.

3.2. Annual schedule 2024

In the year 2024, 43 Workshops during 40 weeks, 12 Miniworkshops during 4 weeks, 3 Arbeitsgemeinschaften during 3 weeks, 6 Oberwolfach Seminars during 3 weeks and 6 further training activities during 6 weeks have taken place. All short-term events are presented with a short description in sections 3.3 – 3.8.

The Oberwolfach Research Fellows program, supported 33 projects with a research stay at the MFO. Seven individuals benefited from an

profitierten von einer Oberwolfach Leibniz Fellowship am MFO. Die Gruppen und Einzelpersonen aus den längerfristigen Programmen sind mit ihren Aufenthaltsdaten in den Kapiteln 3.9 und 3.10 aufgeführt.

Oberwolfach Leibniz Fellowship at the Institute. The groups and individuals from the longer-term programs are listed with their stay dates in chapters 3.9 and 3.10.

Ingesamt nahmen ca. 2.500 Personen an allen Programmen des MFO teil, davon ca. 25% aus Deutschland, 42% aus anderen europäischen Ländern und 33% aus dem nicht-europäischen Ausland.

In total, around 2,500 persons attended the Oberwolfach programs, about 25% from Germany, 42% from other European countries, and 33% from non-European countries.

Die überwiegende Mehrheit der Forscherinnen und Forscher nahm vor Ort an den Programmen teil. Die virtuellen Teilnahmen verringerten sich weiter auf etwa 6%.

The majority of researchers participated on site. Virtual participation further decreased to around 6%.

Das Institut legt großen Wert darauf, dass alle Gebiete der Mathematik und ihre Grenzgebiete, auch im Hinblick auf Anwendungen, vertreten sind. Das nachfolgende Tagungsprogramm belegt diese Politik.

The Institute emphasizes that all fields of mathematics and related areas are represented, including applications. The following schedule of meetings gives proof of this policy.

Workshops

ID	Date	Title
2402	7 Jan – 12 Jan 2024	Fracture as an Emergent Phenomenon
2403	14 Jan – 19 Jan 2024	Cluster Algebras and Its Applications
2404	21 Jan – 26 Jan 2024	Discrete Geometry
2406	4 Feb – 9 Feb 2024	Applications of Optimal Transportation
2407	11 Feb – 16 Feb 2024	Interfaces, Free Boundaries and Geometric Partial Differential Equations
2408	18 Feb – 23 Feb 2024	Analysis, Geometry and Topology of Positive Scalar Curvature Metrics
2409	25 Feb – 1 Mar 2024	Hyperbolic Balance Laws: Interplay between Scales and Randomness
2410	3 Mar – 8 Mar 2024	Mechanics of Materials: Multiscale Design of Advanced Materials and Structures
2411a	10 Mar – 15 Mar 2024	Combinatorial $\ast$ -algebras
2411b	10 Mar – 15 Mar 2024	Nonlinear Optics: Physics, Analysis, and Numerics
2412	17 Mar – 22 Mar 2024	K-Stability, Birational Geometry and Mirror Symmetry
2413	24 Mar – 29 Mar 2024	Proof Complexity and Beyond
2416	14 Apr – 19 Apr 2024	Hochschild (Co)Homology and Applications
2417	21 Apr – 26 Apr 2024	Applied Harmonic Analysis and Data Science
2418	28 Apr – 3 May 2024	Non-commutative Function Theory and Free Probability
2419a	5 May – 10 May 2024	Real and Logarithmic Enumerative Geometry
2419b	5 May – 10 May 2024	Game-theoretic Statistical Inference: Optional Sampling, Universal Inference, and Multiple Testing Based on E-values
2420	12 May – 17 May 2024	Statistical Physics and Random Surfaces
2422	26 May – 31 May 2024	Constrained Dynamics, Stochastic Numerical Methods and the Modeling of Complex Systems
2423	2 Jun – 7 Jun 2024	Complexity Theory
2424	9 Jun – 14 Jun 2024	Geometrie

ID	Date	Title
2425	16 Jun – 21 Jun 2024	Arrangements, Matroids and Logarithmic Vector Fields
2426	23 Jun – 28 Jun 2024	Statistics and Learning Theory in the Era of Artificial Intelligence
2427	30 Jun – 5 Jul 2024	Model Hierarchies in Atmosphere, Ocean, and Climate Sciences
2428	7 Jul – 12 Jul 2024	Algebraic Geometry: Wall Crossing and Moduli Spaces, Varieties and Derived Categories
2429	14 Jul – 19 Jul 2024	Arithmetic Geometry
2430	21 Jul – 26 Jul 2024	Topologie
2431	28 Jul – 2 Aug 2024	Polynomial Optimization for Nonlinear Dynamics: Theory, Algorithms, and Applications
2432	4 Aug – 9 Aug 2024	Mathematical Aspects of General Relativity
2433	11 Aug – 16 Aug 2024	Calculus of Variations
2434	18 Aug – 23 Aug 2024	Mathematics, Statistics, and Geometry of Extreme Events in High Dimensions
2435	25 Aug – 30 Aug 2024	Homotopical Algebra and Higher Structures
2436	1 Sep – 6 Sep 2024	Explicit Methods in Number Theory
2437	8 Sep – 13 Sep 2024	Riemann Surfaces: Random, Flat, and Hyperbolic Geometry
2438	15 Sep – 20 Sep 2024	Recent Developments in Dirichlet Form Theory and Related Fields
2439a	22 Sep – 27 Sep 2024	MATRIX-MFO Tandem Workshop: Invariants in Low-Dimensional Topology: Combinatorics, Geometry, and Computation
2439b	22 Sep – 27 Sep 2024	MFO-RIMS Tandem Workshop: Algebraic Geometry and Noncommutative Projective Varieties
2440	29 Sep – 4 Oct 2024	Anabelian Geometry and Representations of Fundamental Groups
2444	27 Oct – 1 Nov 2024	Deep Learning for PDE-based Inverse Problems
2445	3 Nov – 8 Nov 2024	Directions in Rough Analysis
2446	10 Nov – 15 Nov 2024	Combinatorial Optimization
2449	1 Dec – 6 Dec 2024	Representations of p -adic Groups
2451	15 Dec – 20 Dec 2024	Convex Geometry and its Applications

Miniworkshops

ID	Date	Title
2405a	28 Jan – 2 Feb 2024	Mini-Workshop: Artin Groups meet Triangulated Categories
2405b	28 Jan – 2 Feb 2024	Mini-Workshop: Bridging Number Theory and Nichols Algebras via Deformations
2405c	28 Jan – 2 Feb 2024	Mini-Workshop: Permutation Patterns
2415a	7 Apr – 12 Apr 2024	Mini-Workshop: Growth and Expansion in Groups
2415b	7 Apr – 12 Apr 2024	Mini-Workshop: Mathematics of Entropic AI in the Natural Sciences
2415c	7 Apr – 12 Apr 2024	Mini-Workshop: New Horizons in Linear Dynamics, Universality, and the Invariant Subspace Problem
2447a	17 Nov – 22 Nov 2024	Mini-Workshop: Mixing Times in the Kardar–Parisi–Zhang Universality Class
2447b	17 Nov – 22 Nov 2024	Mini-Workshop: Critical Phenomena of the XY Model

ID	Date	Title
2447c	17 Nov – 22 Nov 2024	Mini-Workshop: Infinite-dimensional Kac-Moody Lie Algebras in Supergravity and M Theory
2450a	8 Dec – 13 Dec 2024	Mini-Workshop: Geometry of Random Fields and Random Walk Clusters: New Horizons
2450b	8 Dec – 13 Dec 2024	Mini-Workshop: High-Dimensional Control Problems and Mean-Field Equations with Applications in Machine Learning
2450c	8 Dec – 13 Dec 2024	Mini-Workshop: Data-driven Modeling, Analysis, and Control of Dynamical Systems

Arbeitsgemeinschaften

ID	Date	Title
2414	31 Mar – 5 Apr 2024	Arbeitsgemeinschaft: Geometry and Representation Theory around the $P=W$ Conjecture
2441	6 Oct – 11 Oct 2024	Arbeitsgemeinschaft: Quantum Signal Processing and Non-linear Fourier Analysis
2442	13 Oct – 18 Oct 2024	Arbeitsgemeinschaft: Algebraic K-Theory and the Telescope Conjecture

Oberwolfach Seminars

ID	Date	Title
2421a	19 May – 24 May 2024	Oberwolfach Seminar: Classification of C^* -Algebras and Dynamics
2421b	19 May – 24 May 2024	Oberwolfach Seminar: Long-Time Behavior in Fluids
2443a	20 Oct – 25 Oct 2024	Oberwolfach Seminar: Metric Topology of Aspherical Spaces
2443b	20 Oct – 25 Oct 2024	Oberwolfach Seminar: Reduction of Arithmetic Varieties
2448a	24 Nov – 29 Nov 2024	Oberwolfach Seminar: Exponential Motives
2448b	24 Nov – 29 Nov 2024	Oberwolfach Seminar: Control and Machine Learning

Further training activities

ID	Date	Title
2403a	17 Jan – 19 Jan 2024	ELLIS-Workshop: Multimodal Learning Systems
2407a	14 Feb – 16 Feb 2024	ELLIS-Workshop: Semantic, Symbolic and Interpretable Machine Learning
2409a	26 Feb – 28 Feb 2024	ELLIS-Workshop: Interactive Learning and Interventional Representations
2413a	25 Mar – 27 Mar 2024	ELLIS-Workshop: Natural Language Processing
2420a	11 May – 18 May 2024	Trainings- und Abschlussseminar für die Internationale Mathematik-Olympiade
2442a	13 Oct – 19 Oct 2024	Banach Center – Oberwolfach Graduate Seminar: Black Holes and Conformal Infinities of Spacetime

3.3. Workshops

Workshop 2402



07.01. – 12.01.2024

Organizers:

Fracture as an Emergent Phenomenon

Patrick Diehl, Baton Rouge
Robert Lipton, Baton Rouge
Anna Pandolfi, Milano
Thomas Wick, Hannover

Abstract

The mechanics of fracture propagation provides essential knowledge for the risk tolerance design of devices, structures, and vehicles. Techniques of free energy minimization provide guidance, but have limited applicability to material systems evolving away from equilibrium. Experimental evidence shows that the material response depends on driving forces arising from mechanical fields. Recent years have witnessed the development of new methods for modeling complex dynamic and quasistatic fracture. The focus of this workshop was on the most advanced techniques for modeling fracture, represented by eigenerosion methods, variational approaches, phase field fracture models, and non-local approaches. Technical progress is contingent on the further development of the mathematical framework underlying these techniques. This is necessary for accurate and reliable computational modeling of fracture for multiple freely propagating cracks.

Participants

Aksoylu, Burak (San Antonio), Bellido, Jose C. (Ciudad Real), Bhattacharya, Debdeep (Salt Lake City), Bobaru, Florin (Lincoln), Boddin, Samira (Kassel), Buczkowski, Nicole (Worcester), Carrara, Pietro (Zürich), Celiker, Fatih (Detroit), Dal Maso, Gianni (Trieste), Darmicheli, Davood (Baton Rouge), Dayal, Kaushik (Pittsburgh), De Lorenzis, Laura (Zürich), Diehl, Patrick (Baton Rouge), Dolbow, John (Durham), Foss, Mikil (Lincoln), Freddi, Francesco (Parma), Hermann, Alexander (Geesthacht), Hild, Francois (Gif-sur-Yvette), Jha, Prashant K. (Portsmouth), Kalina, Martha (Dresden), Khimin, Denis (Hannover), Knees, Dorothee (Kassel), Kolditz, Leon Maximilian (Hannover), Kosin, Viktor (Hannover), Lancioni, Giovanni (Ancona), Larsen, Christopher J. (Worcester), Lipton, Robert (Baton Rouge), Lopez-Pamies, Oscar (Urbana), Maurini, Corrado (Paris), Muha, Boris (Zagreb), Negri, Matteo (Pavia), Neitzel, Ira (Bonn), Ongaro, Greta (Roma), Pandolfi, Anna (Milano), Partmann, Kai (Siegen), Parvizi, Maryam (Hannover), Pernatii, Anna (Magdeburg), Prudhomme, Serge (Montréal), Radu, Petronela (Lincoln), Riccobelli, Davide (Milano), Roubicek, Tomas (Praha), Samarawickrama, Nuwanthi (Baton Rouge), Sander, Oliver (Dresden), Schmidt, Bernd (Augsburg), Schweitzer, Marc Alexander (Bonn), Scott, James (New York), Seleson, Pablo (Oak Ridge), Shojaei, Arman (Geesthacht), Thomas, Marita (Berlin), Toader, Rodica (Trieste), Trask, Nathaniel (Albuquerque), Truskinovsky, Lev (Paris), von Wahl, Henry (Jena), Vrgoc, Ana (Zagreb), Weinberg, Kerstin (Siegen), Wick, Thomas (Hannover), Wieners, Christian (Karlsruhe), Wollner, Winnifried (Hamburg), Yu, Rena C. (Ciudad Real), Yu, Yue (Bethlehem)



14.01. – 19.01.2024

Organizers:

Cluster Algebras and Its Applications

Karin Baur, Leeds

Bethany Marsh, Leeds

Ralf Schiffler, Storrs

Sibylle Schroll, Köln

Abstract

This workshop focused on recent developments in cluster algebras and their applications as well as interactions with other areas of mathematics. In addition to new advances in the theory of cluster algebras themselves, it included applications to knot theory and geometry as well as interactions with representation theory and categorification, Grassmannians, combinatorics, geometric surfaces models and Lie theory.

Participants

Baur, Karin (Leeds), Bazier-Matte, Véronique (Québec), Brüstle, Thomas (Sherbrooke), Buan, Aslak Bakke (Trondheim), Canakci, Ilke (Amsterdam), Coelho Simoes, Raquel (Lancaster), de Laporte, Bea (Köln), Faber, Eleonore (Graz), Felikson, Anna (Durham), Fock, Vladimir V. (Strasbourg), Garcia, Monica (Versailles), Garcia Elsener, Ana (Mar del Plata), Geiss, Christof (Ciudad de México), Gekhtman, Michael (Notre Dame), Gratz, Sira (Aarhus), Gunawan, Emily (Lowell), Holm, Thorsten (Hannover), Hörmayer, Julia (Leeds), Iyama, Osamu (Tokyo), Jin, Haibo (Köln), Kaipel, Maximilian (Köln), Keller, Bernhard (Paris), Kelley, Elizabeth (Urbana), King, Alastair (Bath), Klász, Viktória (Bonn), Krause, Henning (Bielefeld), Labardini-Fragoso, Daniel (Ciudad de México), Leclerc, Bernard (Caen), Lee, Kyungyong (Tuscaloosa), Marsh, Bethany Rose (Leeds), Morier-Genoud, Sophie (Reims), Mou, Lang (Köln), Nakanishi, Tomoki (Nagoya), Palu, Yann (Amiens), Plamondon, Pierre-Guy (Versailles), Pressland, Matthew (Glasgow), Qin, Fan (Shanghai Shi), Reading, Nathan (Raleigh), Reineke, Markus (Bochum), Schiffler, Ralf (Storrs), Schröer, Jan (Bonn), Schroll, Sibylle (Köln), Serhiyenko, Khrystyna (Lexington), Shapiro, Michael (East Lansing), Snepenger, Anja (Leeds), Thomas, Hugh R. (Montréal), Todorov, Gordana (Boston), Weng, Daping (Davis), Williams, Lauren K. (Cambridge), Williams, Nicholas (Lancaster), Yildirim, Emine (Leeds)



21.01. – 26.01.2024

Organizers:

Discrete Geometry

Karim Adiprasito, Jerusalem

Xavier Goaoc, Villers-les-Nancy

Zuzana Patáková, Praha

Abstract

A number of important recent developments in various branches of discrete geometry were presented at the workshop. The presentations illustrated both the diversity of the area and its strong connections to other fields of mathematics such as convex geometry, combinatorics, or topology. Two open problem sessions highlighted the abundance of open questions and many of the results presented were obtained by young researchers, confirming the vitality of the field.

Participants

Adiprasito, Karim (Paris), Aronov, Boris (Brooklyn), Avvakumov, Sergey (Toronto), Barany, Imre (Budapest), Barvinok, Alexander (Ann Arbor), Brandenburg, Marie-Charlotte (Leipzig), Bukh, Boris (Pittsburgh), Frankl, Nora (Milton Keynes), Frick, Florian (Pittsburgh), Fulek, Radoslav (Brooklyn), Gladkov, Nikita (Los Angeles), Goaoc, Xavier (Villers-lès-Nancy), Greenfeld, Rachel (Evanston), Henk, Martin (Berlin), Holmsen, Andreas (Daejeon), Jung, Attila (Budapest), Kalai, Gil (Jerusalem), Keller, Chaya (Ariel), Kleist, Linda (Braunschweig), Kyncl, Jan (Praha), Linial, Nathan (Jerusalem), Liu, Gaku (Seattle), McGinnis, Daniel (Ames), Montejano, Luis (Ciudad de México), Nevo, Eran (Jerusalem), Oliveros, Deborah (Juriquilla Queretaro), Pach, János (Budapest), Padrol, Arnau (Barcelona), Pak, Igor (Los Angeles), Paták, Pavel (Praha), Patáková, Zuzana (Praha), Philippe, Eva (Paris), Pohoata, Cosmin (Princeton), Raz, Orit (Jerusalem), Roldán-Pensado, Edgardo (Morelia, Michoacán), Rote, Günter (Berlin), Sanyal, Raman (Frankfurt am Main), Sauermann, Lisa (Bonn), Schnider, Patrick (Zürich), Sharir, Micha (Tel Aviv), Soberón, Pablo (New York), Solymosi, József (Vancouver), Steiner, Raphael Mario (Zürich), Tancer, Martin (Praha), Tardos, Gábor (Budapest), Tomon, Istvan (Umeå), Tóth, Csaba Dávid (Los Angeles), van Handel, Ramon (Princeton), Walczak, Bartosz (Kraków), Welzl, Emo (Zürich), Yap, Corrine (Atlanta), Zakharov, Dmitrii (Cambridge), Zeng, Ji (La Jolla), Zerbib, Shira (Ames), Zhao, Yufei (Cambridge)



04.02. – 09.02.2024

Organizers:

Applications of Optimal Transportation

Guillaume Carlier, Paris

Maria Colombo, Lausanne

Virginie Ehrlacher, Marne de la Vallée

Daniel Matthes, Garching

Abstract

The mathematical theory of optimal transportation is constantly expanding its range of application, while applications give impulses for new research directions in the field. This workshop was specifically devoted to applications of optimal transportation in the natural sciences, and to the recent developments of the theory that have been motivated by these. The bouquet of current applications includes mathematical models for large-scale air motion, dynamics of plasmas, material design, pattern formation in fluids, collective behaviour in biology, and many more. Related theoretical developments are in the analysis of the Hellinger-Kantorovich metric for modeling reaction-diffusion processes, and in efficient numerical methods for multi-marginal optimal transport, to name two of many examples encountered in this workshop.

Participants

Ambrosio, Luigi (Pisa), Baradat, Aymeric (Villeurbanne), Benamou, Jean-David (Paris), Bourne, David (Edinburgh), Brenier, Yann (Orsay), Bruna, Maria (Cambridge), Buttazzo, Giuseppe (Pisa), Cancès, Clément (Villeneuve d'Ascq), Carlier, Guillaume (Paris), Chizat, Lenaïc (Lausanne), Colombo, Maria (Lausanne), Cotar, Codina (London), David, Noemi (Villeurbanne), Di Marino, Simone (Genova), Dumas, Annette (Villeurbanne), Dusson, Geneviève (Besançon), Ehrlacher, Virginie (Marne-la-Vallée), Eichinger, Katharina (Palaiseau), Erbar, Matthias (Bielefeld), Fathi, Max (Paris), Friesecke, Gero (Garching bei München), Gallouët, Thomas (Orsay), Gozlan, Nathael (Paris), Kim, Inwon C. (Los Angeles), Laschos, Vaïos (Berlin), Lavanant, Hugo (Milano), Malamut, Hugo (Paris), Matthes, Daniel (Garching bei München), McCann, Robert J. (Toronto), Mérigot, Quentin (Orsay), Mielke, Alexander (Berlin), Natale, Andrea (Lille), Nenna, Luca (Orsay), Otto, Felix (Leipzig), Pass, Brendan (Edmonton), Pegon, Paul (Paris), Radici, Emanuela (L'Aquila), Santambrogio, Filippo (Villeurbanne), Savaré, Giuseppe (Milano), Schlichting, André (Münster), Schmidtchen, Markus (Dresden), Silini, Lauro (Zürich), Slepcev, Dejan (Pittsburgh), Sylvestre, Maxime (Paris), Todeschi, Gabriele (Marne-la-Vallée), Ullrich, Anton (Leipzig), Vialard, François-Xavier (Marne-la-Vallée), Wirth, Benedikt (Münster), Yao, Yao (Singapore), Zimmer, Johannes (Garching bei München)



11.02. – 16.02.2024

**Interfaces, Free Boundaries and Geometric Partial
Differential Equations**

Organizers:

Charlie Elliott, Coventry
Harald Garcke, Regensburg
Barbara Niethammer, Bonn
Gieri Simonett, Nashville

Abstract

Partial differential equations arising in the context of interfaces and free boundaries encompass a flourishing area of research. The workshop focused on new developments and emerging new themes. At the same time also new interesting results on more traditional areas like, e.g. regularity theory and classical numerical approaches have been addressed. By convening experts from various disciplines related to modeling, analysis, and numerical methods concerning interfaces and free boundaries, the workshop facilitated progress on longstanding open questions and paved the way for novel research directions.

Participants

Abels, Helmut (Regensburg), Alphonse, Amal (Berlin), Bao, Weizhu (Singapore), Bartels, Sören (Freiburg i. Br.), Bothe, Dieter (Darmstadt), Bronsard, Lia (Hamilton), Chambolle, Antonin (Paris), Deckelnick, Klaus (Magdeburg), Djurdjevac, Ana (Berlin), Elliott, Charles M. (Coventry), Fischer, Julian (Klosterneuburg), Garcke, Harald (Regensburg), Giga, Mi-Ho (Tokyo), Giga, Yoshikazu (Tokyo), Grasselli, Maurizio (Milano), Grün, Günther (Erlangen), Hieber, Matthias (Darmstadt), Hintermüller, Michael (Berlin), Hinze, Michael (Koblenz), King, John R. (Nottingham), Knopf, Patrik (Regensburg), Kornhuber, Ralf (Berlin), Kovács, Balázs (Paderborn), Laux, Tim (Regensburg), Liu, Chun (Chicago), Marveggio, Alice (Bonn), Mavrikakis, Achilleas (Coventry), Niethammer, Barbara (Bonn), Nochetto, Ricardo H. (College Park), Novaga, Matteo (Pisa), Nürnberg, Robert (Trento), Olshanskii, Maxim A. (Houston), Pluda, Alessandra (Pisa), Poiatti, Andrea (Milano), Pozzi, Paola (Essen), Ranner, Tom (Leeds), Reusken, Arnold (Aachen), Röger, Matthias (Dortmund), Sales, Tom (Coventry), Schubert, Richard (Bonn), Sethian, James A. (Berkeley), Simonett, Gieri (Nashville), Stinner, Björn (Coventry), Styles, Vanessa (Brighton), Trautwein, Dennis (Regensburg), Ullrich, Clemens (Erlangen), Venkataraman, Chandrasekhar (Brighton), Voigt, Axel (Dresden), Wagner, Barbara A. (Berlin), Wang, Changyou (West Lafayette), Wilke, Mathias (Halle / Saale), Wittmann, Julia (Regensburg), Zahedi, Sara (Stockholm)



18.02. – 23.02.2024

Analysis, Geometry and Topology of Positive Scalar Curvature Metrics

Organizers:

Bernd Ammann, Regensburg
Bernhard Hanke, Augsburg
Anna Sakovich, Uppsala

Abstract

Riemannian metrics with positive scalar curvature play an important role in differential geometry and general relativity. To investigate these metrics, it is necessary to employ concepts and techniques from global analysis, geometric topology, metric geometry, index theory, and general relativity. This workshop brought together researchers from a variety of backgrounds to combine their expertise and promote cross-disciplinary exchange.

Participants

Allen, Brian (Bronx), Ammann, Bernd (Regensburg), Baldauf, Julius (Cambridge), Bär, Christian (Potsdam), Besson, Gérard (Grenoble), Bettiol, Renato G. (Bronx), Bryden, Edward (Antwerpen-Wilrijk), Burkhardt-Guim, Paula (New York), Burtscher, Annegret (Nijmegen), Carlotto, Alessandro (Povo), Carron, Gilles (Nantes), Cecchini, Simone (College Station), Cederbaum, Carla (Tübingen), Chow, Tsz-Kiu Aaron (Cambridge), Chruściel, Piotr T. (Wien), Dahl, Mattias (Stockholm), Deruelle, Alix (Orsay), Ebert, Johannes (Münster), Engel, Alexander (Greifswald), Frenck, Georg (Augsburg), Frerichs, Helge (Augsburg), Gicquaud, Romain (Tours), Glöckle, Jonathan (Regensburg), Goette, Sebastian (Freiburg i. Br.), Graf, Melanie (Hamburg), Große, Nadine (Freiburg i. Br.), Hanke, Bernhard (Augsburg), Hertl, Thorsten (Freiburg i. Br.), Hirsch, Sven (Durham), Huang, Lan-Hsuan (Storrs), John, Florian (Freiburg i. Br.), Konno, Hokuto (Tokyo), Körber, Thomas (Wien), Kröncke, Klaus (Stockholm), Kubota, Yosuke (Kyoto), Lee, Dan A. (New York), Lee, Man-Chun (Shatin, N.T., Hong Kong), Ludewig, Matthias (Regensburg), Mazzeo, Rafe (Stanford), Mondello, Ilaria (Créteil), Oronzio, Francesca (Stockholm), Ozuch, Tristan (Cambridge), Piazza, Paolo (Roma), Piubello, Annachiara (Potsdam), Roero, Rebecca (Potsdam), Sakovich, Anna (Uppsala), Schick, Thomas (Göttingen), Schönlinner, Lukas (Augsburg), Seipel, Julian (Regensburg), Semmelmann, Uwe (Stuttgart), Sormani, Christina (New York), Tony, Thomas (Münster), Tsiamis, Raphael (New York), Unger, Ryan (Stanford), Wang, Yipeng (New York), Weinberger, Shmuel (Chicago), Wiemeler, Michael (Münster), Wilking, Burkhard (Münster), Wolff, Markus (Stockholm), Zeidler, Rudolf (Münster), Zhu, Jintian (Hangzhou, Zhejiang)



25.02. – 01.03.2024

Hyperbolic Balance Laws: Interplay between Scales and Randomness

Organizers:

Remi Abgrall, Zürich
Mauro Garavello, Milano
Mária Lukáčová-Medvidová, Mainz
Konstantina Trivisa, College Park

Abstract

Hyperbolic balance laws are fundamental in the mathematical modeling of transport-dominated processes in natural, socio-economic and engineering sciences. The aim of the workshop was to discuss open questions in the area of nonlinear hyperbolic conservation and balance laws. We have focused on a delicate interplay between scale hierarchies and random/stochastic effects and discuss them from analytical, numerical and modeling point of view. This leads to questions of admissibility criteria connecting to ill-posedness of weak entropy solutions, hyperbolic problems with non-local terms, mean field theory, multiscale and structure preserving numerical methods, random solutions and uncertainty quantification methods, as well as data-based methods.

Participants

Abgrall, Remi (Zürich), Barsukow, Wasilij (Talence), Boscarino, Sebastiano (Catania), Chertock, Alina (Raleigh), Colombo, Rinaldo M. (Brescia), Dumbser, Michael (Trento), Feireisl, Eduard (Praha), Freistühler, Heinrich (Konstanz), Garavello, Mauro (Milano), Giesselmann, Jan (Darmstadt), Helzel, Christiane (Düsseldorf), Herty, Michael (Aachen), Holden, Helge (Trondheim), Klingenberg, Christian (Würzburg), Kröner, Dietmar (Freiburg i. Br.), Kukavica, Igor (Los Angeles), Kurganov, Alexander (Shenzhen, Guangdong Province), Liu, Yongle (Zürich), Lukáčová-Medvidová, Mária (Mainz), Maire, Pierre-Henri (Le Barp), May, Sandra (Uppsala), Micalizzi, Lorenzo (Raleigh), Nocita, Claudia (Pavia), Oberlack, Martin (Darmstadt), Öffner, Philipp (Mainz), Petrova, Iuliia (Rio de Janeiro), Puppo, Gabriella A. (Roma), Ricchiuto, Mario (Talence), Rohde, Christian (Stuttgart), Russo, Giovanni (Catania), Schömer, Andreas (Mainz), She, Bangwei (Beijing), Shu, Chi-Wang (Providence), Simonis, Stephan (Karlsruhe), Spinolo, Laura (Pavia), Tadmor, Eitan (College Park), Thein, Ferdinand (Aachen), Thomann, Andrea (Villers-lès-Nancy), Trivisa, Konstantina (College Park), Vilar, Francois (Montpellier), Warnecke, Gerald (Magdeburg), Westdickenberg, Michael (Aachen), Yuan, Yuhuan (Nanjing)



03.03. – 08.03.2024

Mechanics of Materials: Multiscale Design of Advanced Materials and Structures

Organizers:

Samuel Forest, Evry
David McDowell, Atlanta
Stefan Müller, Bonn
Ewald Werner, München

Abstract

Materials can now be designed and architected like structural components for targeted mechanical and physical properties. Structures and microstructures should not be studied independently and their design will benefit from a multiscale approach combining nonlinear continuum mechanics approaches and physical descriptions of elasticity, viscoplasticity, phase transformations and damage of microstructures, at various scales. The aim of the workshop was to gather outstanding junior and senior researchers in the various branches of mathematics, physics and engineering sciences suited to address the question of design of materials and structures by means of multiscale discrete and continuum approaches to their constitutive behavior. Examples include atomic or macroscopic lattices, random or periodic cellular materials, smart materials like shape memory alloys, 3D woven composites, acoustic and electromagnetic metamaterials, etc.

Participants

Amouzou-Adoun, Yaovi Armand (Metz), Antretter, Thomas (Leoben), Ask, Anna (Chatillon), Bardella, Lorenzo (Brescia), Berbenni, Stephane (Metz), Blaszczyk, Mischa (Bochum), Böhlke, Thomas (Karlsruhe), Capolungo, Laurent (Los Alamos), Doskar, Martin (Praha), El-Azab, Anter A. (West Lafayette), Flachberger, Wolfgang (Leoben), Forest, Samuel (Évry), Hochrainer, Thomas (Graz), Huber, Jakob Martin (Garching bei München), Husert, Markus (Paris), Jebahi, Mohamed (Metz), Kästner, Markus (Dresden), Kiefer, Björn (Freiberg), Kienzler, Reinhold (Bremen), Knees, Dorothee (Kassel), Kochmann, Dennis M. (Zürich), Kouznetsova, Varvara (Eindhoven), Kreisbeck, Carolin (Eichstätt), Krempaszky, Christian (Garching bei München), Lewintan, Peter (Karlsruhe), Marian, Jaime (Los Angeles), McDowell, David L. (Atlanta), Mesarovic, Sinisa (Pullman), Milton, Graeme (Salt Lake City), Müller, Stefan (Bonn), Schlömerkemper, Anja (Würzburg), Schneider, Matti (Essen), Schulz, Katrin (Karlsruhe), Segurado, Javier (Getafe (Madrid)), Stupkiewicz, Stanislaw (Warszawa), Svendsen, Robert (Aachen), Weinberg, Kerstin (Siegen), Werner, Ewald A. (Garching bei München), Wieners, Christian (Karlsruhe), Xiong, Liming (Raleigh), Xu, Shuozhi (Norman), Yavari, Arash (Atlanta), Zwicknagl, Barbara (Berlin)



10.03. – 15.03.2024

Organizers:

Combinatorial $\ast$ -algebras

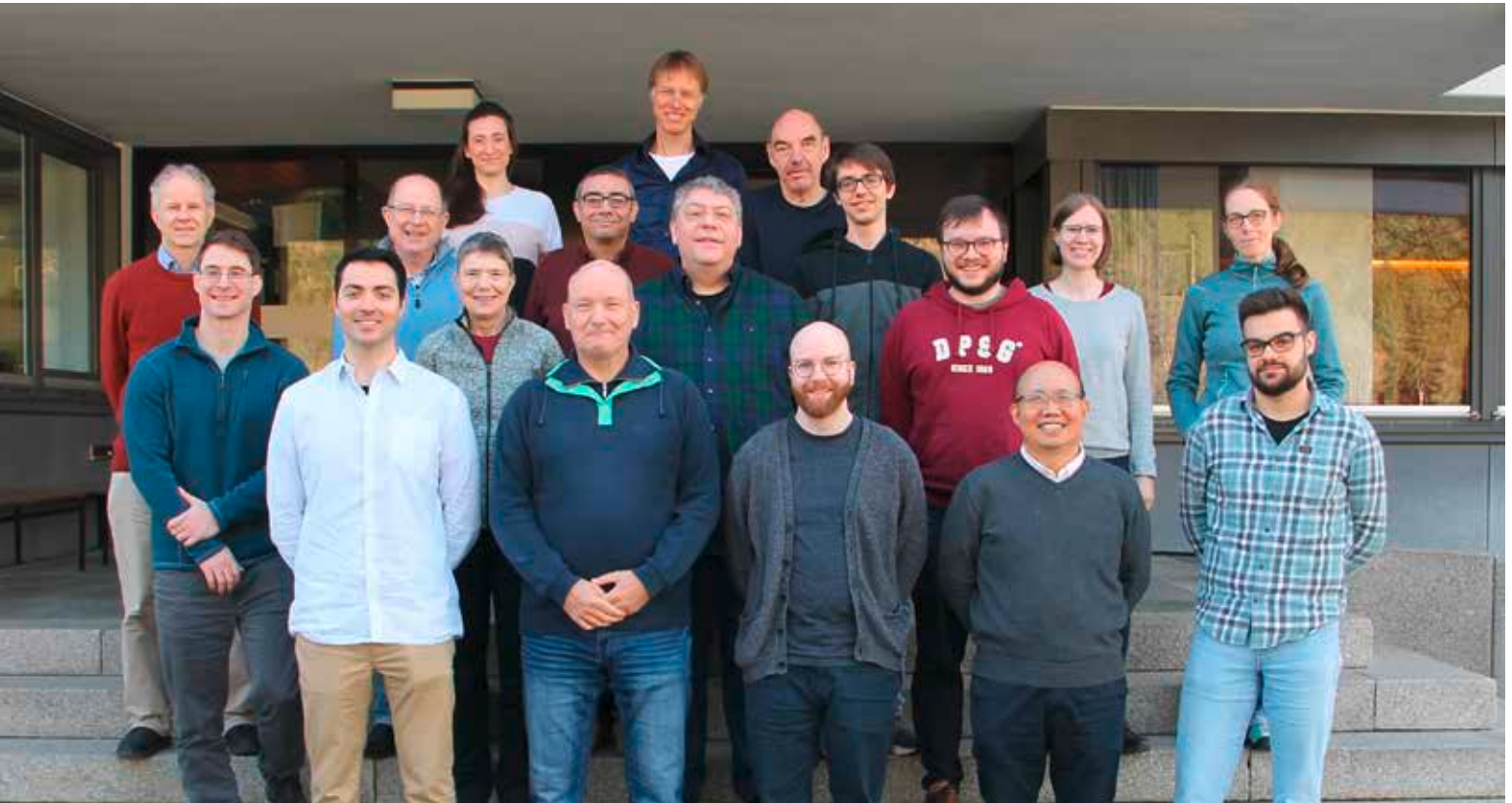
Guillermo Cortiñas, Buenos Aires
Søren Eilers, Copenhagen
Elizabeth Gillaspy, Missoula
Roosbeh Hazrat, Sydney

Abstract

This workshop aimed to strengthen ties and foster collaborations between different communities working on combinatorial $\ast$ -algebras, including $C^\ast$ - and pure algebraists. The participants ranged from leading experts in the field to younger researchers and also some graduate students. Twenty-five 50min talks presented a wide range of the latest results on the theory and its applications, reflecting a good mix of nationalities and age groups.

Participants

Ánh, Pham Ngoc (Budapest), Ara, Pere (Bellaterra, Barcelona), Armstrong, Becky (Wellington), Arnone, Guido (Buenos Aires), Brix, Kevin Aguyar (Lund), Clark, Lisa Orloff (Wellington), Cortiñas, Guillermo (Buenos Aires), Dor-On, Adam (Haifa), Duwenig, Anna (Leuven), Eilers, Søren (København), Gillaspy, Elizabeth (Missoula), Gonçalves, Daniel (Florianópolis), Hazrat, Roosbeh (Perth), Li, Huanhuan (Hefei), Li, Xin (Glasgow), Martinez, Diego (Münster), McCormick, Kathryn (Long Beach), Meyer, Ralf (Göttingen), Nam, Tran Giang (Hanoi), Pardo, Enrique (Puerto Real), Ruiz, Efrén (Hilo), Sims, Aidan (Wollongong), Steinberg, Benjamin (New York), Tanner, Owen (Glasgow), Taylor, Jonathan (Potsdam), Vas, Lia (Philadelphia)



10.03. – 15.03.2024

Organizers:

Nonlinear Optics: Physics, Analysis, and Numerics

Kurt Busch, Berlin

Ramy El-Ganainy, Houghton

Marlis Hochbruck, Karlsruhe

Abstract

When high-intensity electromagnetic waves at optical frequencies interact with solids and/or nanostructures the materials' response cannot anymore be described via simple linear relations. The resulting science of nonlinear optics has recently witnessed exiting developments that have brought to the fore numerous mathematical challenges that need to be addressed in order to fully exploit the opportunities that result from these developments. The mathematical modeling involves a system of partial differential equations where the Maxwell equations are coupled to evolution equations of the materials and their response to electromagnetic fields. Typically, the full coupled systems are quite complicated or even intractable so that the derivation, the analysis, and the numerical treatment of simplified effective models is often indispensable. In turn, this requires the close cooperation between researchers from theoretical physics and analysis/numerics in order to push forward the field on nonlinear optics.

Participants

Appel, Heiko (Hamburg), Bandelow, Uwe (Berlin), Bao, Weizhu (Singapore), Busch, Kurt (Berlin), Döding, Christian (Bonn), Dörich, Benjamin (Karlsruhe), Dörner, Julian (Karlsruhe), El-Ganainy, Ramy (Houghton), Giacomotti, Alejandro (Talence), Hochbruck, Marlis (Karlsruhe), Kullig, Julius (Magdeburg), Lubich, Christian (Tübingen), Makris, Konstantinos (Heraklion), Nicaise, Serge (Valenciennes), Richter, Maria (Berlin), Rodriguez Echarri, Alvaro (Berlin), Ruff, Maximilian (Karlsruhe), Scheid, Claire (Nice), Schneider, Guido (Stuttgart), Staliunas, Kestutis (Barcelona), Verfürth, Barbara (Bonn)



17.03. – 22.03.2024

Organizers:

K-Stability, Birational Geometry and Mirror Symmetry

Thibaut Delcroix, Montpellier

Liana Heuberger, Bath

Susanna Zimmermann, Orsay

Abstract

The workshop “K-stability, Birational Geometry and Mirror Symmetry” presented recent advances in all three topics, in the form of research level mini-courses, research talks and lightning talk sessions. Deep interactions between the three topics were highlighted, together with applications (e.g. to K-moduli or subgroups of the Cremona groups) and new directions (such as non-Archimedean methods in K-stability and Mirror Symmetry).

Participants

Alves da Silva, Eduardo (Orsay), Araujo, Carolina (Rio de Janeiro), Barros, Ignacio (Antwerpen), Blanc, Jérémy (Neuchâtel), Boitrel, Aurore (Orsay), Bot, Anna (Basel), Boucksom, Sébastien (Paris), Castravet, Ana-Maria (Versailles), Cheltsov, Ivan (Edinburgh), Delcroix, Thibaut (Montpellier), Denisova, Elena (Edinburgh), Duarte Guerreiro, Tiago (Colchester), Duncan, Alexander R. (Columbia), Etxabbarri Alberdi, Erroxe (Nottingham), Fong, Pascal (Orsay), Gugiatti, Giulia (Trieste), Hausen, Jürgen (Tübingen), Heuberger, Liana (Bath), Kaloghiros, Anne-Sophie (Uxbridge), Lee, King-Leung (Montpellier), Legendre, Eveline (Villeurbanne), Liu, Yuchen (Evanston), Martinez-Garcia, Jesus (Colchester), Mazzon, Enrica (Regensburg), Monin, Leonid (Lausanne), Nghiem, Tran-Trung (Montpellier), Petracci, Andrea (Bologna), Pille-Schneider, Léonard (Regensburg), Pinardin, Antoine (Edinburgh), Půček, Roland (Jena), Schaller, Karin (Berlin), Schneider, Julia (Zürich), Sharma, Shreya (Columbia), Smith, Jonathan (Columbia), Süß, Hendrik (Jena), Tipler, Carl (Brest), Tsakanikas, Nikolaos (Lausanne), Urech, Christian (Zürich), Wang, Ying (Ann Arbor), Wisniewski, Jaroslaw (Warszawa), Wrobel, Milena (Oldenburg), Xie, Zhixin (Vandoeuvre-lès-Nancy), Yasinsky, Egor (Talence), Zikas, Sokratis (Futuroscope Chasseneuil)



24.03. – 29.03.2024

Organizers:

Proof Complexity and Beyond

Albert Atserias, Barcelona

Meena Mahajan, Chennai

Jakob Nordström, Copenhagen/Lund

Alexander Razborov, Chicago

Abstract

Proof complexity is a multi-disciplinary research area that addresses questions of the general form “how difficult is it to prove certain mathematical facts?” The current workshop focused on recent advances in our understanding that the analysis of an appropriately tailored concept of “proof” underlies many of the arguments in algorithms, geometry or combinatorics research that make the core of modern theoretical computer science. These include the analysis of practical Boolean satisfiability (SAT) solving algorithms, the size of linear or semidefinite programming formulations of combinatorial optimization problems, the complexity of solving total NP search problems by local methods, and the complexity of describing winning strategies in two-player round-based games, to name just a few important examples.

Participants

Andrews, Robert (Princeton), Atserias, Albert (Barcelona), Beame, Paul (Seattle), Beckmann, Arnold (Swansea), Berkholz, Christoph (Ilmenau), Blekherman, Greg (Atlanta), Bonacina, Ilario (Barcelona), Bonet, Maria Luisa (Barcelona), Buss, Samuel (La Jolla), Carboni Oliveira, Igor (Coventry), Carmosino, Marco (Boston), Choudhury, Abhimanyu (Tamil Nadu, Chennai), Conneryd, Jonas (Lund), de Rezende, Susanna F. (Lund), Fijalkow, Joanna (Talence), Fleming, Noah (St. John’s), Galesi, Nicola (Roma), Ghannane, Yassine (København), Göös, Mika (Lausanne), Grohe, Martin (Aachen), Hakoniemi, Tuomas (Helsinki), Håstad, Johan (Stockholm), Hirsch, Edward A. (Ariel), Hrubes, Pavel (Praha), Itsykson, Dmitry (Beer-Sheva), Janett, Duri Andrea (København), Jeřábek, Emil (Praha), Kasche, Kaspar (Jena), Kolodziejczyk, Leszek (Warszawa), Kolokolova, Antonina (St. John’s), Kothari, Pravesh K. (Princeton), Lauria, Massimo (Roma), Mahajan, Meena (Tamil Nadu, Chennai), Müller, Moritz (Passau), Nordström, Jakob (København), Pang, Shuo (København), Papamakarios, Theodoros (Chicago), Pitassi, Toniann (New York), Potechin, Aaron (Chicago), Pudlak, Pavel (Praha), Raymond, Annie (Amherst), Razborov, Alexander A. (Chicago), Risse, Kilian (Lausanne), Robere, Robert (Montréal), Santhanam, Rahul (Oxford), Sofronova, Anastasia (Lausanne), Sokolov, Dmitry (Lausanne), Thapen, Neil (Praha), Toran, Jacobo (Ulm), Tulsiani, Madhur (Chicago), Tzameret, Iddo (London), Vinyals, Marc (Auckland)



14.04. – 19.04.2024

Organizers:

Hochschild (Co)Homology and Applications

Bernhard Keller, Paris
Henning Krause, Bielefeld
Wendy Lowen, Antwerpen
Andrea Solotar, Buenos Aires

Abstract

In 1945 Gerhard Hochschild published “On the cohomology groups of an associative algebra” in the “Annals of Mathematics” and thereby created what is now called Hochschild theory. The subject not only provides interesting homological invariants; it also serves as a link connecting algebra, topology, and geometry. The focus of the meeting was on recent developments, for instance in the study of singularities, deformations, and representations.

Participants

Barmeier, Severin (Köln), Belmans, Pieter (Esch-sur-Alzette), Bergh, Petter A. (Trondheim), Besson, Jules (Paris), Bian, Xiuli (Köln), Booth, Matt (Lancaster), Borges Marques, Violeta (Antwerpen), Campos, Ricardo (Toulouse), Canesin, Ricardo (Paris), Chen, Xiao-Wu (Hefei, Anhui Province), Cibils, Claude (Montpellier), Das, Sourav (Kelambakkam), Dotsenko, Vladimir (Strasbourg), Erdmann, Karin (Oxford), Gomez, Juan Omar (Bielefeld), Goodbody, Isambard (Glasgow), Han, Yang (Beijing), Hermans, Lander (Antwerpen), Jasso, Gustavo (Lund), Kaipel, Maximilian (Köln), Kaledin, Dmitry (Moscow), Karadag, Tekin (Athens), Keller, Bernhard (Paris), Konovalov, Andrei (Essen), Krause, Henning (Bielefeld), Küng, Felix (Bruxelles), Lehmann, Alessandro (Antwerpen), Liu, Miantao (Paris), Lowen, Wendy (Antwerpen), Manikandan, Naageswaran (Berlin), Marcos, Eduardo N. (São Paulo), Mertens, Arne (Antwerpen-Wilrijk), Muro, Fernando (Sevilla), Ocal, Pablo (Los Angeles), Parker, Chris (Bielefeld), Pevtsova, Julia (Seattle), Rossi Bertone, Fiorela (Bahia Blanca), Rubio y Degraffi, Leonard (Uppsala), Schedler, Travis (London), Schroll, Sibylle (Köln), Skvortsov, Evgeny (Mons), Solberg, Oeyvind (Trondheim), Solotar, Andrea (Buenos Aires), Stevenson, Greg (Aarhus), Suarez-Alvarez, Mariano (Buenos Aires), Symons, Julie (Antwerpen-Wilrijk), Touzé, Antoine (Villeneuve d'Ascq), Vespa, Christine (Marseille), Wang, Haoyu (Hefei), Wang, Yu (Jinzhong), Wang, Zhengfang (Nanjing), Witherspoon, Sarah (College Station), Zhou, Guodong (Shanghai Shi), Zimmermann, Alexander (Amiens), Zvonareva, Alexandra (Stuttgart)



21.04. – 26.04.2024

Organizers:

Applied Harmonic Analysis and Data Science

Ingrid Daubechies, Durham

Gitta Kutyniok, München

Holger Rauhut, München

Abstract

Data science is a field of major importance for science and technology nowadays and poses a large variety of challenging mathematical questions. The area of applied harmonic analysis has a significant impact on such problems by providing methodologies both for theoretical questions and for a wide range of applications in machine learning, as well as in signal and image processing. Building on the success of previous workshops on applied harmonic analysis, this workshop focused on several exciting directions, such as mathematical theory of deep learning, phase-retrieval time-frequency analysis, and sampling on t-design curves, and discussed open problems in the field.

Participants

Achour, El Mehdi (Aachen), Alaifari, Rima (Zürich), Araya, Ernesto (München), Balan, Radu (College Park), Bandeira, Afonso S. (Zürich), Bartolomaeus, Wiebke (München), Bölcskei, Helmut (Zürich), Boyer, Claire (Paris), Calderbank, A. Robert (Durham), Chou, Hung-Hsu (Garching bei München), Cipriani, Cristina (Garching bei München), Daubechies, Ingrid (Durham), De Mol, Christine (Bruxelles), Dirksen, Sjoerd (Utrecht), Dörfler, Monika (Wien), Faulhuber, Markus (Wien), Fono, Adalbert (München), Foucart, Simon (College Station), Gribonval, Remi (Lyon), Gröchenig, Karlheinz (Wien), Grohs, Philipp (Wien), Hoppe, Frederik (Aachen), Kohn, Kathlén (Stockholm), Koke, Christian (Garching bei München), Krahmer, Felix (Garching bei München), Küng, Richard (Linz), Kutyniok, Gitta (München), Langer, Sophie (Enschede), Laus, Hannah (Garching bei München), Maly, Johannes (München), Matveev, Maria (München), Mixon, Dustin G. (Columbus), Needell, Deanna (Los Angeles), Pfander, Götz (Ingolstadt), Rauhut, Holger (München), Razin, Noam (Ramat Aviv, Tel Aviv), Schnass, Karin (Innsbruck), Schönlieb, Carola-Bibiane (Cambridge), Seleznova, Mariia (München), Shalova, Anna (Eindhoven), Singh, Manjot (München), Soltanolkotabi, Mahdi (Los Angeles), Steinerberger, Stefan (Seattle), Stöger, Dominik (Eichstätt), Thesing, Laura (München), Trunschke, Philipp (Nantes), Voigtlaender, Felix (Ingolstadt)



28.04. – 03.05.2024

Organizers:

Non-commutative Function Theory and Free Probability

Kelly Bickel, Lewisburg

Michael Hartz, Saarbrücken

John E. McCarthy, Saint Louis

Roland Speicher, Saarbrücken

Abstract

The workshop brought together researchers in two fields, non-commutative function theory and free probability. The two fields have distinct cultures, but they are both part of non-commutative analysis. The goal was to enhance understanding and to establish links between them. There was a mini-course in each of these areas, and speakers in all the talks were encouraged to give expository talks that illuminated the broader reaches of their fields. Participants enthusiastically affirmed that the workshop succeeded in its goals.

Participants

Augat, Meric (Lewisburg), Banna, Marwa (Abu Dhabi), Bercovici, Hari (Bloomington), Bickel, Kelly (Lewisburg), Capitaine, Mireille (Toulouse), Cébron, Guillaume (Toulouse), Chalmoukis, Nikolaos (Milano), Charlesworth, Ian Lorne (Cardiff), Dayan, Alberto (Saarbrücken), Diez, Charles-Philippe (Belvaux), Dykema, Ken (College Station), Faroß, Nicolas (Saarbrücken), Gerhold, Malte (Saarbrücken), Hartz, Michael (Saarbrücken), Helton, J. William (La Jolla), Jekel, David (Toronto), Jury, Michael T. (Gainesville), Kennedy, Matthew (Waterloo), Krüger, Torben (Erlangen), Li, Wing Suet (Atlanta), Liaw, Constanze (Newark), Mai, Tobias (Saarbrücken), Martin, Robert T.W. (Winnipeg), McCarthy, John E. (St. Louis), Mingo, James A. (Kingston), Nelson, Brent (East Lansing), Nikitopoulos, Evangelos A. (La Jolla), Pascoe, James Eldred (Philadelphia), Scherer, Marcel (Saarbrücken), Schwenninger, Felix (Enschede), Shah, Rikhav (Berkeley), Shalit, Orr (Haifa), Shamovich, Eli (Beer-Sheva), Shlyakhtenko, Dimitri (Los Angeles), Skoufranis, Paul (Toronto), Skripka, Anna (Albuquerque), Sola, Alan (Stockholm), Speicher, Roland (Saarbrücken), Stier, Zachary (Berkeley), Strekelj, Tea (Ljubljana), Tornes, Maximilian (Saarbrücken), Tully-Doyle, Ryan (San Luis Obispo), Vinnikov, Victor (Beer-Sheva), Volčič, Jurij (Philadelphia), Wang, Yi (Chongqing)



05.05. – 10.05.2024

Organizers:

Real and Logarithmic Enumerative Geometry

Dan Abramovich, Providence

Penka Georgieva, Paris

Helge Ruddat, Stavanger

Abstract

Key topics of the workshop included enumerative geometry, Gromov-Witten invariants, and their extensions to general ground fields and tropical counting. Significant contributions were made in refined invariants, topological recursion, and Givental reconstruction. Discussions also covered the log double ramification cycle, Brill-Noether theory, Hilbert schemes of points, moduli spaces, log smooth degenerations, mirror symmetry, and the topology of real algebraic varieties.

Participants

Abramovich, Dan (Providence), Argüz, Hülya (Athens), Bousseau, Pierrick (Athens), Brugallé, Erwan (Nantes), Carocci, Francesca (Lausanne), Ekholm, Tobias (Uppsala), Fantechi, Barbara (Trieste), Garcia-Prada, Elba (Paris), Georgieva, Penka (Paris), Gomez, Andres (Aarhus), Gräfnitz, Tim (Cambridge), Guidoni, Thomas (Paris), Hu, Xianyu (Garching bei München), Ionel, Eleny (Stanford), Itenberg, Ilia (Paris), Kennedy-Hunt, Patrick (Cambridge), Mandel, Travis (Stillwater), Manzaroli, Matilde (Tübingen), Pandharipande, Rahul (Zürich), Parker, Brett Damian (Canberra), Pauli, Sabrina (Düsseldorf), Raukh, Anna-Maria (Stavanger), Ruddat, Helge (Stavanger), Schmitt, Johannes (Zürich), Schuler, Yannik (Sheffield), Siebert, Bernd (Austin), Solomon, Jake (Jerusalem), Tschanz, Calla (Kraków), van Garrel, Michel (Birmingham)



05.05. – 10.05.2024

Organizers:

**Game-theoretic Statistical Inference: Optional Sampling,
Universal Inference, and Multiple Testing Based on E-values**

Peter Grünwald, Amsterdam/Leiden
Aaditya Ramdas, Pittsburgh
Ruodu Wang, Waterloo
Johanna Ziegel, Zürich

Abstract

This half-size MFO workshop brought together researchers in mathematical statistics, probability theory, machine learning, medical sciences, and economics to discuss recent developments in sequential inference. New sequential inference methods that build on nonnegative martingale techniques allow us to elegantly solve prominent shortcomings of traditional statistical hypothesis tests. Instead of p-values, they are based on “e-values” which have the added benefit that their meaning is much easier to communicate to applied researchers, due to their intuitive interpretation in terms of the wealth of a gambler playing a hypothetically fair game. Significant new contributions to this fast growing research area were presented in order to stimulate collaborations, discuss and unify notation and concepts in the fields, and tackle a variety of open problems and address current major challenges.

Participants

Agrawal, Shubhada (Atlanta), de Heide, Rianne (Amsterdam), Dickhaus, Thorsten (Bremen), Dimitriadis, Timo (Heidelberg), Foygel Barber, Rina (Chicago), Frongillo, Rafael (Boulder), Grünwald, Peter (Amsterdam), Ignatiadis, Nikolaos (Chicago), Kassraie, Parnian (Zürich), Koolen, Wouter (Amsterdam), Larsson, Martin (Pittsburgh), Lindon, Michael (New York), Martin, Ryan (Raleigh), Perez, Muriel (Eindhoven), Ramdas, Aaditya (Pittsburgh), Ren, Zhimei (Philadelphia), Ruf, Johannes (London), Shafer, Glenn (Newark), Shi, Hongjian (Garching bei München), Vovk, Vladimir (Egham), Wang, Ruodu (Waterloo), Waudby-Smith, Ian (Pittsburgh), Ziegel, Johanna (Zürich)



12.05. – 17.05.2024

Organizers:

Statistical Physics and Random Surfaces

Christophe Garban, Villeurbanne

Jason Miller, Cambridge UK

Scott Sheffield, Cambridge MA

Abstract

This conference featured a diverse group of participants, from various career stages, to study problems in several hot topics that have grown increasingly prominent and interrelated in recent years. These included the following: (1) random surface models (Liouville quantum gravity, random planar maps, etc.) (2) random curve models (Schramm-Loewner evolution, conformal loop ensembles, etc.) (3) gauge theory models (various forms of lattice Yang-Mills, other approximations) (4) spin models and height functions (including delocalization problems) (5) dimer models (two and higher dimensions versions) (6) conformal field theory (Liouville theory, other theories related to SLE) The conference enabled participants to communicate about the most recent break-throughs and lay the groundwork for further collaborative progress.

Participants

Aggarwal, Amol (New York), Albenque, Marie (Paris), Ambrosio, Valeria (Cambridge), Ang, Morris (New York), Aru, Juhan (Lausanne), Berestycki, Nathanael (Wien), Budzinski, Thomas (Lyon), Cao, Sky (Cambridge), Cerclé, Baptiste (Lausanne), Chelkak, Dmitry (Ann Arbor), Curien, Nicolas (Orsay), Doherty, Cillian (Cambridge), Drewitz, Alexander (Köln), Garban, Christophe (Villeurbanne), Guillarmou, Colin (Orsay), Heydenreich, Markus (Augsburg), Kammerer, Emmanuel (Palaiseau), Kavvasias, Konstantinos (Cambridge), Kupiainen, Antti (Helsinki), Lammers, Piet (Paris), Li, Wenxuan (Cambridge), Maibach, Sid (Bonn), Merkl, Franz (München), Miermont, Grégory (Lyon), Miller, Jason P. (Cambridge), Nissim, Ron (Cambridge), Palö Forsström, Malin (Göteborg), Park, Minjae (Chicago), Peled, Ron (Ramat Aviv, Tel Aviv), Peltola, Eveliina (Los Angeles), Rhodes, Rémi (Marseille), Rodriguez, Pierre-Francois (London), Rolles, Silke (Garching bei München), Sepulveda, Avelio (Estación Central Santiago), Sheffield, Scott (Cambridge), Shen, Hao (Madison), Sturm, Theo (Bonn), Sun, Xin (Beijing), Tian, Yi (Bonn), van Engelenburg, Diederik (Villeurbanne), Viklund, Fredrik (Stockholm), Wang, Yilin (Bures-sur-Yvette), Werner, Wendelin (Cambridge), Wolfram, Catherine (Cambridge), Yu, Pu (Cambridge), Yuan, Yizheng (Cambridge)



26.05. – 31.05.2024

**Constrained Dynamics, Stochastic Numerical Methods
and the Modeling of Complex Systems**

Organizers:

Benedict Leimkuhler, Edinburgh
Richard Tsai, Austin
Gilles Vilmart, Geneva
Rachel Ward, Austin

Abstract

The workshop aimed to explore the foundations of high-dimensional modeling and computational studies. It addressed recent advancements in numerical analysis, dynamical systems, and stochastic differential equations that support model reduction for large-scale complex systems. Incorporating targeted geometric structures, such as Riemannian manifolds, into large-scale statistical models is known to enhance the stability, reliability, and efficiency of numerical methods. However, algorithms are often presented in application contexts without adequate attention to their fundamental properties, limiting the adoption of these advanced modeling methods. The workshop emphasized understanding the fundamental properties of these structures, their impact on dynamics and stochastic dynamics, and the need to redesign algorithms to capture essential properties, aiming for robustness and suitability for high-performance computation.

Participants

Bronasco, Eugen (Genève), Celledoni, Elena (Trondheim), Chada, Neil (Edinburgh), Cohen, David (Göteborg), Cox, Sonja G. (Amsterdam), Esteve-Yagüe, Carlos (Cambridge), Gottwald, Georg A. (Sydney), Goudenège, Ludovic (Gif-sur-Yvette), Grigoryeva, Lyudmilla (St. Gallen), Häberli, Ramona (Genève), Hartmann, Carsten (Cottbus), He, Juncai (Jeddah), Hoffmann, Franca (Pasadena), Jin, Shi (Shanghai Shi), Karoni, Aikaterini (Edinburgh), Kevrekidis, George (Baltimore), Lang, Annika (Göteborg), Laurent, Adrien (Bergen), Leimkuhler, Benedict (Edinburgh), Lelièvre, Tony (Marne-la-Vallée), Lewis, Alexander (Göttingen), Masson, Nicolas (Genève), Meng, Tingwei (Los Angeles), Müller, Klaus-Robert (Berlin), Oberdörster, Stefan (Bonn), Ortega, Juan-Pablo (Singapore), Ottobre, Michela (Edinburgh), Owren, Brynjulf (Trondheim), Paulin, Daniel (Edinburgh), Pavliotis, Grigorios (London), Persson, Anna (Uppsala), Rauhut, Holger (München), Reich, Sebastian (Potsdam), Sachs, Matthias (Birmingham), Schuh, Katharina (Wien), Schwarz, Simon (Göttingen), Stoltz, Gabriel (Marne-la-Vallée), Sturm, Anja (Göttingen), Tao, Molei (Atlanta), Tsai, Yen-Hsi Richard (Austin), van de Geer, Sara (Zürich), Vilmart, Gilles (Genève), Vlaar, Tiffany (Glasgow), Wang, Sven (Berlin), Wang, Xu (Beijing), Ward, Rachel (Austin), Whalley, Peter (Edinburgh), Wormell, Caroline (Sydney), Zygalakis, Konstantinos (Edinburgh)



02.06. – 07.06.2024

Organizers:

Complexity Theory

Peter Bürgisser, Berlin

Irit Dinur, Rehovot

Salil Vadhan, Cambridge MA

Abstract

Computational Complexity Theory is the mathematical study of the intrinsic power and limitations of computational resources like time, space, or randomness. The current workshop focused on recent developments in various sub-areas including fine-grained complexity, algorithmic fairness, pseudorandomness, cryptography, arithmetic complexity, Markov Chain Monte Carlo, structure vs. randomness in combinatorics and complexity, meta-complexity, and the complexity of approximation problems. Many of the developments are related to diverse mathematical fields such as algebra, geometry, combinatorics, analysis, and coding theory.

Participants

Abboud, Amir (Rehovot), Bläser, Markus (Saarbrücken), Bürgisser, Peter (Berlin), Dinur, Irit (Rehovot), Dutta, Pranjali (Singapore), Dwork, Cynthia (Boston), Fischer, Nick (Rehovot), Goldreich, Oded (Rehovot), Goldwasser, Shafi (Berkeley), Guruswami, Venkatesan (Berkeley), Håstad, Johan (Stockholm), Hirahara, Shuichi (Tokyo), Hoza, William (Chicago), Ikenmeyer, Christian (Coventry), Ilango, Rahul (Cambridge), Kalai, Yael Tauman (Cambridge), Kaufman-Halman, Tali (Ramat-Gan), Kothari, Pravesh K. (Pittsburgh), Li, Xin (Baltimore), Limaye, Nutan (København), Lin, Huijia (Rachel) (Seattle), Liu, Kuikui (Cambridge), Meka, Raghu R. (Los Angeles), Minzer, Dor (Cambridge), Mohanty, Sidhanth (Cambridge), O'Donnell, Ryan (Pittsburgh), Park, Jinyoung (New York), Pitassi, Toniann (New York), Reingold, Omer (Stanford), Rothblum, Guy (Rehovot), Rothblum, Ron (Haifa), Saraf, Shubhangi (Toronto), Srinivasan, Srikanth (Aarhus), Sudan, Madhu (Boston), Tal, Avishay (Berkeley), Ta-Shma, Amnon (Tel Aviv), Tavenas, Sébastien (Le Bourget-du-Lac), Umans, Chris (Pasadena), Vadhan, Salil (Boston), Vassilevska Williams, Virginia (Cambridge), Wigderson, Avi (Princeton), Williams, Ryan (Cambridge), Zuckerman, David (Austin), Zuiddam, Jeroen (Amsterdam)



09.06. – 14.06.2024

Organizers:

Geometrie

Aaron Naber, Evanston
André Neves, Chicago
Eleonora Di Nezza, Paris
Burkhard Wilking, Münster

Abstract

The workshop Geometrie, organized by Aaron Naber (Evanston), André Neves (Chicago), Eleonora Di Nezza (Paris), and Burkhard Wilking (Münster), was well attended with over 45 participants whose interests covered a considerable part of the current research in Differential Geometry. We had talks in such diverse subjects as geometric evolution equations, Kähler geometry, minimal surfaces, RCD spaces, hyperbolic metrics, or scalar curvature metrics.

Participants

Bär, Christian (Potsdam), Biquard, Olivier (Paris), Böhm, Christoph (Münster), Buttsworth, Timothy (Sydney), Cederbaum, Carla (Tübingen), Courtois, Gilles (Paris), Deruelle, Alix (Orsay), Dillmann, Pia (Münster), Di Nezza, Eleonora (Paris), Dong, Conghan (Stony Brook), Fanoni, Federica (Créteil), Fino, Anna (Torino), Galaz-García, Fernando (Durham), Hamenstädt, Ursula (Bonn), Hein, Hans-Joachim (Münster), Huisken, Gerhard (Tübingen), Hupp, Erik (Evanston), Jiang, Ruojing (Cambridge), Klemmensen, Johan Jacoby (Münster), Krishnan, Anusha M. (Münster), Lafuente, Ramiro (Brisbane), Lamm, Tobias (Karlsruhe), Lange, Christian (München), Li, Yangyang (Chicago), Liokumovich, Yevgeny (Toronto), Liu, Gang (Shanghai), Lott, John (Berkeley), Lytchak, Alexander (Karlsruhe), Mondino, Andrea (Oxford), Neves, André A. (Chicago), Nienhaus, Jan (Los Angeles), Petrunin, Anton (University Park), Radeschi, Marco (Torino), Rivière, Tristan (Zürich), Santoro, Bianca (Münster), Semmelmann, Uwe (Stuttgart), Sena-Dias, Rosa (Lisboa), Simon, Miles (Magdeburg), Sturm, Theo (Bonn), Sukhorebska, Darya (Karlsruhe), Tholozan, Nicolas (Paris), To, Tat Dat (Paris), Topping, Peter M. (Coventry), Vogiatzi, Artemis (London), Wiemeler, Michael (Münster), Wilking, Burkhard (Münster), Wink, Matthias (Münster), Wulle, Dennis (Münster), Zeidler, Rudolf (Münster)



16.06. – 21.06.2024

Organizers:

Arrangements, Matroids and Logarithmic Vector Fields

Takuro Abe, Tokyo

Graham Denham, London CA

Eva Maria Feichtner, Bremen

Gerhard Röhrle, Bochum

Abstract

The focus of this workshop was on the ongoing interaction between geometric aspects of matroid theory with various directions in the study of hyperplane arrangements. A hyperplane arrangement is exactly a linear realization of a (loop-free, simple) matroid. While a matroid is a purely combinatorial object, though, an arrangement is associated with a range of algebraic and geometric constructions that connect closely with the combinatorics of matroids. The meeting brought together researchers involved with complementary angles on the subject, many of whom had not met before, so an important underlying objective was to make introductions between groups with overlapping interests in order to facilitate new collaborations and advances in the subject.

Participants

Abe, Takuro (Tokyo), Barakat, Mohamed (Siegen), Bath, Dan (Leuven), Bibby, Christin (Baton Rouge), Callegaro, Filippo (Pisa), Commins, Patty (Minneapolis), Coron, Basile (London), Cuntz, Michael (Hannover), Delucchi, Emanuele (Lugano), del Valle Rodríguez, Abraham (Sevilla), Denham, Graham (London), Dinu, Rodica Andreea (Konstanz), DiPasquale, Michael (Las Cruces), Douglass, Matthew (Alexandria), Dupont, Clément (Montpellier), Eur, Christopher (Cambridge), Falk, Michael (Flagstaff), Feichtner, Eva Maria (Bremen), Feigin, Misha (Glasgow), Ferroni, Luis (Stockholm), Fink, Mieke (Bonn), Giordani, Lorenzo (Bochum), Hoster, Elena (Bochum), Jiang, Leo (Toronto), Kühne, Lukas (Bielefeld), Larson, Matt (Stanford), Li, Shiyue (Princeton), Matherne, Jacob (Raleigh), Mineev, Dmitry (Ramat-Gan), Mücksch, Paul (Hannover), Mühlherr, Leonie (Bielefeld), Narvaez Macarro, Luis (Sevilla), Nathanson, Anastasia (Minneapolis), Pagaria, Roberto (Bologna), Pfeiffer, Götz (Galway), Röhrle, Gerhard (Bochum), Saito, Kyoji (Kyoto), Salvetti, Mario (Pisa), Schenck, Henry K. (Auburn), Schulze, Mathias (Kaiserslautern), Steiner, Avi (Chemnitz), Stump, Christian (Bochum), Suciu, Alexander I. (Boston), Szemberg, Tomasz (Kraków), Tran, Tan Nhat (Hannover), Tsujie, Shuhei (Asahikawa), Vecchi, Lorenzo (Stockholm), Wakefield, Max D. (Annapolis), Walther, Uli (West Lafayette), Wiesner, Sven (Bochum), Yoshinaga, Masahiko (Osaka)



23.06. – 28.06.2024

**Statistics and Learning Theory in the Era
of Artificial Intelligence**

Organizers:

Florentina Bunea, Ithaca
Arnak Dalalyan, Palaiseau
Robert Nowak, Madison
Sara van de Geer, Zürich

Abstract

The workshop highlighted recent theoretical advances on inference in high-dimensional statistical models based on the interplay of techniques from mathematical statistics, machine learning, theoretical computer science and related areas. The workshop brought together about 50 researchers in order to present new results, exchange ideas and explore open problems. The anticipated long-term intellectual impact of the workshop is the enrichment of each of the represented disciplines through collaborations born during the meeting. The practical outcomes are the development of new theory and computationally efficient algorithms for machine learning based on a strong mathematical foundation.

Participants

Bach, Francis (Paris), Belkin, Misha (La Jolla), Bellec, Pierre (Piscataway), Bettache, Nayel (Palaiseau), Blum, Ricardo (Heidelberg), Boyer, Claire (Paris), Bradic, Jelena (La Jolla), Brunel, Victor-Emmanuel (Palaiseau), Bunea, Florentina (Ithaca), Butucea, Cristina (Palaiseau), Chamon, Luiz (Stuttgart), Dalalyan, Arnak (Palaiseau), Györfi, László (Budapest), He, Niao (Zürich), Hucker, Laura (Berlin), Hundrieser, Shayan (Göttingen), Jacot, Arthur (New York), Kato, Kengo (Ithaca), Katsevich, Anya (Cambridge), Lu, Yu (Palaiseau), Mammen, Enno (Heidelberg), Manole, Tudor (Pittsburgh), Minasyan, Arshak (Palaiseau), Nadler, Boaz (Rehovot), Neubert, Bianca (Heidelberg), Niles-Weed, Jonathan (New York), Nowak, Robert (Madison), Reiß, Markus (Berlin), Rigollet, Philippe (Cambridge), Rohde, Angelika (Freiburg i. Br.), Schmidt-Hieber, Johannes (Enschede), Schneider, Ulrike (Wien), Sen, Bodhisattva (New York), Skalski, Tomasz (Wrocław), Spokoiny, Vladimir G. (Berlin), Suvorikova, Alexandra (Berlin), Tibshirani, Ryan (Berkeley), Tsybakov, Alexandre B. (Palaiseau), van de Geer, Sara (Zürich), Vinayak, Ramya (Madison), Wahl, Martin (Bielefeld), Wang, Y. Samuel (Ithaca), Wegkamp, Marten (Ithaca), Willett, Rebecca (Chicago), Yang, Fanny (Zürich), Yuan, Ming (New York)



30.06. – 05.07.2024

**Model Hierarchies in Atmosphere, Ocean,
and Climate Sciences**

Organizers:

Paola Cessi, San Diego
Rupert Klein, Berlin
Samuel N. Stechmann, Madison
Bjorn Stevens, Hamburg

Abstract

This Oberwolfach Workshop was dedicated to continuing the sequence on "Atmosphere-Ocean Science". The spirit of these events is that of an open invitation to engage in an eye-level exchange on recent developments and pressing challenges in each of the participating disciplines, and to explore possible new routes of interdisciplinary cooperation. This workshop emphasized "model hierarchies" and their importance for the systematic development of both theoretical understanding and methods of scientific investigation. To limit its scope, the workshop focused on (i) scale interactions in the atmosphere and oceans, (ii) thermodynamics and multiphase processes, and (iii) tropical-extratropical interactions from the applied perspective.

Participants

Albritton, Dallas (Madison), Apte, Amit (Pune), Bäumer, Daniel (Wien), Bresch, Didier (Le Bourget-du-Lac), Bühler, Oliver (New York), Caballero, Rodrigo (Stockholm), Callies, Jörn (Pasadena), Cessi, Paola (La Jolla), Cotter, Colin (London), Craig, George C. (München), Doerffel, Tom (Berlin), Feireisl, Eduard (Praha), Ferrari, Raffaele (Cambridge), Frishman, Anna (Haifa), Glassmeier, Franziska (Delft), Gottwald, Georg A. (Sydney), Hairer, Martin (Lausanne), Haynes, Peter H. (Cambridge), Hieber, Matthias (Darmstadt), Jansen, Malte (Chicago), Kaspi, Yohai (Rehovot), Klein, Rupert (Berlin), Korn, Peter (Hamburg), Li, Jinkai (Guangzhou), Markfelder, Simon (Würzburg), Pfahl, Stephan (Berlin), Rudolph, Annette (Berlin), Schielicke, Lisa (Bonn), Seifert, Axel (Offenbach am Main), Shaw, Tiffany (Chicago), Siebesma, Pier (Delft), Singh, Martin (Clayton), Stechmann, Samuel N. (Madison), Stevens, Bjorn (Hamburg), Titi, Edriss S. (Cambridge), Tziperman, Eli (Cambridge), Vallis, Geoffrey K. (Exeter), Vanneste, Jacques (Edinburgh), Vercauteren, Nikki (Köln), Wachtendonk, Jan (Berlin), Young, William R. (La Jolla), Zhang, Yeyu (Shanghai Shi)



07.07. – 12.07.2024

**Algebraic Geometry: Wall Crossing and Moduli Spaces,
Varieties and Derived Categories**

Organizers:

Daniel Huybrechts, Bonn
Giulia Saccà, New York
Richard Thomas, London
Chenyang Xu, Princeton

Abstract

The workshop attracted leading specialists as well as early career researchers from all over the world. The workshop addressed a broad range of subjects in algebraic geometry. Recent results on moduli spaces of various types (of sheaves, complexes, varieties) played a prominent role in many of the talks, as well as derived categories of coherent sheaves. A number of talks were devoted to the geometry of special varieties (Calabi-Yau, hyperkähler) and to the geometry of the Hitchin system.

Participants

Abasheva, Anna (New York), Addington, Nicolas (Eugene), Bayer, Arend (Edinburgh), Belmans, Pieter (Esch-sur-Alzette), Benoist, Olivier (Paris), Blum, Harold (Salt Lake City), Bottini, Alessio (Bonn), Brakkee, Emma (Leiden), Carini, Riccardo (Bonn), Charles, Francois (Paris), Codogni, Giulio (Roma), DeVleming, Kristin (Amherst), Druel, Stéphane (Villeurbanne), Engel, Philip M. (Bonn), Feyzbakhsh, Soheyla (London), Flapan, Laure (East Lansing), Fu, Lie (Strasbourg), Fujita, Kento (Osaka), Huybrechts, Daniel (Bonn), Ji, Lena (Ann Arbor), Kaloghiros, Anne-Sophie (Uxbridge), Macri, Emanuele (Orsay), Makarova, Svetlana (Essen), Marquand, Lisa (New York), Mauri, Mirko (Palaiseau), Mazzon, Enrica (Regensburg), Moonen, Ben (Nijmegen), O'Grady, Kieran Gregory (Roma), Oguiso, Keiji (Tokyo), Ottem, John Christian (Oslo), Padurariu, Tudor (Paris), Patakfalvi, Zolt (Lausanne), Perry, Alexander (Ann Arbor), Pertusi, Laura (Milano), Saccà, Giulia (New York), Segal, Ed (London), Shen, Junliang (New Haven), Shinder, Evgeny (Sheffield), Spenko, Spela (Bruxelles), Stellari, Paolo (Milano), Thomas, Richard P. W. (London), Van den Bergh, Michel (Hasselt), Vilches Reyes, Nicolás (New York), Xu, Chenyang (Princeton), Yin, Qizheng (Beijing), Zhao, Xiaolei (Santa Barbara), Zhao, Yifan (London), Zhuang, Ziquan (Baltimore)



14.07. – 19.07.2024

Organizers:

Arithmetic Geometry

Bhargav Bhatt, Princeton

Ana Caraiani, London

Gerd Faltings, Bonn

Peter Scholze, Bonn

Abstract

Arithmetic geometry is at the interface between algebraic geometry and number theory, and studies schemes over the ring of integers of number fields, or their p -adic completions. The talks covered a wide range of topics including the categorical Langlands program, Shimura varieties, complex and p -adic Hodge theory, homotopy theory, and Diophantine geometry. During the conference, many active discussions took place.

Participants

Andreatta, Fabrizio (Milano), Anschütz, Johannes (Bonn), Aoki, Ko (Bonn), Bhatt, Bhargav (Princeton), Boxer, George (London), Caraiani, Ana (London), Česnavičius, Kęstutis (Orsay), Clausen, Dustin (Bures-sur-Yvette), Devalapurkar, Sanath (Cambridge), Dimitrov, Vesselin (Pasadena), Efimov, Alexander I. (Jerusalem), Esnault, Hélène (Cambridge), Færgeman, Joakim (New Haven), Faltings, Gerd (Bonn), Gabber, Ofer (Bures-sur-Yvette), Gee, Toby (London), Gleason, Ian (Bonn), Groechenig, Michael (Toronto), Hamann, Linus (San Francisco), Hansen, David (Singapore), Heuer, Ben (Frankfurt am Main), Hevesi, Bence (London), Iwasa, Ryomei (Orsay), Kansal, Kalyani (Princeton), Kisin, Mark (Cambridge), Klingler, Bruno (Berlin), Koshikawa, Teruhisha (Kyoto), Le Bras, Arthur-César (Strasbourg), Lee, Si Ying (Stanford), Mann, Lucas (Münster), Mathew, Akhil (Chicago), Matsumoto, Kojiro (Tokyo), Niziol, Wiesława (Paris), Pan, Lue (Princeton), Petrov, Alexander (Princeton), Rodriguez Camargo, Juan Esteban (New York), Scholze, Peter (Bonn), Shankar, Ananth (Evanston), Sweeting, Naomi (Cambridge), Tang, Longke (Princeton), Viehmann, Eva (Münster), Vologodsky, Vadim (Princeton), Wagner, Ferdinand (Bonn), Zavyalov, Bogdan (Princeton), Zhang, Mingjia (Princeton), Zhu, Xinwen (Stanford)



21.07. – 26.07.2024

Organizers:

Topologie

Mark Behrens, Notre Dame

Ruth Charney, Waltham

Oscar Randal-Williams, Cambridge UK

András I. Stipsicz, Budapest

Abstract

The aim of the workshop was to inform topologists of various specialization about major advances in other parts of topology, foster collaboration and possibly advance this broad and far reaching field of mathematics. The following topics received special attention: manifolds and K-theory, Seiberg-Witten invariants and other incarnations of gauge theory, generalizations of hyperbolic techniques in geometric group theory, and stable homotopy theory.

Participants

Alfieri, Antonio (Montréal), Angelini-Knoll, Gabriel (Villetaneuse), Arone, Gregory (Stockholm), Barthel, Tobias (Bonn), Behrens, Mark Joseph (Notre Dame), Bobkova, Irina (College Station), Boyd, Rachael (Glasgow), Bregman, Corey (Medford), Burklund, Robert (København), Charney, Ruth (Waltham), Davis, Michael W. (Columbus), Feller, Peter (Zürich), Fioravanti, Elia (Karlsruhe), Friedl, Stefan (Regensburg), Hamenstädt, Ursula (Bonn), Hebestreit, Fabian (Bielefeld), Kang, Sungkyung (Oxford), Kong, Hana Jia (Hangzhou), Konno, Hokuto (Tokyo), Kosanovic, Danica (Zürich), Krannich, Manuel (Karlsruhe), Kupers, Alexander (Toronto), Land, Markus (München), Levy, Ishan (Copenhagen), Lück, Wolfgang (Bonn), Malin, Connor (Bonn), Mukherjee, Anubhav (Princeton), Munoz-Echaniz, Samuel (Cambridge), Naumann, Niko (Regensburg), Ramzi, Maxime (København), Randal-Williams, Oscar (Cambridge), Ruberman, Daniel (Waltham), Steinebrunner, Jan (København), Stipsicz, András I. (Budapest), Stoffregen, Matthew (East Lansing), Stoll, Robin (Stockholm), Teichner, Peter (Bonn), Vogtmann, Karen L. (Coventry), Wahl, Nathalie (København), Zakharevich, Inna (Ithaca), Zbinden, Stefanie (Edinburgh)



28.07. – 02.08.2024

**Polynomial Optimization for Nonlinear Dynamics:
Theory, Algorithms, and Applications**

Organizers:

Giovanni Fantuzzi, Erlangen
David Goluskin, Victoria
Jean-Bernard Lasserre, Toulouse

Abstract

This workshop focused on using computational tools of polynomial optimization to deduce information about nonlinear dynamical systems, including systems governed by ordinary or partial differential equations. This approach sits at the interface of various research areas, requiring combinations of applied nonlinear dynamics and control theory, polynomial optimization, real algebraic geometry, partial differential equations, and variational analysis. The workshop brought together researchers in these different areas to share recent advances and to build the connections required for further progress.

Participants

Ahmadi, Amir Ali (Princeton), Arslan, Ali (Zürich), Augier, Nicolas (Toulouse), Bonnet-Weill, Benoit (Gif-sur-Yvette), Bramburger, Jason (Montréal), Carlson, Elizabeth (Pasadena), Chernyshenko, Sergei (London), Chhatoi, Saroj Prasad (Toulouse), de Wolff, Timo (Braunschweig), di Dio, Philipp (Konstanz), Dressler, Mareike (Kensington), Fantuzzi, Giovanni (Erlangen), Fridman, Emilia (Ramat Aviv, Tel Aviv), Fuentes, Federico (Macul, Santiago), Goluskin, David (Victoria), Habibi, Soodeh (Liverpool), Henrion, Didier (Toulouse), Infusino, Maria (Cagliari), Kang, Shucheng (Cambridge), Korda, Milan (Toulouse), Langer, Lars-Luca (Konstanz), Laurent, Monique (Amsterdam), Ma, Shenyuan (Praha), Marx, Swann (Nantes), Miller, Jared (Zürich), Papachristodoulou, Antonis (Oxford), Parker, Jeremy (Dundee), Parrilo, Pablo A. (Cambridge), Rackl, David (Klagenfurt), Rios-Zertuche, Rodolfo (Tromsø), Schlosser, Corbinian (Paris), Schweighofer, Markus (Konstanz), Stingl, Michael (Erlangen), Sznaier, Mario (Boston), Tacchi-Bénard, Matteo (Saint-Martin-d'Hères), Tobasco, Ian (Piscataway), Valmorbida, Giorgio (Gif-sur-Yvette), Vargas, Luis Felipe (Lugano), Wang, Jie (Beijing), Weis, Stephan (Praha), Wynn, Andrew (London), Yang, Heng (Cambridge), Zagabe, Christian Mugisho (Namur)



04.08. – 09.08.2024

Organizers:

Mathematical Aspects of General Relativity

Carla Cederbaum, Tübingen

Mihalis Dafermos, Princeton

Jim Isenberg, Eugene

Hans Ringström, Stockholm

Abstract

General relativity is an area at the interface of partial differential equations, differential geometry, global analysis, mathematical physics and dynamical systems. It interacts with astrophysics, cosmology, high energy physics, and numerical analysis. The field is rapidly expanding and has witnessed remarkable developments and interconnections with other fields in recent years. The workshop Mathematical Aspects of General Relativity was organised by Carla Cederbaum (Tübingen), Mihalis Dafermos (Cambridge/Princeton), Jim Isenberg (Eugene) and Hans Ringström (KTH Stockholm). There were 48 on-site and 4 online participants. There were 16 one hour talks, nine 30 minute talks and four 10 minute talks.

Participants

Alexakis, Spyros (Toronto), Aretakis, Stefanos (Toronto), Avalos, Rodrigo (Tübingen), Bieri, Lydia (Ann Arbor), Bigorgne, Leo (Rennes), Blue, Pieter (Edinburgh), Burtscher, Annegret (Nijmegen), Cederbaum, Carla (Tübingen), Chruściel, Piotr T. (Wien), Cogo, Albachiara (Tübingen), Czimek, Stefan (Leipzig), Dafermos, Mihalis (Princeton), Fajman, David (Wien), Fournodavlos, Grigorios (Heraklion), Franco Grisales, Andrés (Stockholm), Friedrich, Helmut (Golm), Gajic, Dejan (Leipzig), Galloway, Gregory (Coral Gables), Giorgi, Elena (New York), Graf, Melanie (Hamburg), Hintz, Peter (Zürich), Hirsch, Sven (Princeton), Hollands, Stefan (Leipzig), Holzegel, Gustav (Münster), Huang, Lan-Hsuan (Storrs), Huneau, Cécile (Palaiseau), Isenberg, James A. (Eugene), Kehle, Christoph (Zürich), Kehrberger, Leonhard (Leipzig), Li, Warren (Princeton), Lucietti, James (Edinburgh), Luk, Jonathan (Stanford), Mars, Marc (Salamanca), Maxwell, David (Fairbanks), Oh, Sung-Jin (Berkeley), Oliynyk, Todd (Clayton), Petersen, Oliver (Stockholm), Reiris-Ithurralde, Martin (Montevideo), Ringström, Hans (Stockholm), Rodnianski, Igor (Princeton), Sakovich, Anna (Uppsala), Sbierski, Jan J. (Edinburgh), Shlapentokh-Rothman, Yakov (Toronto), Smulevici, Jacques (Paris), Speck, Jared (Nashville), Teixeira da Costa, Rita (Cambridge), Unger, Ryan (Stanford), Vălcu, Caterina (Palaiseau), Vasy, Andras (Stanford), Vicanek Martinez, Olivia (Tübingen), Wald, Robert (Chicago), Wolff, Markus (Stockholm)



11.08. – 16.08.2024

Organizers:

Calculus of Variations

Lia Bronsard, Hamilton

Maria Colombo, Lausanne

László Székelyhidi, Leipzig

Yoshihiro Tonegawa, Tokyo

Abstract

The Calculus of Variations is at the same time a classical subject, with long-standing open questions which have generated exciting discoveries in recent decades, and a modern subject in which new types of questions arise, driven by mathematical developments and emergent applications. It is also a subject with a very wide scope, touching on interrelated areas that include geometric variational problems, optimal transportation, geometric inequalities and domain optimization problems, elliptic regularity, geometric measure theory, harmonic analysis, physics, free boundary problems, etc. The workshop balanced the traditional interests of past conferences with new emerging perspectives.

Participants

Alberti, Giovanni (Pisa), Bonhomme, Elise (Bruxelles), Bronsard, Lia (Hamilton), Colombo, Maria (Lausanne), Cristofori, Riccardo (Nijmegen), Faraco, Daniel (Madrid), Fernández-Real Girona, Xavier (Lausanne), Franceschini, Federico (Zürich), Garcia-Ferrero, Maria Angeles (Madrid), Giardi, Matteo (Leipzig), Giorgi, Tiziana (Tuscaloosa), Guerra, Andre (Zürich), Hirsch, Jonas (Leipzig), Ignat, Radu (Toulouse), Kim, Sunghan (Uppsala), Kirchheim, Bernd (Leipzig), Knüpfer, Hans (Heidelberg), König, Tobias (Frankfurt am Main), Lamy, Xavier (Toulouse), Li, Zhuolin (Leipzig), Louizos, Dean (Hamilton), Menne, Ulrich (Taipei), Millot, Vincent (Créteil), Novack, Michael (Baton Rouge), Pegon, Marc (Villeneuve d'Ascq), Pesic, Anastasija (Berlin), Pigati, Alessandro (Milano), Rindler, Filip (Coventry), Rüland, Angkana (Bonn), Schiffer, Stefan (Leipzig), Schubert, Richard (Bonn), Serra, Joaquim (Zürich), Spolaor, Luca (San Diego), Stantejsky, Dominik (Hamilton), Steinbrüchel, Simone (Leipzig), Székelyhidi Jr., László (Leipzig), Tione, Riccardo (Leipzig), Tonegawa, Yoshihiro (Tokyo), Velichkov, Bozhidar (Pisa), Yu, Hui (Singapore), Zemas, Konstantinos (Münster), Zhao, Zihui (Baltimore)



18.08. – 23.08.2024

**Mathematics, Statistics, and Geometry of Extreme Events
in High Dimensions**

Organizers:

Richard Davis, New York
Rafal Kulik, Ottawa
Anne Sabourin, Paris
Stilian Stoev, Ann Arbor

Abstract

The workshop brought together researchers contributing to various recent topics in Extreme Value Theory. Discussions and talks included recent probabilistic development in the theory of regular variation, advances in multivariate representations compatible with sparsity structures, statistical inference in both high dimensional and time series frameworks, and novel applications and emerging directions that leverage recent advances in deep learning.

Participants

Avella Medina, Marco (New York), Baeriswyl, Fabien (Paris), Bai, Shuyang (Athens), Basrak, Bojan (Zagreb), Bücher, Axel (Bochum), Buritica, Gloria (Genève), Butsch, Lucas (Karlsruhe), Cooley, Dan (Fort Collins), Davis, Richard A. (New York), Davison, Anthony (Lausanne), Drees, Holger (Hamburg), Engelke, Sebastian (Genève), Fasen-Hartmann, Vicky (Karlsruhe), Glowacki, Bartosz (Ottawa), Hentschel, Manuel (Genève), Hirsch, Christian (Aarhus), Huser, Raphaël (Thuwal), Janssen, Anja (Magdeburg), Jin, Bochen (Bern), Klüppelberg, Claudia (Garching bei München), Krall, Mario (Lausanne), Kulik, Rafal (Ottawa), Mansire, Alexandre (Paris), Mikosch, Thomas (København), Molchanov, Ilya (Bern), Nolde, Natalia (Vancouver), Oesting, Marco (Stuttgart), Owada, Takashi (West Lafayette), Pipiras, Vladas (Chapel Hill), Rootzen, Holger L. (Göteborg), Sabourin, Anne (Paris), Samorodnitsky, Gennady (Ithaca), Segers, Johan (Louvain-la-Neuve), Stoev, Stilian A. (Ann Arbor), Strokorb, Kirstin (Cardiff), Thannheimer, Max (Stuttgart), Verma, Victor (Ann Arbor), Volgushev, Stanislav (Toronto), Wadsworth, Jennifer (Lancaster), Wan, Phyllis (Rotterdam), Wang, Tiandong (Shanghai Shi), Wintenberger, Olivier (Paris), Zhou, Chen (Rotterdam)



25.08. – 30.08.2024

Organizers:

Homotopical Algebra and Higher Structures

Michael Batanin, Prague

Andrey Lazarev, Lancaster

Muriel Livernet, Paris

Martin Markl, Prague

Abstract

Homotopical algebra and higher category theory play an increasingly important role in pure mathematics, and higher methods have seen tremendous development in the last couple of decades. The talks delivered at the workshop described some of the latest progress in this area and applications to various problems of algebra, geometry, and combinatorics. As always, we observed lots of mathematical conversations held in large and small groups during lunch breaks and in the evenings.

Participants

Ara, Dimitri (Marseille), Berger, Clemens (Nice), Bergner, Julie (Charlottesville), Booth, Matt (Lancaster), Chuang, Joseph (London), De Leger, Florian (Praha), Dotsenko, Vladimir (Strasbourg), Dyckerhoff, Tobias (Hamburg), Emprin, Coline (Paris), Farr, Sonja (Reno), Fresse, Benoit (Villeneuve d'Ascq), Grego, Maroš (Praha), Hackney, Philip (Lafayette), Haugseng, Rune (Trondheim), Henry, Simon (Ottawa), Holstein, Julian (Hamburg), Joyal, André (Montréal), Kaufmann, Ralph (West Lafayette), Keller, Bernhard (Paris), Lazarev, Andrey (Lancaster), Livernet, Muriel (Paris), Loubaton, Félix (Bonn), Markl, Martin (Praha), Medina-Mardones, Anibal (London), Moser, Lyne (Regensburg), Ozornova, Viktoriya (Bonn), Paoli, Simona (Aberdeen), Poirier, Kate (Brooklyn), Raptis, Georgios (Regensburg), Rasekh, Nima (Bonn), Rasmussen, Julie (Coventry), Richter, Birgit (Hamburg), Robertson, Marcy (Melbourne), Rogers, Chris (Reno), Ronco, Maria O. (Talca), Scheimbauer, Claudia I. (Garching bei München), Schweigert, Christoph (Hamburg), Sheng, Yunhe (Changchun), Tarnowsky, Annika (Bonn), Trnka, Dominik (Brno), Whitehouse, Sarah (Sheffield)



01.09. – 06.09.2024

Organizers:

Explicit Methods in Number Theory

Karim Belabas, Talence

Bjorn Poonen, Cambridge MA

Fernando Rodriguez-Villegas, Trieste

Abstract

Progress in number theory, since its ancient origins, has been informed by calculations. This has become even more true with the advent of computers and the development of the theory of computing. The workshop brought together people attacking key modern problems in number theory via techniques involving concrete or computable descriptions. Here, number theory was interpreted broadly, including algebraic and analytic number theory, Galois theory, arithmetic of varieties, zeta and L-functions and their special values, and modular forms and functions. Considerable attention was paid to computational issues, but the emphasis was on aspects of interest to the pure mathematician.

Participants

Abdelraouf, Asem (Trieste), Achenjang, Niven (Cambridge), Allombert, Bill (Talence), Alpöge, Levent (Cambridge), Balakrishnan, Jennifer S. (Boston), Bayer-Fluckiger, Eva (Lausanne), Belabas, Karim (Talence), Bhargava, Manjul (Princeton), Bouw, Irene I. (Ulm), Calegari, Frank (Chicago), Cohen, Henri (Talence), Costa, Edgar (Cambridge), Cremona, John E. (Coventry), Dokchitser, Tim (Bristol), Elkies, Noam D. (Cambridge), Harvey, David (Sydney), Kellerhals, Ruth (Fribourg), Kunzweiler, Sabrina (Talence), Kurylenko, Vadym (Trieste), Laga, Jef (Cambridge), Lenstra, Hendrik W. (Leiden), Li, Wanlin (St. Louis), Lorenzo Garcia, Elisa (Rennes), Maistret, Céline (Bristol), Pacetti, Ariel Martin (Aveiro), Pagano, Margherita (Leiden), Page, Aurel (Talence), Park, Jennifer (Columbus), Poonen, Bjorn (Cambridge), Prasanna, Kartik (Ann Arbor), Pries, Rachel (Fort Collins), Radchenko, Danylo (Villeneuve d'Ascq), Robert, Damien (Talence), Roberts, David (Morris), Rodriguez-Villegas, Fernando (Trieste), Roe, David (Cambridge), Sawin, Will (Princeton), Schindler, Damaris (Göttingen), Schoof, René (Roma), Shnidman, Ari (Jerusalem), Siksek, Samir (Warwick), Smith, Alexander (Los Angeles), Srinivasan, Padmavathi (Boston), Stoll, Michael (Bayreuth), Sutherland, Andrew (Cambridge), Thorne, Jack (Cambridge), Tornaría, Gonzalo (Montevideo), van Bommel, Raymond (Bristol), Vlasenko, Masha (Warszawa), Voight, John (Hanover), Wessel, Mieke (Göttingen), Wewers, Stefan (Ulm), Yasaki, Dan (Greensboro), Zagier, Don B. (Bonn), Zubrilina, Nina (Princeton)



08.09. – 13.09.2024

Organizers:

Riemann Surfaces: Random, Flat, and Hyperbolic Geometry

Gaëtan Borot, Berlin

Samuel Grushevsky, Stony Brook

Martin Möller, Frankfurt

Abstract

This workshop brought together experts in Riemann surfaces from the point of view of hyperbolic geometry, experts on flat surfaces from the point of view of Teichmüller dynamics, and the combinatorics and probability community working on asymptotic properties, to focus on asymptotic behavior of Riemann surfaces and their combinatorial models at large genus. The workshop was comprised of 20 research talks by participants (50min + questions), and of a session of 5-minute presentations by early career researchers.

Participants

Anantharaman, Nalini (Strasbourg), Apisa, Paul (Madison), Aulicino, David (Brooklyn), Barazer, Simon (Orsay), Bouttier, Jérémie (Paris), Bud, Andrei (Frankfurt am Main), Budd, Timothy (Nijmegen), Chapuy, Guillaume (Paris), Chen, Dawei (Chestnut Hill), Costantini, Matteo (Essen), Covanov, Edmond (Saint-Martin-d'Hères), Delecroix, Vincent (Talence), Deroin, Bertrand (Cergy-Pontoise), Erlandsson, Viveka (Bristol), Fairchild, Samantha (Leipzig), Farre, James (Leipzig), Freedman, Samuel (Chicago), Fu, Kai (Talence), Gadre, Vaibhav (Glasgow), Gargava, Nihar (Strasbourg), Gendron, Quentin (Ciudad de México), Giannini, Riccardo (Glasgow), Grushevsky, Samuel (Stony Brook), Hamenstädt, Ursula (Bonn), He, Vivian (Toronto), Kany, Manuel (Saarbrücken), Kattler, Pascal (Saarbrücken), Kleibrink, Yanik (Frankfurt am Main), le Guilloux, Victor (Strasbourg), Lewanski, Danilo (Trieste), Liu, Mingkun (Belvaux), Louf, Baptiste (Talence), Manet, Hugo (Paris), Masur, Howard (Chicago), Matheus, Carlos (Palaiseau), Möller, Martin (Frankfurt am Main), Petri, Bram (Paris), Prado, Miguel (Frankfurt am Main), Rafi, Kasra (Toronto), Randecker, Anja (Heidelberg), Sauvaget, Adrien (Cergy-Pontoise), Schmitt, Johannes (Zürich), Thomas, Alexander (Villeurbanne), Vasudevan, Sahana (Princeton), Winsor, Karl (Stony Brook), Yakovlev, Ivan (Talence), Zorich, Anton (Paris)



15.09. – 20.09.2024

**Recent Developments in Dirichlet Form Theory
and Related Fields**

Organizers:

Zhen-Qing Chen, Seattle
Michael Röckner, Bielefeld
Masayoshi Takeda, Osaka
Anita Winter, Essen

Abstract

Theory of Dirichlet forms is one of the main achievements in modern probability theory. It has numerous interactions with other areas of mathematics and sciences. The recent notable developments are its role in the study of Liouville Brownian motion, Gaussian free field, stochastic partial differential equations, stochastic analysis on metric measure spaces, and Markov processes in random environments. The workshop brought together top experts in Dirichlet form theory, stochastic analysis and related fields, with the common theme of developing new foundational methods and their applications to specific areas of probability.

Participants

Albeverio, Sergio (Bonn), Alonso Ruiz, Patricia (Jena), Andres, Sebastian (Braunschweig), Barlow, Martin T. (Vancouver), Beznea, Lucian (Bucharest), Cao, Shipping (Seattle), Chen, Xin (Shanghai Shi), Chen, Zhen-Qing (Seattle), Cîmpean, Iulian (Bucharest), Deuschel, Jean Dominique (Berlin), Fan, Wai-Tong (Bloomington), Fang, Shizan (Dijon), Freiberg, Uta (Chemnitz), Gantert, Nina (Garching bei München), Gordina, Masha (Storrs), Grothaus, Martin (Kaiserslautern), Hambly, Ben (Oxford), Hao, Zimo (Bielefeld), Hartung, Lisa (Mainz), Kajino, Naotaka (Kyoto), Kaßmann, Moritz (Bielefeld), Kigami, Jun (Kyoto), Kim, Panki (Seoul), Kumagai, Takashi (Tokyo), Kusuoka, Seichiro (Kyoto), Kuwae, Kazuhiro (Fukuoka), Li, Yuqi (Bielefeld), Meng, Xiangqian (Seattle), Miller, Jason P. (Cambridge), Murugan, Mathav (Vancouver), Ooi, Takumu (Tokyo), Osada, Hirofumi (Kasugai), Röckner, Michael (Bielefeld), Schmidt, Marcel (Leipzig), Shimizu, Ryosuke (Tokyo), Shiozawa, Yuichi (Kyoto), Struwe, Julia (Bielefeld), Suzuki, Kohei (Durham), Swanson, Jason (Orlando), Takeda, Masayoshi (Suita), Uemura, Toshihiro (Osaka), Wang, Jian (Fuzhou), Wang, Jie-Ming (Beijing), Wang, Yilin (Bures-sur-Yvette), Winter, Anita (Essen), Wittmann, Simon (Hong Kong), Yu, Yang (Seattle), Zhang, Tusheng (Manchester), Zhu, Rongchan (Beijing), Zhu, Xiangchan (Beijing)



22.09. – 27.09.2024

MATRIX-MFO Tandem Workshop: Invariants in Low-Dimensional Topology: Combinatorics, Geometry, and Computation

Organizers:

Stefan Friedl, Regensburg
Joan Licata, Canberra
Stephan Tillmann, Sydney
Paula Truöl, Bonn

Abstract

The MATRIX-MFO Tandem Workshop addressed several research questions in low-dimensional topology and related areas. The format of the workshop consisted primarily of discussion sessions focusing on computable invariants of colored spatial graphs, random knots, small clasp number knots, algebraic models for Poincaré duality complexes in dimension 4, and the topological volume of the three-torus.

Participants

Bais, Valentina (Trieste), Ben Aribi, Fathi (Paris), Brejevs, Vitalijs (Wien), Di Prisa, Alessio (Pisa), Ferretti, Livio (Genève), Friedl, Stefan (Regensburg), Galvin, Daniel (Bonn), Hirsch, Tobias (Regensburg), Hsueh, Chun-Sheng (Berlin), Johnson, Christopher (Durham), Kegel, Marc (Berlin), Kitayama, Takahiro (Tokyo), Licata, Joan (Canberra), Manikandan, Naageswaran (Berlin), Merz, Alice (Villeneuve d'Ascq), Misev, Filip (Regensburg), Pencovitch, Mark (Glasgow), Quintanilha, José Pedro (Heidelberg), Ray, Arunima (Bonn), Santoro, Diego (Wien), Schambeck, Lisa (Regensburg), Schleimer, Saul (Coventry), Thiele, Annika (Berlin), Tillmann, Stephan (Sydney), Truöl, Paula (Bonn), Wakelin, Laura (Bonn)



22.09. – 27.09.2024

MFO-RIMS Tandem Workshop: Algebraic Geometry and Noncommutative Projective Varieties

Organizers:

Pieter Belmans, Esch-sur-Alzette
Izuru Mori, Shizuoka
Shinnosuke Okawa, Osaka
Sue Sierra, Edinburgh

Abstract

The workshop focused on noncommutative projective varieties, and the role they play in algebraic geometry. The talks ranged from discussing noncommutative ring theory and the role derived categories play in the subject to novel constructions, classifications, and moduli theory for noncommutative varieties. The interactions between the Japanese and European sides of the workshop were particularly enriching.

Participants

Abdelgadir, Tarig (Loughborough), Barmeier, Severin (Köln), Baumann, Thilo (Esch-sur-Alzette), Belmans, Pieter (Esch-sur-Alzette), Bocklandt, Rafael (Amsterdam), Crawford, Simon (Manchester), De Deyn, Timothy (Glasgow), Dell, Hannah (Bonn), Faber, Eleonore (Graz), Gaddis, Jason (Oxford), Hotchkiss, James (New York), Kemboi, Kimoi (Princeton), Koseki, Naoki (Liverpool), Krah, Johannes (Bielefeld), Mori, Izuru (Shizuoka), Okawa, Shinnosuke (Osaka), Pirozhkov, Dmitrii (Moscow), Polishchuk, Alexander (Eugene), Pym, Brent (Montréal), Robotis, Antonios-Alexandros (Ithaca), Rogalski, Daniel (La Jolla), Schedler, Travis (London), Sierra, Susan J. (Edinburgh), Smith, S. Paul (Seattle), Stafford, J. Toby (Manchester), Ure, Charlotte (Normal), van Garderen, Okke (Trieste)



29.09. – 04.10.2024

Anabelian Geometry and Representations of Fundamental Groups

Organizers:

Anna Cadoret, Paris
Florian Pop, Philadelphia
Jakob Stix, Frankfurt
Adam Topaz, Edmonton

Abstract

The focus of the workshop was on recent developments in local systems in arithmetic geometry in the broad sense, including anabelian geometry. The talks covered results in complex variations of Hodge structures, ℓ -adic local systems, p -adic Hodge theory with p -adic local systems, and new insights into absolute Galois groups, with applications to rational points. The increased interaction between mathematicians working from these different points of view towards similar goals was a focal point of the workshop.

Participants

Achinger, Piotr (Warszawa), Aremu, Kazeem Olalekan (Sokoto), Bellovin, Rebecca (Glasgow), Bresciani, Giulio (Pisa), Brunebarbe, Yohan (Talence), Cadoret, Anna (Paris), Carlsson, Magnus (Frankfurt am Main), Charles, Francois (Paris), Choi, Daebeom (Philadelphia), Eichler, Jaro (Frankfurt am Main), Gatine, Francois (Paris), Gaulhiac, Sylvain (Warszawa), Groechenig, Michael (Toronto), Gropper, Nadav (Haifa), Holzschuh, Tim (Heidelberg), Hoshi, Yuichiro (Kyoto), Javan Peykar, Ariyan (Nijmegen), Karemaker, Valentijn (Utrecht), Kerz, Moritz (Regensburg), Klingler, Bruno (Berlin), Krämer, Thomas (Berlin), Kwon, Andrew (Philadelphia), Lara, Marcin (Warszawa), Litt, Daniel (Toronto), Liu, Haohao, Lüdtke, Martin (Groningen), Mair, Catrin (Darmstadt), Morel, Sophie (Lyon), Nakamura, Hiroaki (Osaka), Niziol, Wiesława (Paris), Olsson, Martin (Berkeley), Petrov, Alexander (Cambridge), Pirutka, Alena (New York), Pop, Florian (Philadelphia), Porowski, Wojciech (Kyoto), Qi, Ge (Edmonton), Rani, Shushma (Allahabad), Reinecke, Emanuel (Bures-sur-Yvette), Saito, Takeshi (Tokyo), Sawin, Will (Princeton), Scherer, Leonie (Frankfurt am Main), Schmidt, Alexander (Heidelberg), Shimizu, Koji (Beijing), Srinivasan, Padmavathi (Boston), Stix, Jakob (Frankfurt am Main), Szamuely, Tamás (Pisa), Tamagawa, Akio (Kyoto), Topaz, Adam (Edmonton), Tsujimura, Shota (Kyoto), Wild, Ruth (Frankfurt am Main), Youcis, Alex (Singapore), Zavyalov, Bogdan (Princeton)



27.10. – 01.11.2024

Organizers:

Deep Learning for PDE-based Inverse Problems

Simon Arridge, London

Peter Maass, Bremen

Carola-Bibiane Schönlieb, Cambridge UK

Abstract

Analysing learned concepts for PDE-based parameter identification problems requires input from different research areas such as inverse problems, partial differential equations, statistics and mathematical foundations of deep learning. This workshop brought together a critical mass of experts in the various field. A thorough mathematical theory for PDE-based inverse problems using learned concepts is within reach in the coming few years and the inspiration of this Oberwolfach meeting will substantially influence this development.

Participants

Alaifari, Rima (Zürich), Alberti, Giovanni S. (Genova), Arridge, Simon R. (London), Barbeiro, Silvia (Coimbra), Berner, Julius (Pasadena), Boulle, Nicolas (London), Bubba, Tatiana (Ferrara), Budd, Chris J. (Bath), Celledoni, Elena (Trondheim), de Hoop, Maarten V. (Houston), De los Reyes, Juan Carlos (Quito), Denker, Alexander (London), Dietrich, Felix (Garching bei München), Dolean-Maini, Victorita (Eindhoven), Gödeke, Janek (Bremen), Gottschalk, Hanno (Berlin), Haber, Eldad (Vancouver), Han, Jiequn (New York), Harrach, Bastian (Frankfurt am Main), Hauptmann, Andreas (Oulu), Heilenkötter, Nick (Bremen), Hertrich, Johannes (London), Iske, Meira (Bremen), Jin, Bangti (Shatin, N.T., Hong Kong), Kaltenbacher, Barbara (Klagenfurt), Kereta, Zeljko (London), Korolev, Yury (Bath), Kreusser, Lisa (Bath), Lee, Yolanne (London), Maaß, Peter (Bremen), Maierhofer, Georg (Cambridge), Murari, Davide (Cambridge), Neumayer, Sebastian (Chemnitz), Nguyen, Tram (Göttingen), Ning, Jianfeng (Shatin, N.T., Hong Kong), Öktem, Ozan (Stockholm), Owren, Brynjulf (Trondheim), Pock, Thomas (Graz), Rowbottom, James (Cambridge), Runkel, Christina (Cambridge), Scherzer, Otmar (Wien), Schönlieb, Carola-Bibiane (Cambridge), Shen, Zebang (Zürich), Shumaylov, Zakhar (Cambridge), Steidl, Gabriele (Berlin), Weigand, Lukas (Hamburg), Zhang, Xiaoqun (Shanghai)



03.11. – 08.11.2024

Organizers:

Directions in Rough Analysis

Thomas Cass, London

Christa Cuchiero, Vienna

Peter Friz, Berlin

Abstract

Rough path theory emerged in the 1990s and was developed in the 2000s as an improved approach to understanding the interaction of complex random systems. As a broader alternative to stochastic calculus, it simultaneously settled significant questions and substantially expanded the scope of classical methods in stochastic analysis. Subsequent related developments have had an impact at the highest level, Martin Hairer's work on regularity structures being among the most prominent. In 2020, rough analysis gained its own AMS classification code, 60L, and this workshop focused on the currently most active areas of the subject among two central strands: (1) the mathematics of the signature transform, including its applications to data science and finance, and (2) rough path theory applied to novel areas in stochastic analysis, such as homogenization, SLE and rough PDEs.

Participants

Abi Jaber, Eduardo (Palaiseau), Allan, Andrew (Durham), Bayer, Christian (Berlin), Blessing Neamtu, Alexandra (Konstanz), Boedihardjo, Horatio (Coventry), Bruned, Yvain (Vandoeuvre-lès-Nancy), Cass, Thomas R. (London), Cuchiero, Christa (Wien), Delarue, Francois (Nice), Diehl, Joscha (Greifswald), Djurdjevac, Ana (Berlin), Ebrahimi-Fard, Kurusch (Trondheim), Ferrucci, Emilio (Oxford), Foster, James (Bath), Friz, Peter K. (Berlin), Gassiat, Paul (Paris), Geng, Xi (Parkville), Guo, Xin (Berkeley), Hager, Paul (Berlin), Hairer, Martin (Lausanne), Harang, Fabian (Oslo), Horvath, Blanka (Oxford), Hu, Ruimeng (Santa Barbara), Inahama, Yuzuru (Fukuoka), Kifer, Yuri (Jerusalem), Kremp, Helena Katharina (Wien), Le, Khoa (Berlin), Lee, Darrick (Edinburgh), Li, Xue-Mei (London), Linares Ballesteros, Pablo (Madrid), Ling, Chengcheng (Augsburg), Lyons, Terence J. (Oxford), Ni, Hao (London), Pelizzari, Luca (Berlin), Perkowski, Nicolas (Berlin), Preiß, Rosa (Berlin), Primavera, Francesca (Berkeley), Singh, Harprit (Edinburgh), Svaluto-Ferro, Sara (Verona), Tapia, Nikolas (Berlin), Teichmann, Josef (Zürich), Tindel, Samy (West Lafayette), Turner, William (London), Wagenhofer, Thomas (Berlin), Zhang, Huilin (Berlin)



10.11. – 15.11.2024

Organizers:

Combinatorial Optimization

Thomas Rothvoss, Seattle

Laura Sanità, Milano

Robert Weismantel, Zürich

Abstract

Combinatorial optimization deals with optimization problems defined on polyhedral constraints or discrete structures such as graphs and networks. In the past thirty years the topic has developed into a rich mathematical discipline with many connections to other fields of mathematics such as combinatorics, group theory, geometry of numbers, convex analysis or real algebraic geometry. It also has strong ties to theoretical computer science and other more applied sciences (such as game theory and operations research).

Participants

Aardal, Karen I. (Delft), Abdi, Ahmad (London), Black, Alexander (Davis), Chekuri, Chandra (Urbana), Dadush, Daniel (Amsterdam), De Loera, Jesús A. (Davis), Dey, Santanu S. (Atlanta), Faenza, Yuri (New York), Goemans, Michel X. (Cambridge), Gupta, Anupam (New York), Huiberts, Sophie (Aubiére), Iwata, Satoru (Tokyo), Kaibel, Volker (Magdeburg), Klein, Kim-Manuel (Lübeck), Klein, Nathan (Princeton), Koh, Zhuan Khye (Amsterdam), Kuhlmann, Stefan (Zürich), Kyng, Rasmus (Zürich), Laurent, Monique (Amsterdam), Megow, Nicole (Bremen), Naor, Joseph (Haifa), Natura, Bento (New York), Newman, Alantha (Grenoble), Oertel, Timm (Erlangen), Olver, Neil (London), Paat, Joseph (Vancouver), Peis, Britta (Aachen), Pokutta, Sebastian (Berlin), Rohwedder, Lars (Maastricht), Rothvoss, Thomas (Seattle), Sanità, Laura (Milano), Saueremann, Lisa (Bonn), Shepherd, Bruce (Vancouver), Singh, Mohit (Atlanta), Skutella, Martin (Berlin), Svensson, Ola Nils A. (Lausanne), Traub, Vera (Bonn), Vargas Koch, Laura (Aachen), Végh, László (Bonn), Vygen, Jens (Bonn), Weismantel, Robert (Zürich), Weltge, Stefan (Garching bei München), Wiese, Andreas (Garching bei München), Yokoi, Yu (Tokyo), Zenklusen, Rico (Zürich)



01.12. – 06.12.2024

Organizers:

Representations of p -adic Groups

Jessica Fintzen, Bonn

David Schwein, Bonn

Maarten Solleveld, Nijmegen

Abstract

Representation theory of p -adic groups is a topic at a crossroads. It links among others to harmonic analysis, algebraic geometry, number theory, Lie theory, and homological algebra. The atomic objects in the theory are supercuspidal representations. Most of their aspects have a strong arithmetic flavour, related to Galois groups of local fields. All other representations are built from these atoms by parabolic induction, whose study involves Hecke algebras and complex algebraic geometry. In the local Langlands program, connections between various aspects of representations of p -adic groups have been conjectured and avidly studied. This workshop brought together mathematicians from various backgrounds, who hold the promise to contribute to the solution of open problems in the representation theory of p -adic groups. Topics included explicit local Langlands correspondences, Hecke algebras for Bernstein components, harmonic analysis, covering groups and ℓ -modular representations of reductive p -adic groups.

Participants

Adler, Jeff (Washington), Aubert, Anne-Marie (Paris), Berry, Rose (Norwich), Beuzart-Plessis, Raphaël (Marseille), Chan, Charlotte (Ann Arbor), Cunningham, Clifton (Calgary), Dat, Jean-Francois (Paris), DeBacker, Stephen (Ann Arbor), Emory, Melissa (Stillwater), Eteve, Arnaud (Bonn), Fintzen, Jessica (Bonn), Flikkema, Janet (Nijmegen), Fu, Chenji (Bonn), Gan, Wee Teck (Singapore), Ganapathy, Radhika (Bangalore, Bengaluru), Girsch, Johannes (Sheffield), Gurevich, Nadya (Beer-Sheva), Hadeg, Ihsane (Bochum), Hanzer, Marcela (Zagreb), Hellmann, Eugen (Münster), Helm, David (London), Henniart, Guy (Orsay), Ivanov, Alexander (Bochum), Kaletha, Tasho (Bonn), Kim, Ju-Lee (Cambridge), Kurinczuk, Robert (Sheffield), Lanard, Thomas (Versailles), Li, Wen-Wei (Beijing), Minguez, Alberto (Wien), Moss, Gil (Orono), Nevins, Monica (Ottawa), Ohara, Kazuma (Bonn), Oi, Masao (Taipei), Okada, Emile (Singapore), Papachristoforou, Constantinos (Sheffield), Prasad, Dipendra (Mumbai), Ray, Mishty (Ottawa), Richarz, Timo (Darmstadt), Schwein, David (Bonn), Sécherre, Vincent (Versailles), Solleveld, Maarten (Nijmegen), Spice, Loren (Fort Worth), Stevens, Shaun (Norwich), Takeda, Shuichiro (Osaka), Tam, Geo Kam-Fai (Sepang), Tiwari, Ekta (Ottawa), Tsai, Cheng-Chiang (Taipei), Vignéras, Marie-France (Paris), Zhao, Yifei (Münster)



15.12. – 20.12.2024

Organizers:

Convex Geometry and its Applications

Shiri Artstein-Avidan, Tel Aviv

Daniel Hug, Karlsruhe

Elisabeth Werner, Cleveland

Abstract

The geometry of convex domains in Euclidean space plays a central role in several branches of mathematics: functional and harmonic analysis, the theory of PDEs, linear programming and, increasingly, in the study of algorithms in computer science. Convex Geometry has experienced a series of striking developments in the past few years: for example, the new tools from stochastic localization, the huge progress around the slicing problem, the measure transportation perspective on old problems, progress on conjectured geometric and functional inequalities and new applications of methods and results to a wide range of fields, including random matrices and statistical learning. The purpose of this meeting was to bring together researchers from the analytic, geometric and probabilistic groups who have contributed to the latest exciting results, to exchange ideas and pave the path for future developments. The meeting continued a tradition of more than 50 years of Oberwolfach meetings with Convex Geometry in the title, at the same time emphasizing the new directions and developments, and new connections to other mathematical fields.

Participants

Alonso-Gutiérrez, David (Zaragoza), Artstein-Avidan, Shiri (Ramat Aviv, Tel Aviv), Assouline, Rotem (Rehovot), Bernig, Andreas (Frankfurt am Main), Besau, Florian (Wien), Böröczky, Karoly (Budapest), Bühler, Tillmann (Karlsruhe), Cai, Xiaxing (Wien), Colesanti, Andrea (Firenze), Faifman, Dmitry (Montréal), Fradelizi, Matthieu (Marne-la-Vallée), Gusakova, Anna (Münster), Haddad, Julian (Sevilla), Herscovici, Orli (Queens), Hug, Daniel (Karlsruhe), Iffland, Luca (Frankfurt am Main), Knörr, Jonas (Wien), Langharst, Dylan (Paris), Litvak, Alexander (Edmonton), Livshyts, Galyna (Atlanta), Ludwig, Monika (Wien), Milman, Emanuel (Haifa), Mui, Stephanie (Atlanta), Mußnig, Fabian (Wien), Pivovarov, Peter (Columbia), Prochno, Joscha (Passau), Putterman, Eli (Tel Aviv), Qin, Lei (Hunan), Reitzner, Matthias (Osnabrück), Rotem, Liran (Haifa), Rudelson, Mark (Ann Arbor), Sadovsky, Shay (Ramat Aviv, Tel Aviv), Schneider, Rolf (Freiburg i. Br.), Schuster, Franz (Wien), Szusterman, Maud (Paris), Tatarko, Kateryna (Waterloo), Thäle, Christoph (Bochum), Tsuji, Hiroshi (Saitama), Vritsiou, Beatrice-Helen (Edmonton), Wannener, Thomas (Jena), Werner, Elisabeth M. (Cleveland), Wyczesany, Katarzyna (Leeds), Xi, Dongmeng (Shanghai Shi), Yaskin, Vladyslav (Edmonton), Zhao, Yiming (Syracuse), Zvavitch, Artem (Kent)

3.4. Miniworkshops

Miniworkshop 2405a



28.01. – 02.02.2024

Organizers:

Artin Groups meet Triangulated Categories

Rachael Boyd, Glasgow

Edmund Heng, Bures-sur-Yvette

Viktoriya Ozornova, Bonn

Abstract

Artin and Coxeter groups are naturally occurring generalisations of the braid and symmetric groups respectively. However, unlike for Coxeter groups, many basic group theoretic questions remain unanswered for general Artin groups - most notably the $K(\pi,1)$ -conjecture for Artin groups remains open except for certain special families of Artin groups. Recently, Artin groups have also appeared as groups acting on triangulated categories, where the associated spaces of Bridgeland's stability conditions provide new realisations of the corresponding $K(\pi,1)$ spaces. The aim of the workshop was to bring together experts and early career researchers from two seemingly different areas of research: (i) geometric and combinatorial group theory and topology, and (ii) triangulated categories and stability conditions, to explore their intersection via the $K(\pi,1)$ -conjecture.

Participants

Bapat, Asilata (Canberra), Bianchi, Andrea (København), Boyd, Rachael (Glasgow), Corrigan, Gabriel (Glasgow), Dell, Hannah (Edinburgh), Deopurkar, Anand (Canberra), Heng, Edmund Xian Chen (Bures-sur-Yvette), Huang, Jingying (Columbus), Keating, Ailsa (Wien), Licata, Anthony M. (Canberra), Mastrocola, Jill (Waltham), McCammond, Jon (Santa Barbara), Ozornova, Viktoria (Bonn), Paolini, Giovanni (Bologna), Schwer, Petra (Heidelberg), Shimpi, Parth (Glasgow), Wemyss, Michael (Glasgow)



28.01. – 02.02.2024

**Bridging Number Theory and Nichols Algebras
via Deformations**

Organizers:

Giovanna Carnovale, Padova
István Heckenberger, Marburg
Leandro Vendramin, Brussel

Abstract

Nichols algebras are graded Hopf algebra objects in braided tensor categories. They appeared first in a paper by Nichols in 1978 in the search for new examples of Hopf algebras. Rediscovered later several times, they also provide a conceptual explanation of the construction of quantum groups. The aim of the workshop was to review recent developments in the field, initiate collaborations, and discuss new approaches to open problems.

Participants

Andruskiewitsch, Nicolás (Córdoba), Angiono, Iván E. (Córdoba), Carnovale, Giovanna (Padova), Chang, Kevin Yaolin (New York), Esposito, Francesco (Padova), Halbig, Sebastian (Marburg), Heckenberger, Istvan (Marburg), Lentner, Simon David (Hamburg), Letourmy, Thomas (Bruxelles), Li, Fengchang (Marburg), Masut, Elisabetta (Padova), Meir, Ehud (Aberdeen), Pevtsova, Julia (Seattle), Rubio y Degraßi, Leonard (Uppsala), Schiffmann, Olivier (Orsay), Stroppel, Catharina (Bonn), Vay, Cristian (Córdoba), Vendramin, Leandro (Brussels), Westerland, Craig (Minneapolis), Wojciechowski, Zbigniew (Dresden), Yakimov, Milen (Boston)



28.01. – 02.02.2024

Organizers:

Permutation Patterns

Miklós Bóna, Gainesville

Mathilde Bouvel, Vandoeuvre-lès-Nancy

Robert Brignall, Milton Keynes

Jay Pantone, Milwaukee

Abstract

The study of permutation patterns has recently seen several surprising results, and the purpose of this mini-workshop was to bring together researchers from across the field to focus on four hot topics related to these recent developments. The topics covered the nature of generating functions that enumerate permutation classes, the structure of permutation classes and the impact this has on their growth rates, and the study of permutons, which lies at the interface of permutation patterns and discrete probability. The workshop offered an opportunity for knowledge exchange, but also time and space to initiate group collaborations on open problems related to these topics.

Participants

Bean, Christian (Keele, Newcastle, Staffs), Bevan, David (Glasgow), Blitvic, Natasha (London), Bóna, Miklós (Gainesville), Bousquet-Mélou, Mireille (Talence), Bouvel, Mathilde (Vandoeuvre-lès-Nancy), Brignall, Robert (Milton Keynes), Claesson, Anders (Reykjavik), Defant, Colin (Cambridge), Elvey Price, Andrew (Tours), Felsner, Stefan (Berlin), Huczynska, Sophie (St. Andrews), Opler, Michal (Praha), Pantone, Jay (Milwaukee), Tenner, Bridget (Chicago), Troyka, Justin (Los Angeles), Vatter, Vincent (Gainesville)



07.04. – 12.04.2024

Organizers:

Growth and Expansion in Groups

Jitendra Bajpai, Kiel

Daniele Dona, Budapest

Abstract

The aim of the workshop was to give a panoramic view of the main lines of research on various aspects of growth and expansion in finite groups. The main topics included: diameter bounds for Cayley graphs of alternating and classical groups, with results for generating sets that can be arbitrary, random, or containing special elements; constructions of expander families of finite simple groups, with the use of property (T); and character bounds for finite simple groups, yielding applications to word map problems and random walks on Cayley graphs. A series of smaller topics explored connections and similarities to different problems in group theory.

Participants

Alekseev, Vadim (Dresden), Arzhantseva, Goulmira N. (Wien), Bajpai, Jitendra (Kiel), Bhakta, Subham (Thiruvananthapuram), Capdeboscq, Inna (Coventry), Dona, Daniele (Budapest), Doucha, Michal (Praha), Eberhard, Sean (Belfast), Garzoni, Daniele (Los Angeles), Helfgott, Harald A. (Paris), Kassabov, Martin (Ithaca), Lifshitz, Noam (Jerusalem), Nitsche, Martin (Karlsruhe), Sabatini, Luca (Budapest), Tent, Katrin (Münster), Tiep, Pham (Piscataway)



07.04. – 12.04.2024

Organizers:

Mathematics of Entropic AI in the Natural Sciences

Susanne Gerber, Mainz
Illia Horenko, Kaiserslautern
Rupert Klein, Berlin
Terence O’Kane, Hobart

Abstract

The mathematical framework of approximate entropic learning introduced very recently promises to provide robust, cheap and efficient ways of machine learning in the so called “small data” regime, when the underlying learning task is highly-underdetermined, due to a large problem dimension and relatively small data statistics size. Such “small data” learning challenges are particularly common in the natural sciences (e.g., in geosciences, in climate research, in economics, and in biomedicine), imposing considerable difficulties for the numerics of common “data-hungry” Artificial Intelligence (AI) tools like Deep Learning (DL). The aim of this workshop was to bring together experts in the emergent fields of entropic and DL mathematics/numerics, with some lead experts applying AI in the domain disciplines. The goal was be to detect and to discuss the commonalities in the challenges and in their mathematical solutions, as well as to discuss and fine-tune common mathematical problem formulations that are motivated by the AI applications in natural sciences. The establishment of a common mathematical framework for such small-data machine learning tasks would not only bolster future methodological developments but would also lay solid foundations to further in-depth rigorous analysis and theoretically founded interpretation of these methods and their results.

Participants

Alagna, Nicolo (Mainz), Bassetti, Davide (Kaiserslautern), Caliendo, Cosima (Mainz), Everschor-Sitte, Karin (Duisburg), Gerber, Susanne (Mainz), Gottwald, Georg A. (Sydney), Groom, Michael (Hobart, Tasmania), Hewel, Charlotte (Mainz), Horenko, Illia (Kaiserslautern), Klein, Rupert (Berlin), O’Kane, Terence J. (Hobart, Tasmania), Pospisil, Lukas (Ostrava), Prokosch, Tim (Kaiserslautern), Siegel, Jonathan W. (College Station), Vercauteren, Nikki (Köln), Yserentant, Harry (Berlin)



07.04. – 12.04.2024

New Horizons in Linear Dynamics, Universality, and the Invariant Subspace Problem

Organizers:

Sophie Grivaux, Villeneuve d'Ascq
Karl Grosse-Erdmann, Mons
Etienne Matheron, Lens
Alfred Peris, Valencia

Abstract

The Mini-Workshop "New Horizons in Linear Dynamics, Universality, and the Invariant Subspace Problem" discussed recent advances in the study of dynamical properties of continuous linear operators, and in the related study of universal properties of holomorphic functions. Ideas from topological dynamics, ergodic theory, and very recent advances on the invariant subspace problem were also considered.

Participants

Bayart, Frederic (Aubière), Bernardes Jr., Nilson C. (Rio de Janeiro), Cardeccia, Rodrigo (San Carlos de Bariloche), Costa Jr., Fernando (Joao Pessoa), D'Aniello, Emma (Caserta), Ernst, Romuald (Calais), Gilmore, Clifford (Aubière), Grivaux, Sophie (Villeneuve d'Ascq), Grosse-Erdmann, Karl (Mons), López-Martínez, Antoni (Valencia), Maiuriello, Martina (Caserta), Manolaki, Myrto (Dublin), Matheron, Etienne (Lens), Menet, Quentin (Mons), Müller, Jürgen (Trier), Papathanasiou, Dimitris (Tuzla/Istanbul), Peris, Alfred (Valencia)



17.11. – 22.11.2024

Organizers:

Mixing Times in the Kardar-Parisi-Zhang Universality Class

Ofer Busani, Edinburgh

Peter Nejjar, Potsdam

Alessandra Occelli, Angers

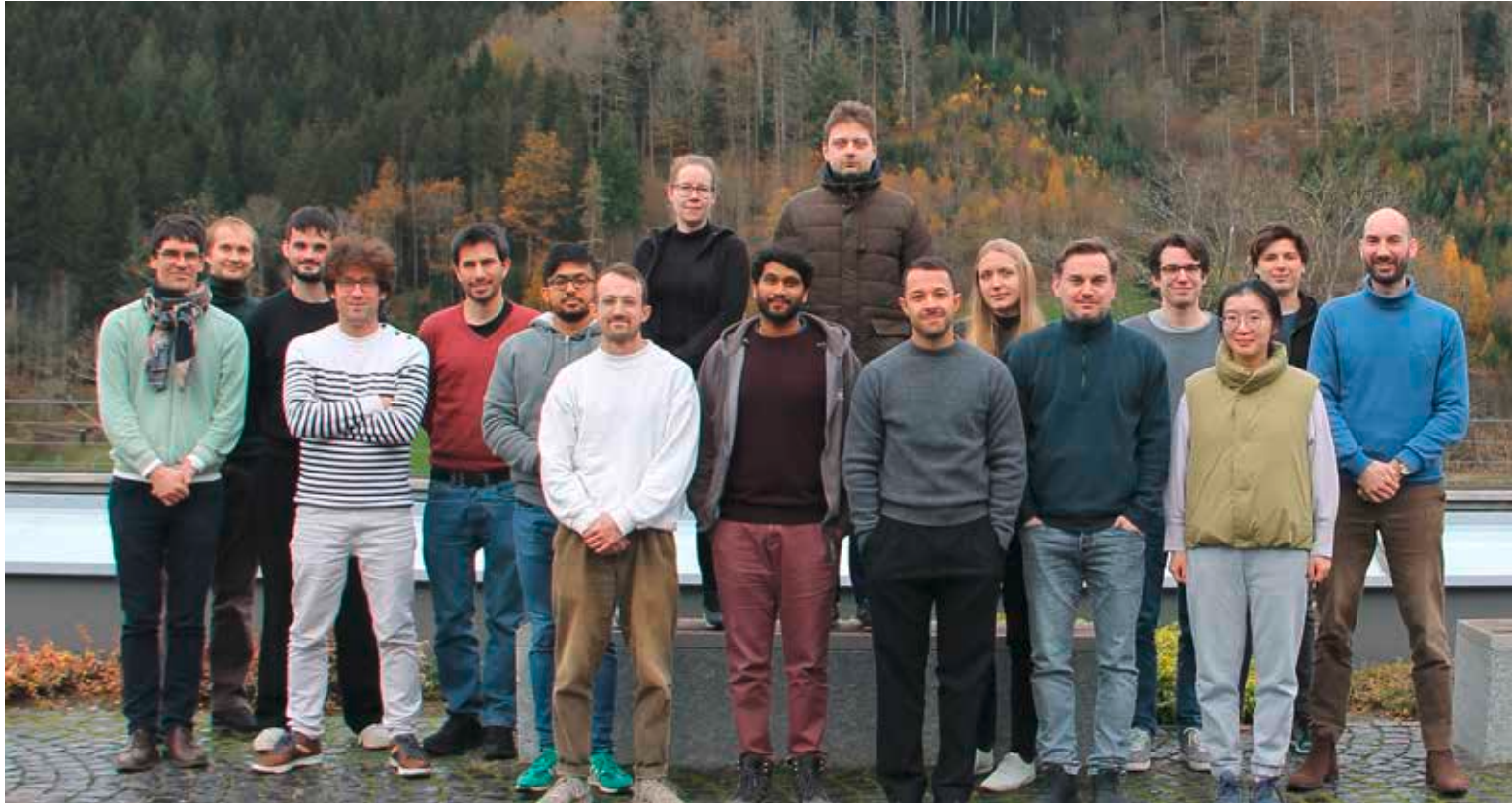
Dominik Schmid, New York

Abstract

The workshop covered new developments in the Kardar-Parisi-Zhang (KPZ) class of growth models and markov chain mixing, broadened by talks on random dimers, matrices and parking functions. Mixing is often related to large time fluctuations, which are governed by universal limits such as the KPZ fixed point. The workshop thus focused on the asymptotic behaviour of KPZ models, the characterization of limiting objects, and cutoff.

Participants

Bernal, David (Berlin), Bisi, Elia (Wien), Bufetov, Alexey (Leipzig), Busani, Ofer (Edinburgh), Drillick, Hindy (New York), Ferrari, Patrik L. (Bonn), Gantert, Nina (Garching bei München), Hartarsky, Ivailo (Villeurbanne), He, Jimmy (Columbus), Hegde, Milind (New York), Liu, Min (Bonn), Nejjar, Peter (Potsdam), Occelli, Alessandra (Angers), Priestley, Amanda (Austin), Schmid, Dominik (New York), Zhang, Lingfu (Pasadena)



17.11. – 22.11.2024

Organizers:

Critical Phenomena of the XY Model

Christophe Garban, Villeurbanne

Trishen S. Gunaratnam, Genève

Eveliina Peltola, Bonn/Aalto

Diederik van Engelenburg, Villeurbanne

Abstract

This Mini-Workshop focused on recent advances in probability theory concerned with the critical phenomena of the XY model and other related spin systems. There were 18 participants, all working at the forefront of this dynamic field, and from various career stages and a diverse range of institutions as well as backgrounds and gender. The Mini-Workshop featured talks by almost all participants except organizers as well as an open problem session. The talks consisted of: a) three mini-courses of four lectures each and b) hour long seminars from the remaining participants. The mini-courses covered random currents for the XY model, random walk representations and triviality in the XY and Ising models, and connections between the spherical model and the Gaussian Free Field. The remaining seminars spanned a diverse range of topics, such as novel probabilistic approaches to the BKT transition in 2d, recent progress on high-dimensional spin systems and finite-size effects, and novel geometric representations for correlations in spin systems.

Participants

Aru, Juhan (Lausanne), Dario, Paul (Créteil), Duminil-Copin, Hugo (Bures-sur-Yvette), Garban, Christophe (Villeurbanne), Gunaratnam, Trishen (Genève), Korzhenkova, Aleksandra (Lausanne), Lammers, Piet (Paris), Lis, Marcin (Wien), Lupu, Titus (Paris), Maibach, Sid (Bonn), Mukherjee, Chiranjib (Münster), Panis, Romain (Genève), Peltola, Eveliina (Los Angeles), Powell, Ellen G. (Durham), Sepulveda, Avelio (Estación Central Santiago), Severo, Franco (Villeurbanne), van Engelenburg, Diederik (Villeurbanne), Xia, Jiaming (Bures-sur-Yvette)



17.11. – 22.11.2024

Infinite-dimensional Kac-Moody Lie Algebras in Supergravity and M Theory

Organizers:

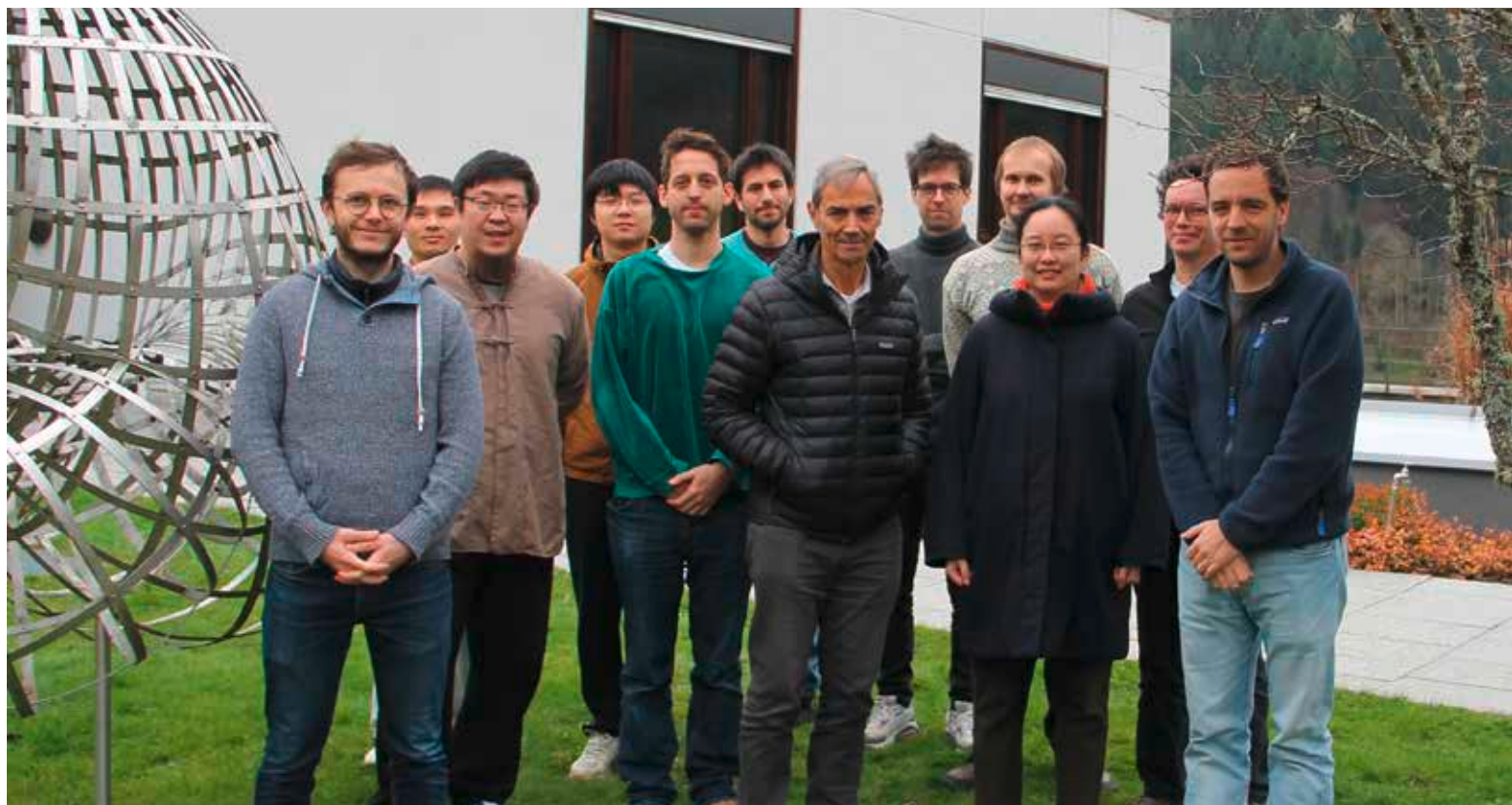
Guillaume Bossard, Palaiseau
Axel Kleinschmidt, Potsdam
Hermann Nicolai, Potsdam

Abstract

This Mini-Workshop explored the role played by infinite-dimensional Lie algebra of Kac-Moody type in supergravity and M theory. Deep conjectures about the role of affine, hyperbolic and other indefinite Kac-Moody algebras could both provide new methods and models for low-dimensional gravity systems and shed new light on the fundamental structure of gravity and unified theories. The elusive precise mathematical structure of some of the algebras can in turn be informed by physical ideas.

Participants

Alonso-Serrano, Ana (Berlin), Bossard, Guillaume (Palaiseau), Cesaro, Mattia (Potsdam), Ciceri, Franz (Lyon), Damour, Thibault (Bures-sur-Yvette), Feingold, Alex (Binghamton), Inverso, Gianluca (Padova), Kleinschmidt, Axel (Potsdam), Köhl, Ralf (Kiel), König, Benedikt (Potsdam), Lautenbacher, Robin (Kiel), Majumdar, Sucheta (Marseille), Malcha, Hannes (Potsdam), Marquis, Timothée (Louvain-la-Neuve), Meissner, Krzysztof (Warszawa), Nicolai, Hermann (Potsdam), Palmkvist, Jakob (Göteborg), Petrini, Michela (Paris)



08.12. – 13.12.2024

**Geometry of Random Fields and Random Walk Clusters:
New Horizons**

Organizers:

Titus Lupu, Paris
Wei Qian, Hong Kong
Pierre-Francois Rodriguez, London

Abstract

Critical phenomena represent a central theme in probability. Research has been going on for many decades and remains very active to date. Recently, models involving natural probabilistic objects such as random walks, loop soups, random interlacements and the Gaussian free field have witnessed exciting developments, both in two- and higher-dimensional setups. The purpose of the workshop was to provide an overview of the state of the art in this rapidly evolving research area. The workshop enabled participants to communicate about the most recent advances in the field, and to discuss propitious avenues for future research.

Participants

Aru, Juhan (Lausanne), Cai, Zhenhao (Rehovot), Drewitz, Alexander (Köln), Ferrari, Pablo A. (Buenos Aires), Gao, Yifan (Hong Kong), Jego, Antoine (Lausanne), Li, Xinyi (Beijing), Prévost, Alexis (Genève), Rodriguez, Pierre-Francois (London), Sepulveda, Avelio (Estación Central Santiago), Vogel, Quirin (Garching bei München), Watanabe, Satomi (Hong Kong), Werner, Wendelin (Cambridge)



08.12. – 13.12.2024

**High-Dimensional Control Problems and Mean-Field Equations
with Applications in Machine Learning**

Organizers:

Giacomo Borghi, Edinburgh
Elisa Iacomini, Ferrara
Mathias Oster, Aachen
Chiara Segala, Lugano

Abstract

High-dimensional control problems and mean field equations have been of increased interest in recent years and novel numerical tools tackling the curse of dimensionality have been developed. These optimization tasks are strongly related to learning problems such as data-driven optimal control and learning of deep neural networks. As a consequence, there is a huge potential to employ control theoretical techniques in Machine Learning. The Mini-Workshop was devoted to discuss possible synergies among the various tools developed in these fields.

Participants

Albi, Giacomo (Verona), Borghi, Giacomo (Edinburgh), Breiten, Tobias (Berlin-Charlottenburg), Conger, Lauren (Pasadena), Gomes, Susana (Coventry), Hoffmann, Franca (Pasadena), Huang, Yuyang (London), Iacomini, Elisa (Ferrara), Kalise, Dante (London), Marx, Swann (Nantes), Oster, Mathias (Aachen), Saluzzi, Luca (Pisa), Scagliotti, Alessandro (Garching bei München), Segala, Chiara (Lugano), Tse, Oliver (Eindhoven), Vaes, Urbain (Champs-sur-Marne)



08.12. – 13.12.2024

**Data-driven Modeling, Analysis, and Control of
Dynamical Systems**

Organizers:

Clarence W. Rowley, Princeton
Claudia Schillings, Berlin
Karl Worthmann, Ilmenau

Abstract

With the rapid increase in data resources and computational power as well as the accompanying current trend to incorporate machine learning into existing methods, data-driven approaches for modelling, analysis, and control of dynamical systems have attracted new interest and opened doors to novel applications. However, there is always a discrepancy between mathematical models and reality such that rigorously-shown error bounds and uncertainty quantification are indispensable for a reliable use of data-driven techniques, e.g., using surrogate models in optimisation-based control. Similar comments apply to data-enhanced models. Consequently, uncertainty about parameters, the model itself and numerous other aspects need to be taken into account, e.g., in data-driven control of (stochastic) dynamical systems. Hence, the respective paradigm changes have led to a variety of novel concepts which, however, still suffer from limitations: many concentrate only on a single aspect, are only applicable to systems of limited complexity, or lack a sound mathematical foundation including guarantees on feasibility, robustness, or the overall performance. Pushing these limits, we face a wide spectrum of theoretic and algorithmic challenges in modeling, analysis, and control under uncertainty using data-driven methods.

Participants

Colbrook, Matthew J. (Cambridge), Fantuzzi, Giovanni (Erlangen), Geiersbach, Caroline (Hamburg), Ghattas, Omar (Austin), Göttlich, Simone (Mannheim), Grüne, Lars (Bayreuth), Kramer, Boris (La Jolla), Nüske, Feliks (Magdeburg), Rowley, Clarence W. (Princeton), Schiela, Anton (Bayreuth), Schillinger, Thomas (Mannheim), Schillings, Claudia (Berlin), Strauch, Claudia (Heidelberg), Surowiec, Thomas M. (Oslo), Ulbrich, Michael (Garching bei München), Worthmann, Karl (Ilmenau), Zuazua, Enrique (Erlangen)

3.5. Simons Visiting Professors

Die folgenden Forscherinnen und Forscher kombinierten eine Workshopteilnahme mit einem Aufenthalt an einer europäischen Universität, unterstützt durch die Simons Foundation.



Christof Geiss, Ciudad de México
Workshop 2403: Cluster Algebras and its Applications
Host: David Hernandez, Paris

3.5. Simons Visiting Professors

The following researchers combined their participation in an Oberwolfach Workshop with a stay at a European University, supported by the Simons Foundation.



Becky Armstrong, Wellington
Workshop 2411a: Combinatorial $\ast$ -algebras
Host: Diego Martinez, Münster



József Solymosi, Vancouver
Workshop 2404: Discrete Geometry
Host: Janos Pach, Budapest



Alexander R. Duncan, Columbia
Workshop 2412: K-Stability, Birational Geometry and Mirror Symmetry
Host: Susanna Zimmermann, Paris



Efren Ruiz, Hilo
Workshop 2411a: Combinatorial $\ast$ -algebras
Host: Søren Eilers, Copenhagen



Constanze Liaw, Newark
Workshop 2418: Non-commutative Function Theory and Free Probability
Host: Eero Saksman, Saarbrücken



David Jekel, Toronto

Workshop 2418: Non-commutative Function Theory and Free Probability
Host: Janusz Wysoczanski, Wrocław



Todd Oliynyk, Clayton

Workshop 2432: Mathematical Aspects of General Relativity
Host: David Fajman, Wien



Michael T. Jury, Gainesville

Workshop 2418: Non-commutative Function Theory and Free Probability
Host: Michael Hartz, Saarbrücken

Andras Vasy, Stanford

Workshop 2432: Mathematical Aspects of General Relativity
Host: Peter Hintz, Zürich

Igor Rodnianski, Princeton

Workshop 2432: Mathematical Aspects of General Relativity
Host: Grigorgios Fournodavlos, Kreta

Takahiro Kitayama, Tokyo

Workshop 2439a: MATRIX-MFO Tandem Workshop: Invariants in Low-Dimensional Topology: Combinatorics, Geometry, and Computation
Host: Stefan Friedl, Regensburg



Uli Walther, West Lafayette

Workshop 2425: Arrangements, Matroids and Logarithmic Vector Fields
Host: Gerhard Röhrle, Bochum



Daniel Rogalski, La Jolla

Workshop 2439b: MFO-RIMS Tandem Workshop: Algebraic Geometry and Noncommutative Projective Varieties
Host: Susan Sierra, Edinburgh

3.6. Arbeitsgemeinschaften

Arbeitsgemeinschaft 2414



31.03. – 05.04.2024

Geometry and Representation Theory around the $P=W$ Conjecture

Organizers:

Tamas Hausel, Klosterneuburg
Davesh Maulik, Cambridge MA
Anton Mellit, Vienna
Olivier Schiffmann, Orsay
Junliang Shen, New Haven

Abstract

Given a smooth projective curve C , nonabelian Hodge theory gives a diffeomorphism between two different moduli spaces associated to C . The first is the moduli space of Higgs bundles on C of rank n , which is equipped with the structure of an algebraic completely integrable Hamiltonian system. The second is the character variety of representations of the fundamental group of C into $GL(n)$. In 2012, de Cataldo, Hausel, and Migliorini proposed the $P=W$ conjecture which identifies the perverse filtration on the cohomology of the Higgs moduli space with the weight filtration on the cohomology of the character variety. Recently, in 2022, two independent proofs of the $P=W$ Conjecture appeared, in work of Maulik & Shen and Hausel, Mellit, Minets & Schiffmann. The aim of the Arbeitsgemeinschaft was to understand the $P=W$ Conjecture and these two recent proofs.

Participants

Aoki, Ko (Bonn), Arbesfeld, Noah (Wien), Bae, Younghun (Utrecht), Bai, David (New Haven), Biswal, Rekha (Bhubaneswar), Dauser, Adam Vincent Daigoro (Bonn), Eteve, Arnaud (Bonn), Færgeman, Joakim (New Haven), Fang, David (New Haven), Forero, Christian (Trieste), Gallego Sanchez, Guillermo (Madrid), Ghosh, Soumik (New Haven), Goltsblat, Mikhail (New Haven), González, Miguel (Madrid), Gorsky, Mikhail (Wien), Guzman, Jose Luis (Cambridge), Hausel, Tamas (Klosterneuburg), Huang, Pengfei (Leipzig), Huynh, Matthew (Stony Brook), Juillard, Thibault (Orsay), Kubik, Mathieu (Paris), Larsen, Anne (Cambridge), Lim, Woonam (Utrecht), Liu, Wille (Taipei), Makarova, Svetlana (Essen), Maulik, Davesh (Cambridge), Mauri, Mirko (Palaiseau), Mellit, Anton (Wien), Moreira, Miguel (Cambridge), Numpaque Roa, Juan Sebastian (Porto), Pi, Weite (New Haven), Picovschi, Raphael (Orsay), Qin, Junhui (Paris), Schefers, Kendric D. (Berkeley), Schiffmann, Olivier (Orsay), Shen, Junliang (New Haven), Shen, Shuting (Beijing), Shu, Cheng (Hangzhou, Zhejiang), Wei, Chuanhao (Hangzhou), Xu, Daxin (Beijing), Yang, Ruijie (Berlin), Yu, Huishi (Beijing), Yuan, Jiangfan (Orsay), Zivanovic, Filip (Stony Brook), Zuliani, Vanja (Orsay)



06.10. – 11.10.2024

Organizers:

Quantum Signal Processing and Nonlinear Fourier Analysis

András Gilyén, Budapest

Lin Lin, Berkeley

Christoph Thiele, Bonn

Abstract

A pivotal algorithm in quantum signal processing represents a real-valued function as a specific entry in a product of $SU(2)$ matrices, where an argument matrix alternates with a sequence of coefficient matrices. Recently, this framework has been identified as a nonlinear Fourier series, a concept studied across various mathematical disciplines. This Arbeitsgemeinschaft explored the intersection of quantum computing and harmonic analysis, emphasizing the potential of this connection.

Participants

Alexis, Michel (Bonn), Alhajjar, Elie (Arlington), Ballew, Cade (Seattle), Becker, Lars (Bonn), Chan, Tiklung (La Jolla), Costa de Sousa, Mateus (Bilbao, Bizkaia), de Dios Pont, Jaume (Zürich), de la Fuente, Ruben (Bilbao, Bizkaia), Doriguello, Joao (Budapest), Faroß, Nicolas (Saarbrücken), Gießler, Max (Bonn), Gilyén, András (Budapest), Hairer, Martin (Lausanne), Ha Quang, Minh (Tokyo), Hsu, Alexander Win (Seattle), Huang, Kaiyi (Madison), Incudini, Massimiliano (Verona), Jamneshan, Asgar (İstanbul), Kaposi, Agoston (Budapest), Kosik, Miriam (Poznań), Kristensen, Lasse Björn (København), Larsen, James (Ann Arbor), Liang, Chong-Wei (Sydney), Lin, Fred (Bonn), Lin, Lin (Berkeley), Liu, Shao (Bonn), Mák, József (Budapest), Mnatsakanyan, Gevorg (Madison), Motta, Ricardo (Bilbao, Bizkaia), Negro, Giuseppe (Lisboa), Ni, Hongkang (Stanford), Oganessian, Kristina (Moscow), Oliveira, Itamar (Birmingham), Oliveira e Silva, Diogo (Lisboa), Peetz, Joseph, Pompili, Lorenzo (Bonn), Roncal, Luz (Bilbao, Bizkaia), Rossi, Zane Marius (Cambridge), Sarkar, Rahul (Stanford), Saucedo, Miquel (Bellaterra, Barcelona), Schleich, Philipp (Toronto), Schreuder, Anne (Cambridge), Srivastava, Rajula (Bonn), Taffarello, Giovanni (Bonn), Takase, Alberto (Houston), Taylor, Mitchell (Zürich), Thiele, Christoph (Bonn), Uraltsev, Gennady (Fayetteville), Zhang, Jianghao (Bonn)



13.10. – 18.10.2024

Organizers:

Algebraic K-Theory and the Telescope Conjecture

Robert Burklund, København
Ishan Levy, Cambridge MA
Jeremy Hahn, Cambridge MA
Tomer Schlank, Jerusalem

Abstract

The telescope conjecture, first formulated by Ravenel in the late 1970s, is a conjectural classification of smashing localizations of the stable homotopy category. Participants discussed interactions between such localizations and algebraic K-theory, culminating in the recent disproof of the telescope conjecture. We ended with some applications and future directions, including to such classical questions as the growth rate of the stable homotopy groups of spheres.

Participants

Allen, Keita T. (Cambridge), Andreychev, Grigory (Princeton), Angelini-Knoll, Gabriel (Villetaneuse), Bai, Qingyuan (København), Barthel, Tobias (Bonn), Blom, Thomas (København), Brink, Emma (Bonn), Burklund, Robert (København), Davies, Jack (Bonn), Fiebig, Peter (Erlangen), Hahn, Jeremy (Cambridge), Henn, Hans-Werner (Strasbourg), Juran, Branko (København), Kaufman, Dani (København), Keenan, Liam (Providence), Keidar, Shai (Chicago), Krause, Achim (Oslo), Kubrak, Dmitry (Bures-sur-Yvette), Levin, Jordan (Paris), Levy, Ishan (Copenhagen), Li, Catherine (Chicago), Li, Gabrielle Yangqing (Urbana), Li, Guchuan (Beijing), Linskens, Sil (Regensburg), Mattis, Klaus (Mainz), Meier, Lennart (Utrecht), Mor, Itamar (Bonn), Moulinos, Tasos (Paris), Naumann, Niko (Regensburg), Neuhauser, Leor (Jerusalem), Nielsen, Marius (Trondheim), Petersen, Sarah (Boulder), Piessevaux, Lucas (Bonn), Pstragowski, Piotr (Kyoto), Ragimov, Shauli (Jerusalem), Ramzi, Maxime (København), Ravenel, Douglas (Rochester), Riedel, Florian (København), Rognes, John (Oslo), Schlank, Tomer (Jerusalem), Shi, Yuqing (Bonn), Stewart, Natalie (Cambridge), Strickland, Neil P. (Sheffield), Subramanian, Vignesh (Utrecht), Sukarto, Eunice (Cambridge), Tang, Longke (Princeton), Tatum, Elizabeth (Bonn), Thom, Andreas B. (Dresden), Wickelgren, Kirsten G. (Durham), Wings, Christoph (Regensburg), Yang, Tristan (Cambridge)

3.7. Oberwolfach Seminare

Oberwolfach Seminar 2421a



19.05. – 24.05.2024

Organizers:

Classification of C^* -Algebras and Dynamics

Shirly Geffen, Münster

Christopher Schafhauser, Lincoln

Gábor Szabó, Leuven

Stuart White, Oxford

Abstract

The last decade has seen repeated major breakthroughs in the structure and classification of C^* -algebras and C^* -dynamical systems. The objective of this Oberwolfach Seminar was to introduce early-career researchers to the key ideas and tools and to bring them up to speed with the latest cutting-edge results. We focused on instructive special cases and examples, with the aim that participants can use classification theorems and techniques in their own research.

Participants

Bouwen, Ben (Odense), Evington, Samuel (Münster), Faurot, Gregory (Lincoln), Geffen, Shirly (Münster), Gesing, Rafaela (Münster), Gonzales, Julian (Glasgow), Hernández Palomares, Roberto (Waterloo), Hua, Shanshan (Oxford), Huppertz, Georg (Göteborg), Kettner, Aaron (Praha), Kopsacheilis, Grigoris (Münster), Kroell, Larissa (Waterloo), Miller, Alistair (Odense), Molander, Melody (Santa Barbara), Mukohara, Miho (Tokyo), Munkholm, Mikkel (Lincoln), Ouseph, Chrisil (West Lafayette), Oyetunbi, Dolapo (Ottawa), Schafhauser, Christopher (Lincoln), Seth, Apurva (Beer-Sheva), Szabó, Gábor (Leuven), Vilalta Vila, Eduard (Göteborg), White, Stuart (Oxford), Wu, Victor (Sydney)



19.05. – 24.05.2024

Organizers:

Long-Time Behavior in Fluids

Peter Constantin, Princeton

Theodore D. Drivas, Stony Brook

Tarek M. Elgindi, Durham, N.C.

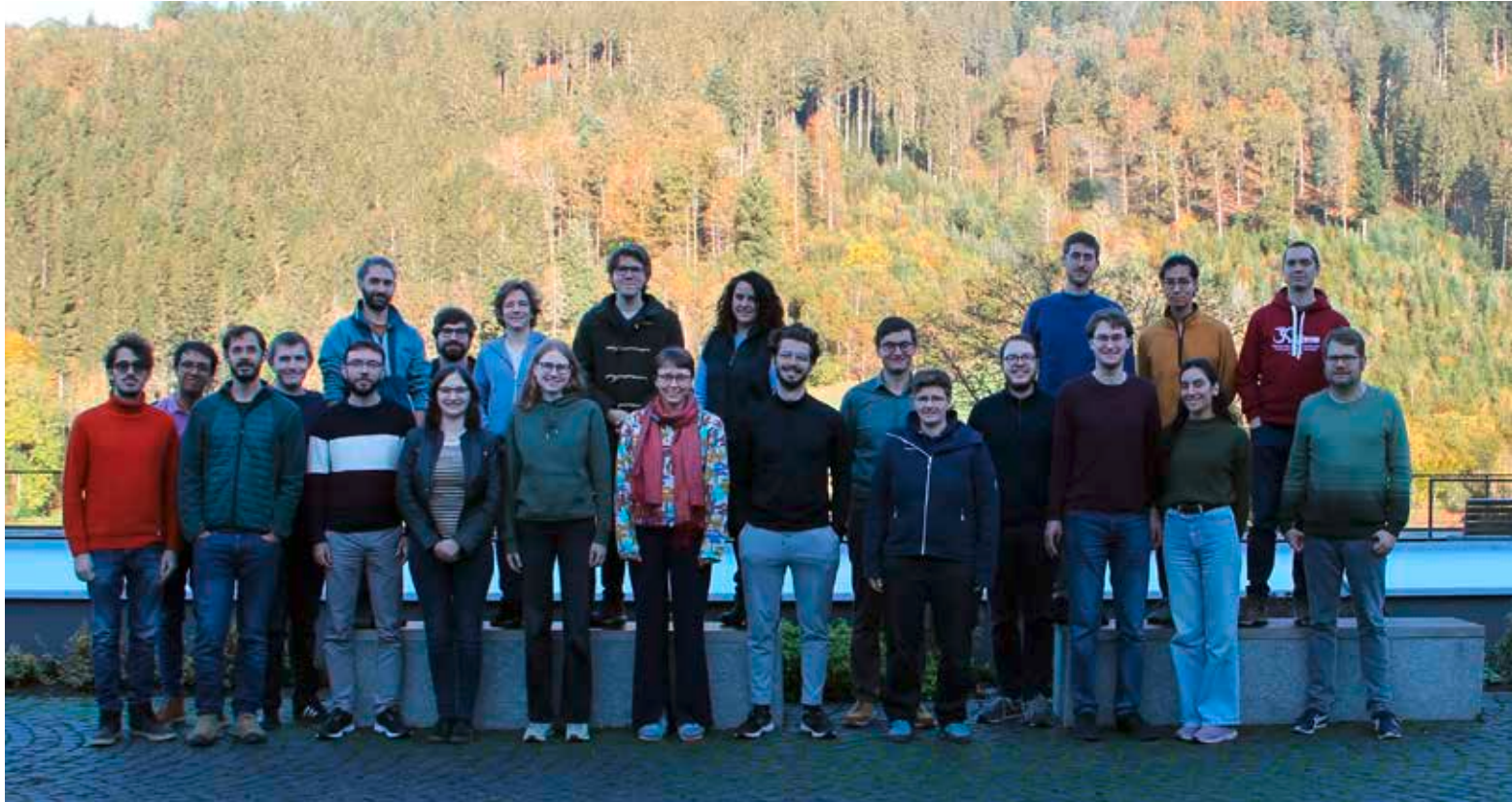
Mihaela Ignatova, Philadelphia

Abstract

The seminar tied together two active research directions: complex fluids and long time behavior of Euler, Navier-Stokes and related equations. The seminar focused on new trends in the investigation of long time behavior, mixing, emergence of coherent structures, topological change and singularity formation in fluids. There were three pedagogical mini-courses aimed at exposing students to the themes of long time behavior and inviscid limit, of complex fluids and of singularity formation. Problem sessions accompanied these courses, during which specific open problems were stated and discussed. Specific lectures described methods of nonlinear and nonlocal analysis with emphasis on broad applicability

Participants

Arslan, Ali (Zürich), Bianchini, Roberta (Roma), Binz, Tim (Princeton), Choi, Hyungjun (Princeton), Constantin, Peter (Princeton), Drivas, Theodore D. (Stony Brook), Elgindi, Tarek M. (Durham), Glukhovskiy, Daniil (Stony Brook), Grayer II, Hezekiah (Princeton), Ignatova, Mihaela (Philadelphia), Inversi, Marco (Basel), Jeong, In-Jee (Seoul), Jo, Min Jun (Durham), Johansson, Carl J.P. (Lausanne), Kalinin, Konstantin (Leipzig), Kim, Junha (Suwon-si), Martinez Zoroa, Luis (Basel), Pappalterra, Umberto (Bielefeld), Pasqualotto, Federico (Berkeley), Raees, Faiq (Abu Dhabi), Roop, Mikhail (Göteborg), Sorella, Massimo (Lausanne), Viviani, Milo (Pisa), Wu, Bian (Leipzig)



20.10. – 25.10.2024

Organizers:

Metric Topology of Aspherical Spaces

Clara Löh, Regensburg

Roman Sauer, Karlsruhe

Abstract

Metric topology lies on the border between algebraic topology and metric geometry. It studies how topological complexity and geometric complexity relate to each other. Classical examples of this paradigm are Gromov's and Thurston's proof of Mostow rigidity via simplicial volume or Gromov's bound of the minimal volume by the simplicial volume. A recent example is the breakthrough result of Chambers–Manin–Weinberger on Lipschitz bounds for nullhomotopies of nullhomotopic Lipschitz maps and its application to quantitative bordism theory. Other recent developments in metric topology include results on macroscopic scalar curvature, filling inequalities, and homological gradient bounds from geometric conditions. In this seminar, we outlined basic techniques of metric topology and guided the participants to recent developments of this research area. We put a special emphasis on aspherical spaces for which the fundamental groups governs the topology.

Participants

Arenas, Macarena (Cambridge), Bargagnati, Giuseppe (Bologna), Bertolotti, Federica (Pisa), Bogliolo, Elena (Pisa), Capovilla, Pietro (Pisa), Drago, Andrea (Roma), Espinosa Baro, Arturo (Poznań), Frerichs, Helge (Augsburg), Hadziosmanovic, Ervin (Pisa), Hofmann, Franziska (Regensburg), Hülkamp, Nora (Göttingen), Li, Kevin (Regensburg), Löh, Clara (Regensburg), Mescher, Stephan (Halle / Saale), Migliorini, Matteo (Karlsruhe), Milizia, Francesco (Pisa), Romero Alba, Sergio (Malaga), Rusakov, Ilja (Regensburg), Sarti, Filippo (Pisa), Sauer, Roman (Karlsruhe), Uschold, Matthias (Regensburg), Wasmeier, Malena (Regensburg), Weis, Jannis (Karlsruhe)



20.10. – 25.10.2024

Organizers:

Reduction of Arithmetic Varieties

Thomas J. Haines, College Park

Timo Richarz, Darmstadt

Eva Viehmann, Münster

Torsten Wedhorn, Darmstadt

Abstract

Shimura varieties have first been studied systematically by Deligne in the 70s. They play a central role in the realization of Langlands correspondences. In recent years, Scholze has introduced moduli spaces of shtukas also in the local number theoretic case merging the geometric Langlands program and the classical Langlands program, culminating in the (still conjectural) geometrization of the local Langlands program by Fargues and Scholze. Together the reduction of Shimura varieties and moduli spaces of shtukas have contributed to spectacular developments in number theory and arithmetic geometry in the last decades.

Participants

Bieker, Patrick (Cambridge), Fu, Chenji (Bonn), Guo, Haoyang (Chicago), Haines, Thomas (College Park), Hedayatzadeh, Mohammad Hadi (Tehran), Hoff, Manuel (Bielefeld), Löwit, Jakob (Klosterneuburg), Luo, Yu (Madison), Oswal, Abhishek (Freiburg i. Br.), Pereira Lourenço, João Nuno (Münster), Perutka, Tomas (Münster), Richarz, Timo (Darmstadt), Schremmer, Felix (Hong Kong), Shao, Xinyu (Paris), Shram, Vladyslav (Münster), Siemon, Paul (Darmstadt), van den Hove, Thibaud (Darmstadt), Viehmann, Eva (Münster), Wedhorn, Torsten (Darmstadt), Yang, Hsin-Yi (Utrecht), Yaylali, Can (Darmstadt), Zachos, Ioannis (Münster), Zhang, Zhiyu (Stanford), Zhou, Yicheng (Paris)



24.11. – 29.11.2024

Organizers:

Exponential Motives

Javier Fresán, Palaiseau

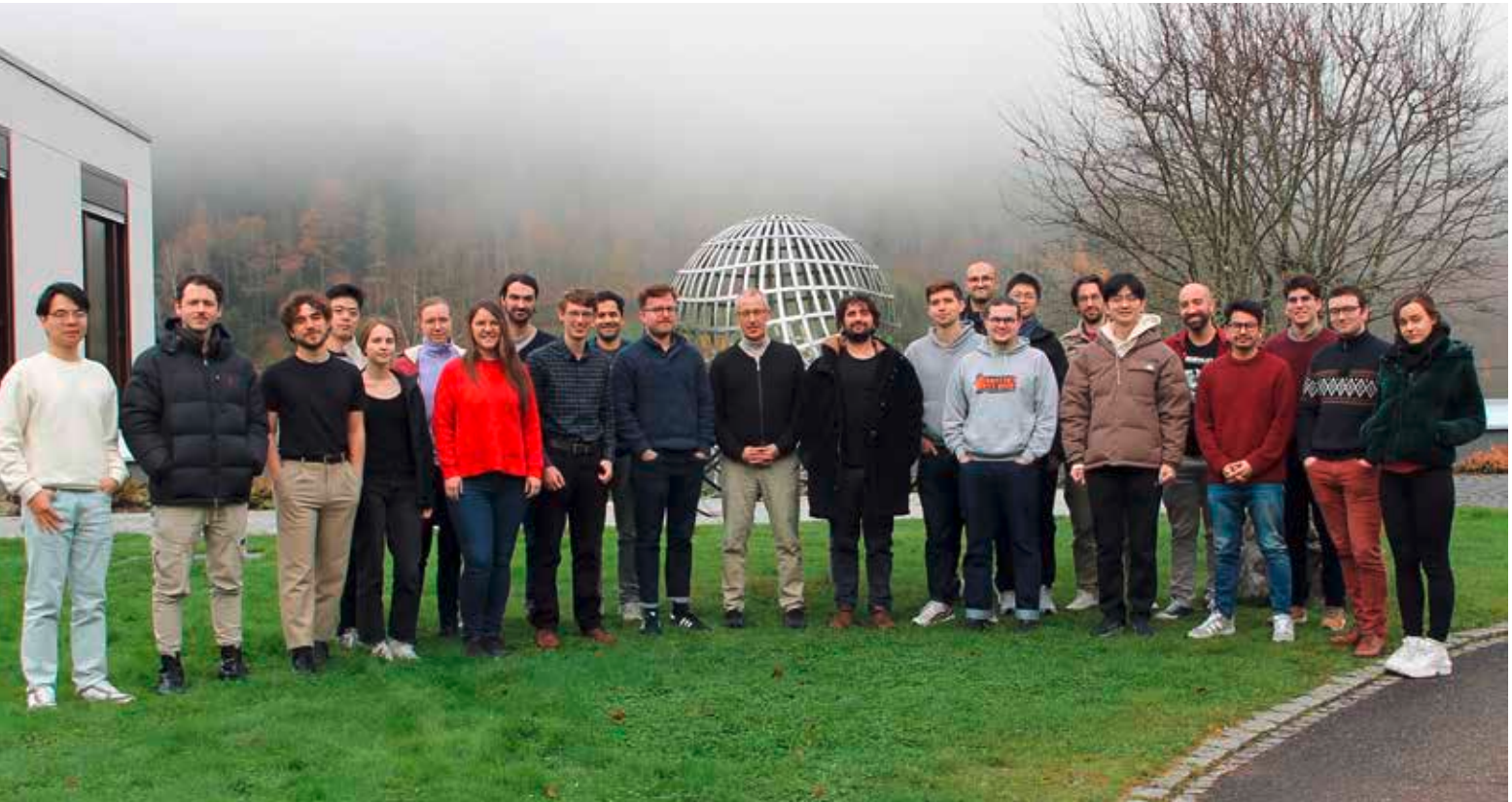
Peter Jossen, London

Abstract

Exponential motives are a powerful tool for the study of a host of objects attached to an algebraic variety along with a regular function, ranging from exponential sums over finite fields in analytic number theory to Landau–Ginzburg models in mirror symmetry. The goal of this week long seminar was to introduce PhD students and post-doctoral researchers to the key ideas of the theory of exponential motives, and to illustrate them by some recent applications to the study of E-functions and Kloosterman sums. We focused on significant examples to be worked out by the participants during the afternoon sessions, and presented a collection of open questions of various levels of difficulty.

Participants

Aloé, Stefano (Palaiseau), Bose, Jishnu (Los Angeles), Brackenhofer, Christoph (Freiburg i. Br.), Cotti, Giordano (Lisboa), Fresán, Javier (Paris), Hinault, Thorgal (Pasadena), Hohl, Andreas (Chemnitz), Jakob, Konstantin (Darmstadt), Jossen, Peter (London), Kamlesh, Deepak (Bonn), Pigé, Xavier (Paris), Qin, Yichen (Berlin), Ren, Muze (Genève), Ribeiro, Gabriel (Zürich), Serafini, Thomas (Paris), Snodgrass, Ben (Freiburg i. Br.), Tapuskovic, Matjia (Oxford), Tilley, Joshua (London), Tubach, Swann (Lyon), van den Hove, Thibaud (Darmstadt), Zhang, Dingxin (Beijing), Zhang, Shaowu (Pasadena)



24.11. – 29.11.2024

Organizers:

Control and Machine Learning

Borjan Geshkovski, Cambridge

Domènec Ruiz-Balet, London

Enrique Zuazua, Erlangen

Abstract

This seminar provided an overview of the recent developments and new horizons of the burgeoning field found at the intersection of control theory and machine learning. This perspective, in which deep neural networks are viewed as controlled flow maps, has shown to be fruitful in analyzing a myriad of problems of interest in machine learning, including interpolation and generalization properties of deep neural networks, or normalizing flows for generative modeling, as well as clustering properties for Transformers – to name a few.

Participants

Alcalde, Albert (Erlangen), Alvarez-López, Antonio (Madrid), Beneventano, Pierfrancesco (Princeton), Bryutkin, Andrey (Cambridge), Cheng, Jingpu (Singapore), Davron, Lucas (Paris), Geshkovski, Borjan (Paris), Giton, Quentin (Orsay), Herberg, Evelyn (Heidelberg), Hernandez Salinas, Martin (Erlangen), Li, Ziqian (Erlangen), Liu, Kang (Dijon), Marcotte, Sibylle (Paris), Martinet, Eloi (Würzburg), Maslovskaya, Sofya (Paderborn), Pecorella, Giulio (Modena), Ruiz-Balet, Domènec (London), Sartor, Enrico (Erlangen), Shalova, Anna (Eindhoven), Singh, Manjot (München), Steynberg, Matthys Jacobus (Erlangen), Tsimpos, Panos (Cambridge), Wang, Ziqi (Erlangen), Zuazua, Enrique (Erlangen)

3.8. Weitere Fortbildungsveranstaltungen / Further training weeks

ELLIS-Workshop 2403a



Photo: Courtesy of Cees Snoek

17.01. – 19.01.2024

Organizers:

Multimodal Learning Systems

Nicu Sebe, Trento

Cees Snoek, Amsterdam

Abstract

ELLIS (European Laboratory for Learning and Intelligent Systems) is a pan-European AI network of excellence organized into ELLIS programs. This workshop was organized within the ELLIS program "Multimodal Learning Systems". Multimodal foundation models are a revolutionary class of AI models that provides impressive abilities to generate content. An international group of researchers from academia and industry gathered at the MFO to discuss the latest advances in this field. The workshop was funded in part by the state of Baden-Württemberg, Germany and supported by ELISE.

Participants

Alahari, Karteek (Saint-Martin-d'Hères), Alameda-Pineda, Xavier (Saint-Martin-d'Hères), Damen, Dima (Bristol), Gall, Jürgen (Bonn), Gong, Shaogang (London), Karatzas, Dimosthenis (Bellaterra, Barcelona), Patras, Ioannis (London), Ricci, Elise (Trento), Sebe, Nicu (Trento), Sminchisescu, Christian (Lund), Snoek, Cees (Amsterdam), Verbeek, Jakob (Saint-Martin-d'Hères)



14.02. – 16.02.2024

Organizers:

Semantic, Symbolic and Interpretable Machine Learning

Paolo Frasconi, Firenze

Kristian Kersting, Darmstadt

Volker Tresp, München

Abstract

ELLIS (European Laboratory for Learning and Intelligent Systems) is a pan-European AI network of excellence organized into ELLIS programs. This workshop was organized within the ELLIS program "Semantic, Symbolic and Interpretable Machine Learning" and focused on machine learning approaches which operate at the human abstraction level, where the world is described by entities, concepts, and their mutual relationships. Among other topics, the event covered multi-relational learning, learning with (temporal) knowledge graphs, and the extraction of statistical and logical regularities from data. It served as an important platform to connect scientists in this field and to foster new research collaborations in Europe. The workshop was funded by the state of Baden-Württemberg (Germany) and organized in collaboration with the ELLIS Institute Tübingen and the Max Planck Institute for Intelligent Systems.

Participants

Chen, Shuo (München), Derkinderen, Vincent (Leuven), Flach, Peter (Bristol), Frasconi, Paolo (Firenze), Hoffart, Johannes (Eschborn), Hüllermeier, Eyke (München), Kersting, Kristian (Darmstadt), Liao, Ruotong (München), Ma, Yunpu (München), Navab, Nassir (Garching bei München), Sokol, Kacper (Zürich), Tresp, Volker (München), Wüst, Antonia (Darmstadt)



26.02. – 28.02.2024

Organizers:

Interactive Learning and Interventional Representations

Nicolo Cesa-Bianchi, Milano

Andreas Krause, Zürich

Bernhard Schölkopf, Tübingen

Abstract

ELLIS (European Laboratory for Learning and Intelligent Systems) is a pan-European AI network of excellence organized into ELLIS programs. This workshop was organized within the ELLIS program "Interactive Learning and Interventional Representations". It spotlighted cutting-edge research in interactive models of learning. The event was a convergence point for international scholars dedicated to redefining the paradigms of online learning, reinforcement learning, causal inference, and interacting learning systems. The workshop was funded by the state of Baden-Württemberg (Germany) and organized in collaboration with the ELLIS Institute Tübingen and the Max Planck Institute for Intelligent Systems.

Participants

Akhavan, Arya (Genova), Cesa-Bianchi, Nicolò (Milano), Colomboni, Roberto (Milano), Esposito, Emmanuel (Milano), Grazi, Riccardo (Genova), Guo, Siyuan (Tübingen), Kassraie, Parnian (Zürich), Koolen, Wouter (Amsterdam), Krause, Andreas (Zürich), Lampert, Christoph (Klosterneuburg), Pace, Alizée (Zürich), Pontil, Massimiliano (Genova), Ramponi, Giorgia (Zürich), Schölkopf, Bernhard (Tübingen), Vernade, Claire (Tübingen), Watkins, Chris (Egham, Surrey)



25.03. – 27.03.2024

Organizers:

Natural Language Processing

Iryna Gurevych, Darmstadt

André Martins, Lisboa

Ivan Titov, Edinburgh

Abstract

ELLIS (European Laboratory for Learning and Intelligent Systems) is a pan-European AI network of excellence organized into ELLIS programs. In this workshop 22 researchers from 12 European institutions gathered at the MFO to discuss future directions in open LLMs and multimodal language technologies. The workshop was organized within the ELLIS NLP program. It was funded by the state of Baden-Württemberg (Germany) and organized in collaboration with the ELLIS Institute Tübingen and the Max Planck Institute for Intelligent Systems.

Participants

Attanasio, Giuseppe (Aveiro), Bavaresco, Anna (Amsterdam), Bernardi, Raffaella (Povo), Bertolazzi, Leonardo (Povo), Chrupala, Grzegorz (Tilburg), Demberg, Vera (Saarbrücken), Elliott, Desmond (København), Fernandez, Raquel (Amsterdam), Gatt, Albert (Utrecht), Ghaleb, Esam (Amsterdam), Giulianelli, Mario (Zürich), Gurevych, Iryna (Darmstadt), Hanna, Michael (Amsterdam), Kaushik Surikuchi, Aditya (Amsterdam), Koller, Alexander (Saarbrücken), Martins, André (Lisboa), Moens, Sien (Leuven), Mondorf, Philipp (München), Pezzelle, Sandro (Amsterdam), Plank, Barbara (München), Schlangen, David (Potsdam), Suglia, Alessandro (Edinburgh), Takmaz, Ece (Amsterdam), Testoni, Alberto (Amsterdam), Titov, Ivan (Edinburgh)



11.05. – 18.05.2024

Trainings- und Abschlussseminar für die Internationale Mathematik-Olympiade

Organizers:

Patrick Bauermann, Bonn
Uwe Leck, Flensburg

Abstract

The Institute hosted again the final week of the preparation seminars for the German candidates for the International Mathematical Olympiad (IMO). Sixteen pupils made it to the final round of the selection competition. Six of them became part of the team that traveled to Bath (United Kingdom) and participated at the IMO. The German selection competition and the preparatory seminars are organized by "Bildung & Begabung", the talent promotion center of the federal and state governments.

Participants

Böke, Clemens (Löhne), Ding, Tina (Kempten), Fedorov, Fedir (Brieselang), Husynin, Vlad (Würzburg), Jäniche, Florian (Halle/Saale), Kottisch, Leonard (Oldenburg), Krabbenhöft, Lars (Höchstadt/Aisch), Kraftsik, Christian (Vaterstetten), Lavrova, Vera (Fulda), Lindenthal, David (Schwaig), Lörcks, Philipp (Trier), Mintken, Tammo (Oldenburg), Raitz v. Frentz, Johannes (Sehnde), Schimpke, Sebastian (Hamburg), Schmidt, Paul Jakob (Osterode), Zenker, Lennart (Artern)



13.10. – 19.10.2024

Organizers:

Black Holes and Conformal Infinities of Spacetime

Maciej Dunajski, Cambridge UK

Dejan Gajic, Leipzig

Wojciech Kaminski, Warsaw

Jerzy Lewandowski, Warsaw

James Lucietti, Edinburgh

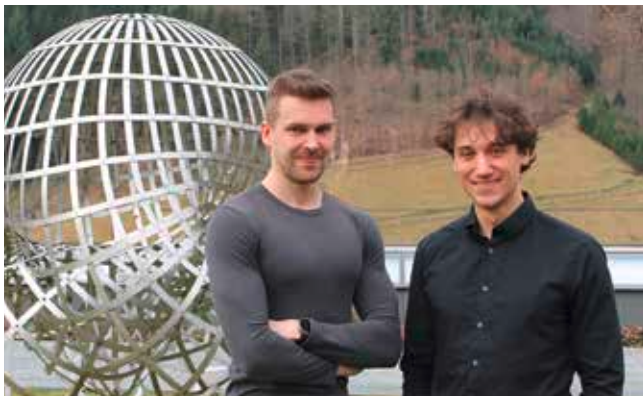
Abstract

The seminar was devoted to the mathematical aspects of two dynamically developing and important areas of the general theory of relativity: conformal infinities of space-time and black holes. Courses and lectures: Conformal methods in general relativity, conformal geometry and the Fefferman–Graham construction, normal conformal Cartan connection and asymptotically (A)dS spacetimes, waves on black hole spacetimes, extreme black holes, non-trivial NUT horizons.

Participants

Aravindhan, Srinivasan (Praha), Babisch, Florian (Tübingen), Bakun, Zuzanna (Kraków), Bhattacharjee, Arindam (Warszawa), Cafaro, Luca (Warszawa), Cameron, Peter (Edinburgh), Colling, Alex (Cambridge), Dey, Sumit (Warszawa), Dunajski, Maciej (Cambridge), Engel, Benjamin (Warszawa), Ficek, Filip (Wien), Gajic, Dejan (Leipzig), Glöckle, Jonathan (Regensburg), Haghsheenas, Mahdi (London), Kaminski, Wojciech (Erlangen), Kayzer, Damian (Warszawa), Lucietti, James (Edinburgh), Lukanty, Angelika (Kraków), Manzano, Miguel (Salamanca), Marajh, Jordan (London), Miethke, Benedikt (Edinburgh), Mohseni, Rouzbeh (Kraków), Oseka, Julia (Kraków), Ossowski, Maciej (Warszawa), Rallabhandi, Virinchi Venkata (Edinburgh), Sanchez Perez, Gabriel (Salamanca), Sansom, Robert (London), Schneider, Eivind (Tromsø), Schulz, Malte (Marburg), Sikorski, Bartłomiej (Warszawa), Smolka, Tomasz (Warszawa), Steneker, Wijnand Sebastiaan (Tromsø), Szereszewski, Adam (Warszawa), Turner, George (Praha), Urbanski, Karol (Kraków), Varrin, Ludovic (Warszawa), Verma, Paritosh (Lublin), Wierzbicki, Jan (Kraków), Zychowicz, Adam (Kraków)

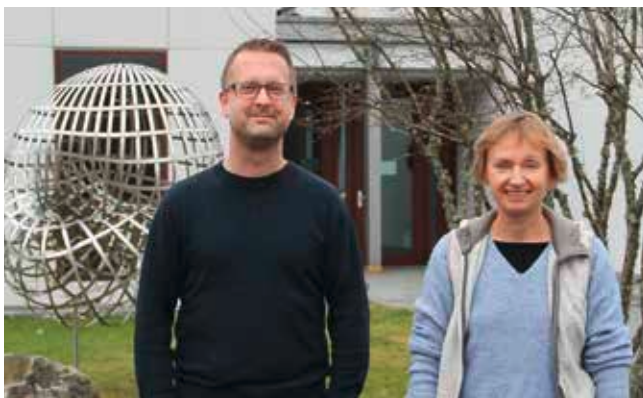
3.9. Oberwolfach Research Fellows



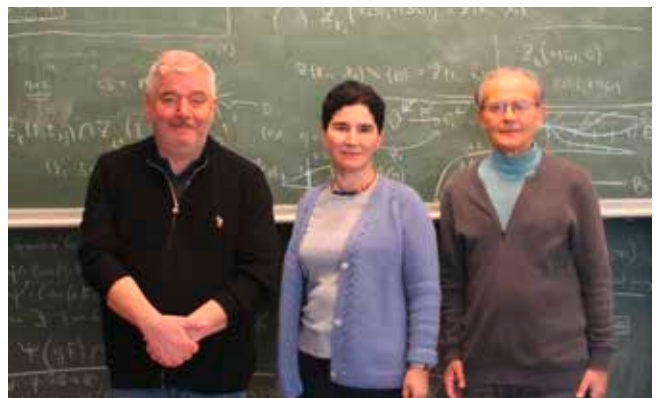
Jorge Farina-Asategui, Lund (left)
Mikel E. Garciarena, Salerno (right)
21.01. – 02.02.2024



Francesco Locatello, Tübingen (1st left)
Bernhard Schölkopf, Tübingen (2nd left)
Kun Zhang, Pittsburgh (2nd right)
Julius von Kügelgen, Tübingen (1st right)
18.02. – 23.02.2024



Heiko Dietrich, Clayton VIC (left)
Bettina Eick, Braunschweig (right)
04.02. – 16.02.2024



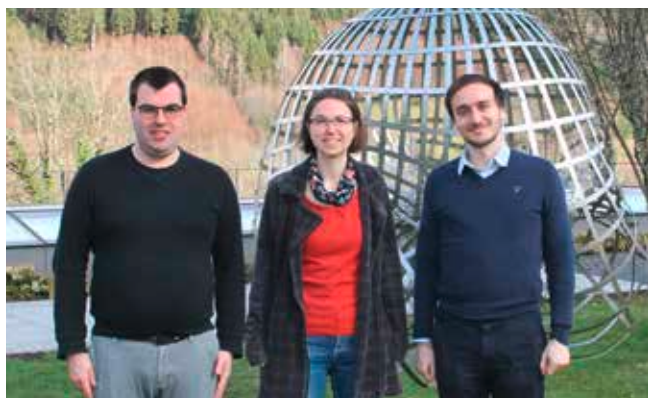
Duško Jojić, Banja Luka (left)
Gaiane Panina, St. Petersburg (middle)
Rade T. Živaljević, Belgrade (right)
25.02. – 08.03.2024



Fabio Bernasconi, Lausanne (2nd right)
Andrea Fanelli, Bordeaux (2nd left)
Julia Schneider, Lausanne (1st right)
Susanne Zimmermann, Paris (1st left)
11.02. – 16.02.2024



Andrés Jaramillo Puentes (1st left)
Hannah Markwig, Tübingen (2nd left)
Sabrina Pauli, Düsseldorf (2nd right)
Felix Röhrle, Tübingen (1st right)
10.03. – 22.03.2024



Raphael de Fondeville, Neuchâtel (right)
Marco Oesting, Stuttgart (left)
Kirsting Strokorb, Cardiff (middle)
 10.03. – 22.03.2024



Joel F. Feinstein, Nottingham (left)
Alexander J. Izzo, Bowling Green (right)
 14.04. – 26.04.2024



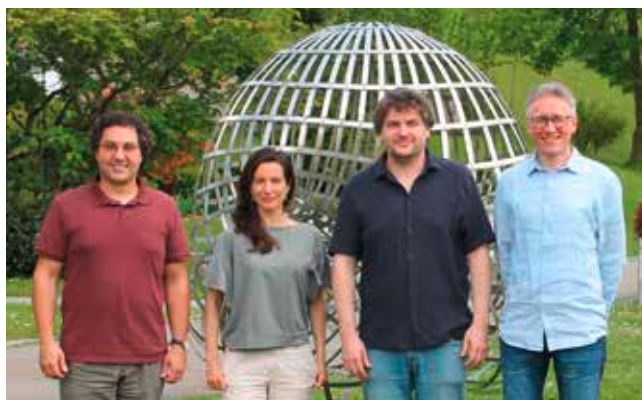
Chiara Esposito, Salerno (2nd right)
Ryszard Nest, Copenhagen (1st left)
Rosa Marchesini, Göttingen (2nd left)
Jonas Schnitzer, Freiburg (middle)
Boris Tsygan, Evanston (1st right)
 24.03. – 19.04.2024



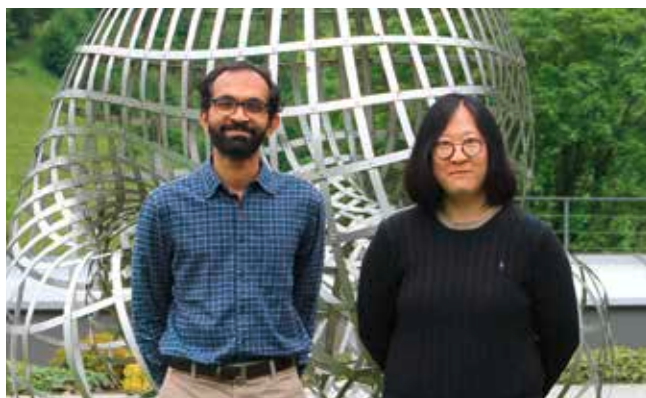
Nicole Berline, Palaiseau (right)
Velleda Baldoni, Roma (left)
Michele Vergne, Paris (middle)
 21.04. – 03.05.2024



Kieran Calvert, Lancaster (left)
Marcelo De Martino, Gent (right)
 07.04. – 12.04.2024
 28.04. – 03.05.2024



Chiara Boccato, Milano (2nd left)
Joachim Kerner, Hagen (2nd right)
Maximilian Pechmann, Cookeville (1st left)
Wolfgang Spitzer, Hagen (1st right)
 12.05. – 24.05.2024



Jungwon Lee, Warwick (right)
Bharathwaj Palvannan, Bangalore (left)
 26.05. – 07.06.2024



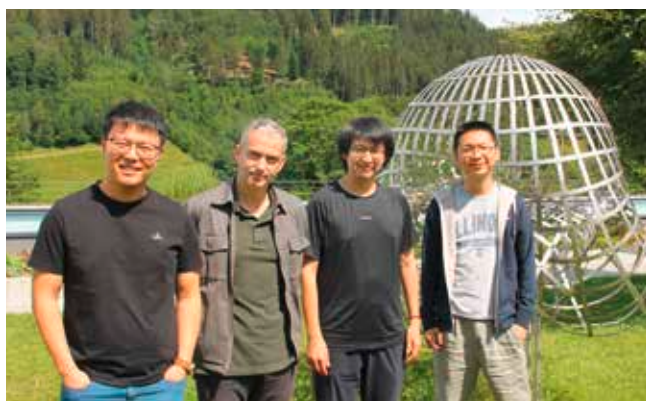
Volker Remmert, Wuppertal (right)
Rebecca Waldecker, Halle (left)
 09.06. – 14.06.2024



Anna Abbatiello, Caserta (2nd left)
Danica Basaric, Milano (2nd right)
Nilasis Chaudhuri, Warsaw (1st right)
Eduard Feireisl, Praha (1st left)
 26.05. – 07.06.2024



Matthew Douglass, Alexandria (right)
Götz Pfeiffer, Galway (middle)
Gerhard Röhrle, Bochum (left)
 23.06. – 28.06.2024



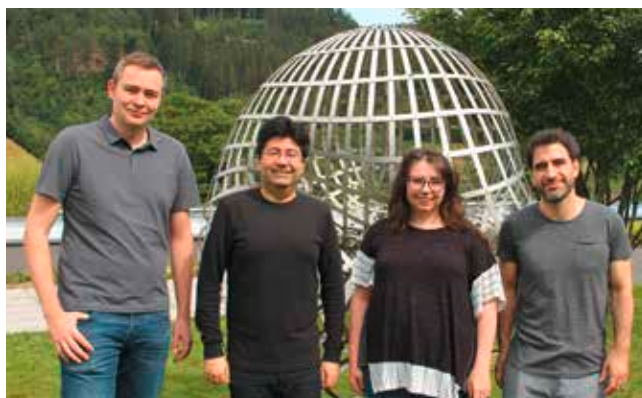
Pengfei Huang, Leipzig (1st left)
Georgios Kydonakis, Patras (2nd left)
Hao Sun, Guangzhou (2nd right)
Lutian Zhao, College Park (1st right)
 09.06. – 21.06.2024



Ho Lee, Seoul (1st right)
Ernesto Nungesser, Madrid (1st left)
John Garrett Stalker, Dublin (2nd right)
Kenneth Paul Tod, Oxford (2nd left)
 30.06. – 12.07.2024



Jacqueline Godoy Mesquita, Brasilia (right)
Sabrina Streipert, Pittsburgh (left)
 30.06. – 19.07.2024



Jane Ivy Coons, Oxford (2nd right)
Carlos Enrique Améndola Cerón, Berlin
 (2nd left)
Alexandros Grosdos, Augsburg (1st right)
Frank Röttger, Eindhoven (1st left)
 28.07. – 09.08.2024



Jiang-Ping Jeff Chen, St. Cloud (1st right)
Joseph W. Dauben, New York (middle)
Shuchun Guo, Beijing (left, virtual participant)
Wann-Sheng Horng, Taipei (2nd right)
Dahai Zhou, Beijing (2nd left, virtual part.)
 14.07. – 26.07.2024



Takayuki Hibi, Osaka (right)
Sara Saeedi Madani, Tehran (left)
 18.08. – 30.08.2024



Mireille Boutin, West Lafayette (right)
Gregor Kemper, Garching (left)
 21.07. – 02.08.2024

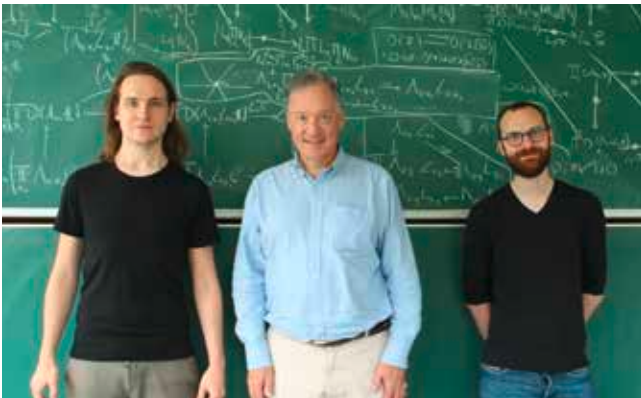
Christian Krattenthaler, Wien
Thomas W. Müller, Wien
 25.08. – 13.09.2024



Joan Elias, Barcelona (left)
Rosa M. Miró Roig, Barcelona (right)
 25.08. – 06.09.2024



Lilit Martirosyan, Wilmington (left)
Hans Wenzl, La Jolla (right)
 29.09. – 11.10.2024



Scott Balchin, Belfast (right)
Tobias Barthel, Bonn (left)
John Greenlees, Warwick (middle)
 01.09. – 13.09.2024



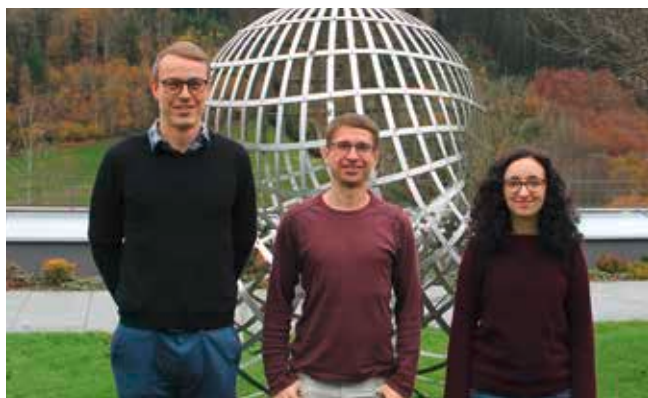
Sarah Brauner, Montréal (1st right)
Patricia Commins, Minneapolis (2nd right)
Darij Grinberg, Philadelphia (1st left)
Franco Saliola, Montréal (2nd left)
 13.10. – 01.11.2024



Alessio Corti, London (left)
Helge Ruddat, Stavanger (right)
 15.09. – 27.09.2024



Ana Botero, Bielefeld (middle)
Enrica Mazzon, Regensburg (left)
Léonard Pille-Schneider, Regensburg (right)
 27.10. – 08.11.2024



Richard Höfer, Regensburg (middle)
Amina Mecherbet, Paris (right)
Richard Schubert, Bonn (left)
 10.11. – 15.11.2024



Mattia Magnabosco, Oxford (right)
Tommaso Rossi, Paris (left)
 08.12. – 20.12.2024

Michel Balazard, Marseille
Bruno Martin, Calais
 17.11. – 29.11.2024

3.10. Oberwolfach Leibniz Fellows



Daniele Dona, Budapest
 28.01. – 19.04.2024

external guest researchers:

Jitandra Bajpai, Edmonton
 04.02. – 17.02.2024
 24.03. – 06.04.2024

Subham Bhakta, Thiruvananthapuram
 14.04. – 19.04.2024



Sarfaz Ahmad, Lahore (left)
 04.02. – 09.02.2024

external guest researchers:

Muhammad Mansha, Muneeba (right)
 04.02. – 09.02.2024

Volkmar Welker, Marburg (middle)
 04.02. – 09.02.2024



Pedro Pinto, Darmstadt
17.03. – 07.06.2024

external guest researchers:

Nicolas Pischke, Darmstadt
31.03. – 05.04.2024

Morenoleji Neri, Bath
12.05. – 17.05.2024

Thomas Powell, Bath
12.05. – 17.05.2024

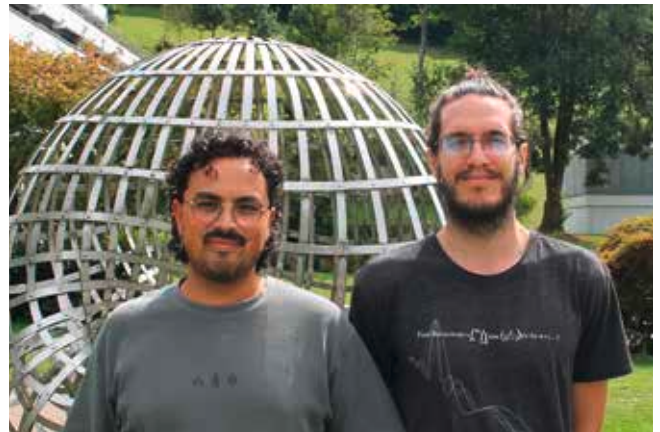
Laurentiu Leustean, Bucharest
19.05. – 24.05.2024



Alberto Rodriguez Vazquez, Leuven
26.05. – 21.06.2024

external guest researcher:

Miguel Dominguez-Vazquez, Santiago de Compostela
09.06. – 21.06.24



Marco Praderio Bova, Lancaster UK (right)
14.07. – 06.09.2024

external guest researcher:

Guille Carrion Santiago, Malaga (left)
25.08. – 06.09.2024



Duong Dinh, Hamburg
01.09. – 22.11.2024

external guest researchers:

Jörg Teschner, Hamburg
19.09. – 23.09.24
25.09. – 30.09.24

Vladimir Roubtsov, Angers
22.09. – 04.10.24

Sid Maibach, Bonn
10.11. – 15.11.24

Eveliina Peltola, Los Angeles
10.11. – 15.11.24

Hui-An Shen, Bern
24.11. – 20.12.24

3.11. Publikationen

Das MFO unterstützt die Idee von Open Access. Alle Publikationen sind auf der Webseite publications.mfo.de elektronisch frei verfügbar (mit Ausnahme der Buchreihe Oberwolfach Seminars beim Birkhäuser Programm von Springer).

Oberwolfach Reports (OWR)

OWR wird in Zusammenarbeit mit EMS Press veröffentlicht und enthält die Ergebnisse der Workshops, Miniworkshops und Arbeitsgemeinschaften in Form von erweiterten Abstracts der Vorträge. Für 2024 sind die Bände OWR 21.1 bis 21.4 mit mehr als 3.000 Seiten erschienen.

Oberwolfach Preprints (OWP)

In OWP werden Resultate von längerfristigen Forschungsaufenthalten publiziert, aber auch von mathematischen Vorträgen im Rahmen von besonderen Veranstaltungen des MFO. Im Jahr 2024 sind die folgenden Preprints erschienen:

- Arm Exponent for the Gaussian Free Field on Metric Graphs in Intermediate Dimensions
[OWP-2024-01] Drewitz, Alexander; Prévost, Alexis; Rodriguez, Pierre-François
- A Gentle Introduction to Interpolation on the Grassmann Manifold
[OWP-2024-02 and OWP-2024-02-v2 (revised version)] Ciaramella, Gabriele; Gander, Martin J.; Vanzan, Tommaso
- Ky Fan Theorem for Sphere Bundles
[OWP-2024-03] Panina, Gaiane; Živaljević, Rade
- On Dykstra's Algorithm with Bregman Projections
[OWP-2024-04] Pinto, Pedro; Pischke, Nicholas
- On Overgroups of Distinguished Unipotent Elements in Reductive Groups and Finite Groups of Lie Type
[OWP-2024-05] Bate, Michael; Böhm, Sören; Martin, Benjamin; Röhrle, Gerhard
- Proof Mining and the Convex Feasibility Problem: the Curious Case of Dykstra's Algorithm
[OWP-2024-06] Pinto, Pedro
- The Alternating Halpern-Mann Iteration for Families of Maps
[OWP-2024-07] Firmino, Paulo; Pinto, Pedro
- The Subgroup Structure of Pseudo-Reductive Groups
[OWP-2024-08] Bate, Michael; Martin, Benjamin; Röhrle, Gerhard; Sercombe, Damian
- Diameter and Connectivity of Finite Simple Graphs II
[OWP-2024-09] Hibi, Takayuki; Saeedi Madani, Sara
- Local Existence and Conditional Regularity for the Navier-Stokes-Fourier System Driven by Inhomogeneous Boundary Conditions
[OWP-2024-10] Abbatiello, Anna; Basarić, Danica; Chaudhuri, Nilasis; Feireisl, Eduard
- On the Halpern Method with Adaptive Anchoring Parameters
[OWP-2024-11] Pinto, Pedro; Pischke, Nicholas
- The Congruence Properties of Romik's Sequence of Taylor Coefficients of Jacobi's Theta Function θ_3
[OWP-2024-12] Krattenthaler, Christian; Müller, Thomas W.

3.11. Publications

The MFO supports the idea of open access. Hence, all publications are freely available on the website publications.mfo.de (with the exception of the book series Oberwolfach Seminars from the Birkhäuser program at Springer).

Oberwolfach Reports (OWR)

OWR is published in cooperation with EMS Press and contains extended abstracts of the talks in the Workshops, Mini-Workshops, and Arbeitsgemeinschaften. For 2024, the issues OWR 21.1 to 21.4 were published with more than 3,000 pages in total.

Oberwolfach Preprints (OWP)

OWP mainly contains research results related to a longer stay in Oberwolfach, but this can also include lectures held during special occasions in Oberwolfach. The following Preprints were published in 2024:

- A CFSG-Free Explicit Jordan's Theorem over Arbitrary Fields
[OWP-2024-13] Bajpai, Jitendra; Dona, Daniele
- Alternating Snake Modules and a Determinantal Formula
[OWP-2024-14] Brito, Matheus; Chari, Vyjayanthi

Schnappschüsse moderner Mathematik aus Oberwolfach

In den „Schnappschüssen moderner Mathematik aus Oberwolfach“ bereiten Teilnehmerinnen und Teilnehmer der wissenschaftlichen Programme des MFO einen besonders spannenden Aspekt ihrer Forschung für die interessierte Öffentlichkeit auf. Im Jahr 2024 sind vier Schnappschüsse aus unterschiedlichen mathematischen Gebieten erschienen:

Snapshots of modern mathematics from Oberwolfach

In the "snapshots of modern mathematics from Oberwolfach" participants of the scientific programs at the MFO explain an especially exciting aspect of their research to an interested public. Four snapshots from distinct mathematical areas have been published in 2024:

- Waves and Incidences
(No. 1/2024) Yung, Po-Lam
- Randomness is Natural – an Introduction to Regularisation by Noise
(No. 2/2024) Djurdjevac, Ana; Elad Altman, Henri; Rosati, Tommaso
- Voronoi Cells: Or How to Find the Nearest Bakery
(No. 3/2024) Hess, Sarah; Torres, Angélica; van der Eyden, Mirte
- Uncertainty as an Ingredient in Financial Modeling
(No. 4/2024) Korn, Ralf

4. Infrastruktur und Finanzen

4.1. Übersicht der Bereiche

Die wissenschaftliche Arbeit der Forschungsgäste wird durch eine effiziente Infrastruktur ermöglicht.

Von besonderer Bedeutung ist die Bibliothek, die in der mathematischen Forschung eine ähnliche Rolle spielt wie das Labor in den Naturwissenschaften. Die Bibliothek des MFO zählt zu den weltweit besten Spezialbibliotheken in der Mathematik und steht den Gästen rund um die Uhr zur Verfügung.

Daneben spielt der Bereich der Informationstechnologie eine wichtige Rolle, sowohl direkt für die wissenschaftliche Arbeit, als auch für die weltweite Kommunikation der Forschenden untereinander.

Zur Planung, Durchführung und Begleitung der wissenschaftlichen Programme waren am Institut etwa 21 Stellen in den Bereichen der wissenschaftlichen und allgemeinen Verwaltung, Bibliothek, IT, Öffentlichkeitsarbeit, Gästebetreuung und Hauswirtschaft besetzt. Für die effiziente, konzentrierte Arbeit der Gäste am MFO sind dabei die abgeschiedene Lage, die hervorragende wissenschaftliche Infrastruktur, und nicht zuletzt auch die ideale Betreuung einschließlich Unterbringung und Verpflegung im Gästehaus, direkt neben dem Tagungs- und Bibliotheksgebäude, wichtige Faktoren.

4.2 Bibliothek

Die Bibliothek des MFO ist für die Forschungsgäste in Oberwolfach das wichtigste Arbeitsmittel. Sie wird intensiv von Teilnehmenden aller Programme genutzt. Viele ziehen eine Einladung nach Oberwolfach anderen Einladungen vor, da sie am MFO Literatur vorfinden, die für sie sonst nicht zugänglich ist. Neben dem hohen internationalen Standard des wissenschaftlichen Programms und den exzellenten Rahmenbedingungen für den persönlichen Gedankenaustausch ist die Bibliothek ein wichtiger Grund für das hohe Ansehen des MFO weltweit.

Der hohe Stellenwert der Bibliothek wird auch deutlich in dem großen Engagement verschiedener Stiftungen wie der Klaus Tschira Stiftung gGmbH, der Marga und Kurt Möllgaard-Stiftung, der VolkswagenStiftung sowie der Carl Friedrich von Siemens Stiftung. So haben die Klaus Tschira Stiftung und die VolkswagenStiftung zu gleichen

4. Facilities and Finances

4.1. Overview on the divisions

The MFO has set up an excellent infrastructure for scientific research activities.

The library represents a vital part of this infrastructure and plays an important role, similar to laboratories in experimental sciences. The MFO's library is one of the world's most excellent libraries in mathematics and can be used by the guest researchers 24 hours a day.

But also information technology is of great importance for assisting research activities, and also to ensure worldwide communication among the scientific community.

For the planning and realization of the scientific program approximately 21 positions in various divisions, such as scientific and administration management, library, IT, outreach and media, guest service, and housekeeping are provided. Besides the excellent scientific infrastructure it is also the Institute's remote location, and the excellent service with board and lodging in our guest house close to the conference and library building, that guarantees efficient and concentrated working conditions for our guests.

4.2 Library

The library is the most important working tool for scientific research in Oberwolfach. It is used intensively by participants of all scientific programs. Many mathematicians prefer an invitation to Oberwolfach to other invitations because they find literature here that is otherwise unavailable for them. In addition to the high international standard of the scientific program and the excellent conditions for the face-to-face exchange of ideas, the library is an important factor for the high reputation of the MFO worldwide.

The high significance of the library is also reflected in the great commitment of various foundations, such as the Klaus Tschira Stiftung gGmbH, the Marga and Kurt Möllgaard-Foundation, the Volkswagen Foundation and the Carl Friedrich von Siemens Foundation. For example, the Klaus Tschira Stiftung and the Volkswagen

Teilen den Erweiterungsbau der Oberwolfacher Bibliothek finanziert und damit Platz für etwa 20 weitere Jahre geschaffen. Die Carl Friedrich von Siemens Stiftung unterstützt die Oberwolfacher Bibliothek seit 1999 mit einem regelmäßigen Betrag für den Erwerb von Büchern. In 2015–2016 konnte durch Mittel der VolkswagenStiftung die Informations- und Kommunikations-Infrastruktur der Bibliothek modernisiert und eine Kompaktanlage für die gebundenen Zeitschriften eingerichtet werden. Darüber hinaus hat die Deutsche Forschungsgemeinschaft (DFG) seit 2004 zahlreiche Projekte im Rahmen des Förderprogramms „Wissenschaftliche Literaturversorgungs- und Informationssysteme“ finanziert.

Bibliotheksprofil

Die Oberwolfacher Bibliothek hat die Aufgabe, die Fachliteratur aus allen Bereichen der Mathematik sowie aus angrenzenden Gebieten so vollständig wie möglich zu erwerben und bereit zu stellen. Im Fokus stehen dabei insbesondere mathematische Fachzeitschriften sowie Monographien und Kongressberichte der relevanten Fachverlage. Schwerpunktmäßig werden Bücher in gedruckter Form angeschafft, Zeitschriften hingegen bevorzugt elektronisch. Aber auch E-Books werden seit 2014 gezielt und in Ergänzung zum gedruckten Bestand erworben. Die relevante Literatur wird gekauft, im Tausch gegen institutseigene Publikationen erworben oder als Geschenk empfangen.

Die Bibliothek des MFO ist eine reine Präsenzbibliothek und für die Forschungsgäste rund um die Uhr geöffnet. Sämtliche Bestände stehen innerhalb der Bibliothek ohne Einschränkung zur Verfügung. Es findet keinerlei Ausleihe statt, auch Fernleihe ist nur in begründeten Einzelfällen möglich (z.B. bei Alleinbesitz).

Das MFO nimmt seit 1995 am Südwestdeutschen Bibliotheksverbund (SWB) teil. Die Arbeit im Verbund sowie die durch das Bibliotheksservice-Zentrum Baden-Württemberg (BSZ) als betreuende Institution bereitgestellte Software bedeuten für das Institut eine erhebliche Erleichterung bei der Verwaltung der Bibliotheksbestände.

Bestand

Zum Bestand der Bibliothek gehörten zum Jahresende 2024 ca. 71.600 gedruckte Bücher, darunter 51.100 Monographien und 10.200 Kongressberichte. 136 Bücher konnten mit Mitteln der Carl Friedrich von Siemens Stiftung erworben werden. Die Zahl der E-Books konnte auf etwa 32.000 gesteigert werden.

Foundation have funded the extension of the library building in equal parts, creating space for another 20 years. The Carl Friedrich von Siemens Foundation has supported the Oberwolfach library since 1999 with a regular amount for the purchase of books. In 2015–2016 the MFO received support from the Volkswagen Foundation to modernize the library infrastructure of information and communication and to install compact shelves for the bound journal volumes. In addition, since 2004, the Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) has financed numerous projects within the funding program “Scientific Library Services and Information Systems”.

Library profile

The task of the library in Oberwolfach is to acquire and to provide specialist literature from all fields of mathematics and its neighboring areas as completely as possible. In particular, the acquisition focuses on mathematical journals and monographs as well as on conference proceedings of the relevant academic publishers. Books are primarily acquired in printed form, while journals are preferred electronically. However, since 2014 e-books have also been systematically acquired in addition to the printed stock. The relevant literature is either purchased, acquired in exchange for publications of the Institute, or received as a gift.

The library of the MFO is a reference library and can be used by our research guests 24 hours a day. The complete collection is available within the library without restriction. There is no lending system, interlibrary lends are only possible in justified individual cases (e.g. in the case of exclusive possession).

Since 1995 the MFO has been a member of the Südwestdeutscher Bibliotheksverbund (SWB), which, together with the software provided by the Bibliotheksservice-Zentrum Baden-Württemberg (BSZ) as supporting institution, facilitates the cataloging of our library collection enormously.

Library Holdings

The library’s collection at the end of 2024 included approximately 71,600 printed books, including 51,100 monographs and 10,200 congress proceedings. 136 books were acquired with funds from the Carl Friedrich von Siemens Foundation. The number of e-books has increased to about 32,000.

Vor allem durch DFG-Nationallizenzen sowie die DEAL-Verträge und weitere Konsortiallizenzen stehen am MFO über 13.000 E-Journals zur Verfügung. Die Zahl der Print-Abonnements verringerte sich auf 120 Titel. In den Kompaktregalen befanden sich darüberhinaus ca. 33.000 gedruckte Zeitschriftenbände, nicht alles davon ist digital erhältlich.

Buchausstellung

Die ständige Buchausstellung gibt interessierten wissenschaftlichen Verlagen die Möglichkeit, ihre Neuerscheinungen im Bereich Mathematik am MFO über einen längeren Zeitraum zu präsentieren. Die Bibliothek des MFO profitiert von dieser Kooperation, indem sie die kostenlos gelieferten Neuerscheinungen in ihren Bestand integrieren kann. 2024 gingen insgesamt 739 Bücher im Rahmen der Buchausstellung in den Bibliotheksbestand ein. Wir danken den folgenden Verlagen für ihre Unterstützung und ihr Mitwirken in unserem Buchausstellungsprogramm:

- American Mathematical Society (AMS)
- Atlantis Press (Co-publishing with Springer)
- Birkhäuser Science
- Cambridge University Press
- CRC Press/Taylor & Francis Group
- De Gruyter GmbH & Co. KG
- EMS Press
- International Press of Boston, Inc.
- Iwanami Shoten Publishers
- Mathematical Society of Japan
- Oxford University Press
- Princeton University Press
- Société Mathématique de France (SMF)
- Springer Nature
- Springer Spektrum
- XYZ Press by AwesomeMath (distributed by AMS)

Oberwolfach Photo Collection

Zum Bibliotheksbestand gehört eine umfangreiche Sammlung an Porträts von Mathematikern und Mathematikerinnen, zusammengetragen durch Herrn Prof. Dr. Konrad Jacobs, Erlangen. Diese Sammlung ist im Jahr 2004 mit Hilfe des Springer Verlags Heidelberg digitalisiert worden; sie steht im Internet mit verschiedenen Recherche-Funktionen frei zur Verfügung. Die

Mainly through DFG National Licences as well as the DEAL contracts and other consortia licences, more than 13,000 e-journals are available at the MFO. The number of print subscriptions has decreased to 120 titles. Additionally, the compact shelves of the library contain about 33,000 bound journal volumes, where not all of them are also electronically available.

Book exhibition

The permanent book exhibition enables academic publishers to present their new publications in the field of mathematics at the MFO for a certain period of time. The library of the MFO benefits from this cooperation, because all books from the exhibition can be included free of charge into the inventory of the library. In the year 2024 the library received a total of 739 books this way. We wish to thank the following publishers for taking part in our book exhibition program:

Oberwolfach Photo Collection

The inventory of the library includes a large collection of mathematician portraits, collected by Prof. Dr. Konrad Jacobs, Erlangen. This collection has been digitized in the year 2004 with support of the publisher Springer Heidelberg. It is freely available on the internet with a variety of search functions. The underlying database is an in-house development of the MFO. The collection

zugrunde liegende Datenbank ist eine Eigenentwicklung des MFO. Die Sammlung wird laufend ergänzt durch eigene Aufnahmen sowie durch externe Beiträge. Sie wird unter anderem für den Bereich Mathematik in der Wikipedia unter den Bedingungen der Creative Commons License Attribution-Share Alike 2.0 Germany sowie in zunehmendem Maße von Verlagen für deren Publikationen genutzt. Ende 2024 waren ca. 24.160 Fotos in der Datenbank enthalten.

4.3. IT

Die IT-Abteilung des MFO stellt den Institutsangehörigen, den Gremien und den Gästen effiziente IT-Arbeitsumgebungen zur Verfügung. Sie unterstützt die Bibliothek und den Bereich der Öffentlichkeitsarbeit bei Diensten für die mathematische Community und die interessierte Öffentlichkeit. Dabei sind Informationssicherheit und Datenschutz wichtige Aspekte, die entsprechend berücksichtigt werden.

Verwaltungsbereich

Die Verwaltung der Tagungen und der längeren Forschungsaufenthalte erfolgt mit der am MFO entwickelten Software „owconf“, die Anforderungen von wissenschaftlicher Begutachtung, Konferenzmanagement und Hotelsoftware in sich vereinigt. In den vergangenen Jahren wurde die Software stetig weiterentwickelt. Zahlreiche neue Anforderungen – sowohl in technischer Hinsicht als auch aus Benutzersicht – erforderten jedoch eine grundlegende Überarbeitung, so dass 2023 mit der Erstellung einer neuen Version begonnen wurde. Erste Module der neuen Software gingen im Lauf des Jahres 2024 erfolgreich in den produktiven Betrieb über.

Kommerzielle Software wird in den Bereichen Finanzbuchhaltung, Personalverwaltung sowie beim Bibliothekskatalog und der Literaturrecherche eingesetzt.

Das Verwaltungspersonal arbeitet hauptsächlich mit Remote-Desktop-Sitzungen, die von den PC-Arbeitsplätzen oder per VPN von mobilen Arbeitsplätzen aus genutzt werden.

Gästebereich

Wegen der relativ kurzen Aufenthalte der Gäste sind alle IT-Angebote so intuitiv wie möglich gestaltet. Die Gäste erhalten persönliche Nutzerkonten für die Online-Angebote der Bibliothek, drahtlosen und kabelgebundenen Internetzugang sowie Scan- und Druckmöglichkeiten.

Alle Vortragsräume sind mit moderner Präsentations- und Videokonferenztechnik ausgestattet.

is continuously supplemented by in-house photographs and contributions by mathematicians worldwide. Among other things, the collection is used for the field of mathematics in Wikipedia according to the conditions of the Creative Commons License Attribution-Share Alike 2.0 Germany. Increasingly, publishers use the collection as well for their publications. By the end of 2024 the database contained approximately 24,160 photos.

4.3. IT

The IT department of the MFO provides an efficient IT infrastructure for the employees of the Institute, the committees, and the visiting scientists. Furthermore, the IT department supports the library and the public relations of the MFO with regard to services for the mathematical community and the interested public. Data security and data protection are important tasks, taken into account throughout.

Administrative sector

The databased software “owconf”, developed in-house, handles tasks arising from scientific management, conference management and guesthouse administration. The software has been continuously enhanced over the past years. Numerous new requirements – both from a technical and user perspective – now afforded a fundamental revision, so work on a new version started in 2023. The first modules of the new software were successfully put into operation during the year 2024.

Commercial software is used for financial accounting and human resources, for the library catalog and the literature search portal.

The administrative staff mainly works with remote desktop sessions, which are accessed from the PC workstations or from mobile workstations via VPN.

Guests' working environments

Due to the relatively short stays of the guest scientists, all services are designed as easy to use as possible. Guest scientists are provided with personal accounts for the online services of the library, wifi and cable-bound ethernet connection as well as scan and print facilities.

The IT section maintains modern presentation and videoconference equipment in all lecture

Auch für Kleingruppen und Einzelpersonen in den Langzeitprogrammen des MFO stehen Videokonferenzsysteme zur Verfügung.

Webdienste

Die Webdienste für die Gäste und die weitere mathematische Community bieten Informationen über die Angebote des MFO, künftige und vergangene Forschungsprogramme und – in Zusammenarbeit mit der Bibliothek – freien Zugang zu Publikationen des Instituts. Der spezielle Webdienst „Oberwolfach Photo Collection“ ist eine Eigenentwicklung des MFO.

Unterstützung der Öffentlichkeitsarbeit

Die IT-Abteilung unterstützt die Öffentlichkeitsarbeit des MFO, insbesondere die „Schnappschüsse moderner Mathematik aus Oberwolfach“, für deren Produktion sie die Infrastruktur bereitstellt. Außerdem betreut die IT des MFO das Oberwolfacher Museum für Mineralien und Mathematik „MiMa“ (s. Abschnitt 4.4.: Öffentlichkeitsarbeit). Ausgewählte Exponate werden auch direkt am Institut den Forschungsgästen über einen Touchscreen bereitgestellt.

4.4. Öffentlichkeitsarbeit

Das MFO richtet sich in seiner Öffentlichkeitsarbeit sowohl an wissenschaftliche als auch an nicht-wissenschaftliche Zielgruppen. Die wissenschaftliche Kernzielgruppe, bestehend aus Mathematikern und Mathematikerinnen sowie Forschenden in angrenzenden Gebieten, erhält regelmäßig Informationen über anstehende Veranstaltungen und wissenschaftliche Programme des MFO. Das MFO verschickt dazu einen halbjährlichen Rundbrief per Email, informiert auf der eigenen Webseite und verbreitet Flyer und Poster. Außerdem nutzt das Institut die angebotenen Informationskanäle der mathematischen Fachgesellschaften, z.B. von DMV und EMS.

Zusätzlich zur wissenschaftlichen Kernzielgruppe richtet sich das MFO an im weiteren Sinne forschungsinteressierte Gruppen, insbesondere an Schülerinnen und Schüler, Studierende, Lehrkräfte und Wissenschaftsredaktionen, sowie an die breite Öffentlichkeit. Das Ziel ist es, das Verständnis für die Bedeutung der Mathematik zu fördern. Das MFO verfolgt dazu drei miteinander vernetzte Aktivitäten: Das Institut ist Mitbetreiber des Museums für Mineralien und Mathematik in Oberwolfach, es ist Herausgeber der Open-Source Schriftenreihe „Schnappschüsse moderner Mathematik aus Oberwolfach“ und es ist Teilhaber und Kooperationspartner der IMAGINARY gGmbH.

rooms. Video conference systems are also available for small groups and individuals in the long-term programs of the MFO.

Web services

Web services for the guest scientists and the wider mathematical community include information about MFO facilities, future and past research programs at the MFO and open access to publications of the Institute in collaboration with the MFO library. The special web service “Oberwolfach Photo Collection” has been developed in-house.

Support of outreach activities

The IT section also supports the outreach activities of the MFO, in particular it supplies the infrastructure for producing the “snapshots of modern mathematics from Oberwolfach”. Moreover, the IT section services the Museum for Minerals and Mathematics “MiMa” (see section 4.4.: Outreach and Media). Selected exhibits are also provided to our research guests at the Institute on a touchscreen.

4.4. Outreach and media

In its outreach the MFO addresses both academic and non-academic target groups. The core academic target group, consisting of mathematicians and researchers in adjacent areas, regularly receives information on forthcoming events and scientific programs of the MFO. The MFO sends a biannual newsletter via email, informs on its website and distributes posters and flyers. The Institute also uses the information channels offered by national and international mathematical societies, e.g. of the German Mathematical Society (DMV) and the European Mathematical Society (EMS).

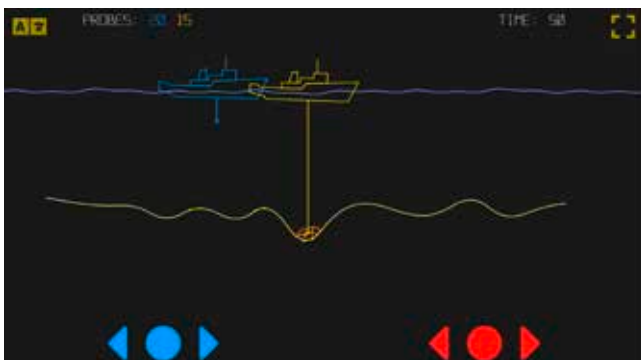
In addition to the core academic target group, the MFO addresses groups interested in research in a broader sense, in particular pupils, students, teachers and science journalists, as well as the general public. The main objective with regard to these audiences is to promote the understanding of the importance of mathematics and modern mathematical research. The MFO pursues three interlinked activities: The Institute is co-operator of the Museum of Minerals and Mathematics in Oberwolfach, it is the publisher of the open-source article series “snapshots of modern mathematics from Oberwolfach” and it is shareholder and cooperation partner of the IMAGINARY gGmbH.

Mathematik im MiMa

Das Mathematische Forschungsinstitut Oberwolfach betreibt seit 2010 gemeinsam mit dem Verein der Freunde von Mineralien und Bergbau und der Gemeinde Oberwolfach das MiMa. Das Museum für Mineralien und Mathematik zeigt eine einzigartige Sammlung an Mineralien aus dem Schwarzwald und erklärt ihre Formen und Symmetrien in interaktiven mathematischen Installationen. Der mathematische Teil der Ausstellung bietet kunstvolle Einblicke in die Mathematik und lädt dazu ein, mathematische Phänomene spielerisch zu erforschen – in interaktiven Programmen, Hands-on-Exponaten und Bildern. Ein deutlicher Schwerpunkt liegt auf den Grundlagen der Kristallografie. Durch die Verknüpfung von Mathematik und Mineralogie bietet das Museum einen interdisziplinären Zugang zu beiden Wissenschaften und vereint zwei Besonderheiten der Region unter einem Dach.

Die Ausstellung richtet sich an ein breites Publikum. Ein besonderer Schwerpunkt liegt auf den Schulen der Region, für die spezielle Führungen angeboten werden. Im Rahmen der Reihe „Kultur im MiMa“ finden außerdem Veranstaltungen zu unterschiedlichen Themen aus Mathematik und Mineralogie statt.

Seit Beginn des Jahres 2023 war das Museum wegen An- und Umbaumaßnahmen durch die Gemeinde Oberwolfach geschlossen. Die Maßnahmen erforderten u.a. auch den Umzug und die teilweise Erneuerung des technischen Unterbaus der Mathematikausstellung durch die IT Abteilung des MFO. Die Schließzeit wurde außerdem dazu genutzt, gemeinsam mit IMAGINARY eine neue Station zum Thema Künstliche Intelligenz einzurichten, die zur Wiedereröffnung im Juli 2024 vorgestellt wurde. Auch der Audio-guide und die Begleitbroschüre zur Ausstellung wurden während der Schließzeit überarbeitet.



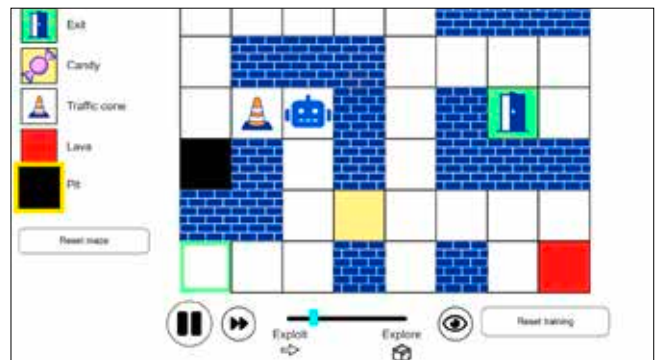
Zwei Programme der neuen KI Station: Anhand einer Schatzsuche lernen Besucher spielerisch das Gradientenverfahren kennen und mit der Methode des bestärkenden Lernens lassen sie einen Roboter selbständig den Ausgang eines Labyrinths finden.

Mathematics at the MiMa

Since 2010 the Mathematisches Forschungsinstitut Oberwolfach engages in the MiMa, together with the association of the Friends of Minerals and Mining in Oberwolfach and the municipality Oberwolfach. The museum for minerals and mathematics shows a one-of-a-kind collection of minerals from all over the Black Forest and explains their forms and symmetries with interactive mathematical applications. The maths exhibition delivers aesthetic insights into mathematics and enables visitors to playfully explore mathematical phenomena using interactive programs, hands-on exhibits, and images. A clear focus is put on the mathematical foundations of crystallography. Through the combination of mathematics and mineralogy, the museum offers an interdisciplinary approach to both sciences and presents two unique features of the region in one single spot.

The exhibition is aimed at a broad audience. A special focus is on the schools of the region, for which special tours are offered. Within the "Culture in MiMa" series, there are also events on various topics from mathematics and mineralogy.

The museum has been closed since the beginning of 2023 due to expansion and renovation work by the municipality of Oberwolfach. These measures required, among other things, the relocation and partial renewal of the technical infrastructure for the mathematics exhibition by the MFO's IT department. The closure was also used to set up a new station on artificial intelligence in collaboration with IMAGINARY, which was presented at the reopening in July 2024. The audio guide and the accompanying brochure for the exhibition were also revised during the closure.



Two programs of the new AI exhibit: Using a treasure hunt, visitors playfully learn about gradient descent, and using the reinforcement learning method, they let a robot independently find the exit of a labyrinth.

In den verbleibenden sechs Monaten des Jahres 2024 verzeichnete das MiMa deutlich über 3000 Besucher.

Schnappschüsse moderner Mathematik

Das Ziel der „Schnappschüsse moderner Mathematik aus Oberwolfach“ ist es, mathematische Ideen und Probleme in verständlicher Art und Weise einem breiteren Publikum zu vermitteln. Sie sollen spannende Einblicke in die aktuelle mathematische Forschung bieten. Die Schnappschüsse werden von Teilnehmenden des wissenschaftlichen Programms am MFO geschrieben. Ein Team aus Editorinnen und Editoren unterstützt sie bei der Aufbereitung der komplizierten Sachverhalte. Das MFO veröffentlicht die Schnappschüsse unter einer Creative Commons Lizenz.

Das Schnappschuss-Projekt hat zum Ziel, Verständnis und Wertschätzung für moderne Mathematik und mathematische Forschung in der interessierten Öffentlichkeit weltweit zu fördern. Die angestrebte Leserschaft besteht aus Mathematiklehrkräften, Wissenschaftsjournalistinnen und -journalisten, Studierenden sowie fortgeschrittenen Schülerinnen und Schülern.

Das Projekt wird von Dr. Anja Randecker koordiniert. Sie ist als Chefredaktorin für das Editieren der Texte verantwortlich. Im Redaktionsteam wirkten außerdem mit: Dr. Michela Egidi, Dr. Carina Geldhauser, Dr. Martin Günther, Natan Dominko Kobilica, Daniel Kronberg, Dr. Marta Maggioni, Dr. Sara Munday, Oliver Nagy, Anup Anand Singh, Dr. Matthew Tam und Joonas Mikael Vättö. Im Laufe des Jahres wurden 4 Schnappschüsse publiziert (s. Abschnitt 3.11.: Publikationen).

Zusammenarbeit mit IMAGINARY

IMAGINARY startete am MFO anlässlich des Wissenschaftsjahres der Mathematik 2008 als interaktive Wanderausstellung und entwickelte sich über die Jahre zu einer Online-Plattform für interaktive Mathematik-Vermittlung. Seit 2016 ist IMAGINARY eine selbständige gemeinnützige GmbH mit einem breiten Spektrum an Dienstleistungen in der Mathematikkommunikation. Das MFO ist Teilhaber der Gesellschaft und kooperiert mit IMAGINARY im Bereich seiner Öffentlichkeitsarbeit, insbesondere bei den Schnappschüssen und dem MiMa. Beide Projekte gingen als Teilprojekte aus IMAGINARY hervor und sind heute noch am MFO angesiedelt. Im MiMa unterstützt IMAGINARY das MFO bei der Auswahl und Implementierung neuer Exponate. Die Schnappschüsse werden maßgeblich über die IMAGINARY-Plattform verbreitet.

In the remaining six months of 2024, the MiMa was visited by well over 3,000 people.

Snapshots of modern mathematics

The aim of the “snapshots of modern mathematics from Oberwolfach” is to explain mathematical problems and ideas in an understandable way to a broader audience. They shall provide exiting insights into current mathematical research. The snapshots are written by participants of the scientific program at the MFO. A team of editors assists them in communicating complicated matters. The MFO publishes the snapshots for free download under a Creative Commons license.

The snapshot project is designed to promote the understanding and appreciation of modern mathematics and mathematical research in the interested public world-wide. The targeted readership consists of mathematics teachers, science journalists, undergraduate and advanced high school students.

The snapshots project is coordinated by Dr. Anja Randecker. As senior editor she is responsible for the editing process of the snapshots. The team of junior editors consisted of Dr. Michela Egidi, Dr. Carina Geldhauser, Dr. Martin Günther, Natan Dominko Kobilica, Daniel Kronberg, Dr. Marta Maggioni, Dr. Sara Munday, Oliver Nagy, Anup Anand Singh, Dr. Matthew Tam and Joonas Mikael Vättö. 4 snapshots were published in this year (see section 3.11.: Publications).

Cooperation with IMAGINARY

IMAGINARY started at the MFO on the occasion of the science year of mathematics in 2008 as an interactive traveling exhibition and developed over the years to an online platform for interactive mathematics communication. In 2016 IMAGINARY became an independent non-profit company (gGmbH) offering a wide range of services in mathematics communication. The MFO is a shareholder of the company and cooperates with it within the scope of public relations – in particular, with regard to the snapshots and the MiMa. Both projects were once founded as subprojects of IMAGINARY and are continued by the MFO. With regard to the MiMa, IMAGINARY supports the MFO in the selection and implementation of new exhibits. The snapshots are largely distributed via the IMAGINARY platform.

4.5. Verwaltung und Hauswirtschaft

Aufgrund der Beschlüsse der Gemeinsamen Wissenschaftskonferenz (GWK) erstellt das MFO als Mitglied der Leibniz-Gemeinschaft seit dem Haushaltsjahr 2006 ein Programmbudget als Grundlage für die gemeinsame Finanzierung durch Bund und Länder.

Das Tagungsgebäude liegt dem Gästehaus direkt gegenüber und wurde 1975 mit Mitteln der VolkswagenStiftung erbaut. Es bietet den Forschungsgästen exzellente Arbeitsmöglichkeiten und umfasst die Bibliothek, mehrere Vortrags- und Diskussionsräume, sowie zahlreiche Einzelarbeitsplätze. Ferner ist die wissenschaftliche Verwaltung dort untergebracht. Im Mai 2007 konnte der Erweiterungsbau der Bibliothek, finanziert von der Klaus Tschira Stiftung und der VolkswagenStiftung, feierlich eingeweiht werden. Die Nähe von Tagungsgebäude und Gästehaus erweist sich als sehr effizient, bietet sie den Gästen doch rund um die Uhr die Möglichkeit zu kreativer Arbeit, was intensiv genutzt wird. Im Frühjahr 2010 wurde die Sanierung des Gästehauses abgeschlossen.

Der Verwaltungsbereich umfasst derzeit 10,73 besetzte Stellen für die wissenschaftliche Verwaltung (Organisation der Workshops, Öffentlichkeitsarbeit, Drittmittelprojekte), die Bibliothek, die IT sowie für die allgemeine Verwaltung (Finanzverwaltung, Beschaffungswesen, Personalsachbearbeitung, Vertragswesen, usw.) und die Gästebetreuung.

Der Hauswirtschaftsbereich des Instituts unterstützt die Durchführung der wissenschaftlichen Programme, indem die Gastforscher im Gästehaus des Instituts Unterkunft und Verpflegung erhalten. Das Gästehaus wurde mit Mitteln der VolkswagenStiftung erbaut und 1967 eingeweiht. Die Wissenschaftler sind überwiegend in Einzelzimmern untergebracht, jedoch gibt es auch 8 größere Appartements sowie 5 Bungalows. Dadurch sind auch längere Aufenthalte im Rahmen der Programme Oberwolfach Research Fellows und Oberwolfach Leibniz Fellows möglich. Der Hauswirtschaftsbereich umfasst insgesamt 13,5 Stellen für Küche und Zimmerservice sowie für die Pflege von Gebäuden und Grundstück (davon waren 2024 lediglich 10,65 Stellen besetzt).

4.5. Administration and housekeeping

According to the resolution of the Joint Science Conference (Gemeinsame Wissenschaftskonferenz GWK), the MFO as a member of the Leibniz Association, has established a budget-plan since 2006 as a basis for the common financing by the federation of Germany and the federal states.

The library building is located immediately opposite the guest house and was built with funds from the Volkswagen Foundation in 1975. Hosting the library, several lecture halls and discussion rooms, and numerous individual workplaces it offers excellent working conditions for scientific research. The offices of the scientific administration are also part of this building. The extension of the library, funded by the Klaus Tschira Stiftung and the Volkswagen Foundation was ceremonially inaugurated in May 2007. The short distance between the guest house and the library building has proved very convenient as it offers scientists the possibility to work at any time, which is used extensively. Since spring 2010 the renovation measures in the guest house have been terminated.

The administration encompasses at the moment 10.73 positions, covering scientific administration (planning and organisation of the scientific program, public relation, third-party projects), library, IT-services and general administration (financial management, purchasing, personnel administration, contracts, renovation measures etc.) as well as guest services.

Since board and lodging is provided by the Institute, housekeeping is also an important part of the realisation of the scientific program at the MFO. The guest house was built with funds from the Volkswagen Foundation and inaugurated in 1967. Accommodation of the scientists is mainly provided in single rooms. In addition to that, 8 apartments and 5 bungalows enable a longer stay at the MFO within the programs Oberwolfach Research Fellows and Oberwolfach Leibniz Fellows. The housekeeping department comprises 13.5 positions for kitchen and room service as well as for the maintenance of the buildings and premises (only 10.65 positions staffed in 2024).

4.6. Finanzielle Übersicht

4.6. Financial overview

Erlöse 2024 (gerundet auf 1.000 €)	Revenues 2024 (rounded to 1,000 €)	
Zuwendung Bund/Länder	Benefits from the federation/federal states	3.623.000
Selbstbewirtschaftungsmittel aus 2023	Benefits from 2023	172.000
Drittmittel	Third party funds	277.000
Spenden	Donations	138.000
Sonstige Einnahmen	Other income	142.000
Zweckgebundene Reste aus 2023	Earmarked surpluses	259.000
Summe Erlöse	Total revenues	4.611.000

Aufwendungen 2024 (gerundet auf 1.000 €)	Expenses 2024 (rounded to 1,000 €)	
Personalausgaben	Personnel department	1.581.000
Materialaufwand	Purchases	390.000
Aufwand für bezogene Leistungen	Expenses for drawn benefits	109.000
Sonstige Aufwendungen (inklusive Sachausgaben Bibliothek)	Other expenses (with material expenses for the library)	1.651.000
Rückstellungen für zweckgebundene Reste	Provisions for earmarked surpluses	569.000
Investitionen	Investments	311.000
Summe Aufwendungen	Total expenses	4.611.000

Erläuterungen

Der Anteil von Drittmitteln, Spenden und sonstigen Einnahmen bezogen auf die Gesamtsumme der Erlöse liegt im Haushaltsjahr 2024 bei 15,4%. Die zweckgebundenen Reste und Selbstbewirtschaftungsmittel aus 2023 sind dabei nicht berücksichtigt.

Öffentliche Mittel

Das MFO erhielt im Haushaltsjahr 2024 insgesamt 3,623 Mio. Euro Zuwendung von Bund und Ländern.

Drittmittel

Die projektbezogenen Drittmittel rekrutierten sich im Haushaltsjahr 2024 insbesondere aus Mitteln der National Science Foundation (NSF) der USA, der Simons Foundation, der Carl Friedrich von Siemens Stiftung und aus der Beteiligung am MaRDI Projekt (Mathematical Research Data Initiative).

Förderverein und Oberwolfach Stiftung

Zweckgebundene Spenden erhielt das MFO auch im Haushaltsjahr 2024 vom Förderverein, der

Explanations

The third party funds were attributed to the fiscal year they were assigned to. The proportion of private resources (own income, third-party-funds and donations) of the total sum of revenues is 15.4%. Funds carried forward from 2023 are disregarded here.

Public funding

In the fiscal year 2024 the MFO received 3.623 million Euro funding from the federation and the federal states.

Third-party funds

Earmarked third party funds in the fiscal year 2024 are mainly composed of the grants from the US National Science Foundation (NSF), the Simons Foundation, the Carl Friedrich von Siemens Foundation and from the participation in the Mathematical Research Data Initiative (MaRDI).

Förderverein and Oberwolfach Foundation

Earmarked donations have been received by the Förderverein, the Oberwolfach Foundation,

Oberwolfach Stiftung und der Carl Friedrich von Siemens Stiftung. Die Gelder wurden für Reisekostenzuschüsse in besonderen Fällen, für die Unterstützung von Kinderbetreuungskosten, die Beschaffung von Büchern in der Bibliothek und als Zuschuss zu Baumaßnahmen verwendet.

4.7. Dank

Ein besonders herzliches Dankeschön gilt den Zuwendungsgebern (Bund und Länder). Weiter gilt unser Dank allen Drittmittelgebern wie der Carl Friedrich von Siemens Stiftung, der National Science Foundation (NSF) und der Simons Foundation. Ein besonderes Dankeschön gilt natürlich auch dem Förderverein und der Oberwolfach Stiftung für die großzügige Unterstützung des MFO.

4.8. Organisationsstruktur

Das Mathematische Forschungsinstitut Oberwolfach (MFO) hat die Rechtsform einer gemeinnützigen GmbH. Die Organe der gGmbH sind die Gesellschafterversammlung, der Verwaltungsrat, der wissenschaftliche Beirat und die Geschäftsführung.

Gesellschafter

Alleiniger Gesellschafter des MFO ist die Gesellschaft für Mathematische Forschung e.V. (GMF), die durch ihren Vorstand vertreten wird. Die GMF hat ca. 100 Mitglieder, darunter die vier institutionellen Mitglieder DMV (Deutsche Mathematiker-Vereinigung), GAMM (Gesellschaft für angewandte Mathematik und Mechanik), EMS (European Mathematical Society) und Förderverein. Die GMF ist Eigentümer des Grundstücks und der Institutsgebäude des MFO.

and the Carl Friedrich von Siemens Foundation. These funds have been used to support travel costs for scientists in special cases, for child support, for special literature, and as additional support for building measures.

4.7. Acknowledgement

A particular thank-you goes to the federation and the federal states for their financial support. We would also like to thank for the third-party funds received from the Carl Friedrich von Siemens Foundation, the National Science Foundation (NSF) and the Simons Foundation. Our special thank-you also goes to the Förderverein and the Oberwolfach Foundation for their important support of the MFO.

4.8. Structure of the organization

The Mathematisches Forschungsinstitut Oberwolfach (MFO) has the legal form of a non-profit corporation (gGmbH). The organs of the gGmbH are the Shareholders' Meeting, the Administrative Council, the Scientific Advisory Board, and the management.

Shareholder

The sole associate of the MFO is the Gesellschaft für Mathematische Forschung e.V. (Society for Mathematical Research, GMF), represented by its board. The GMF consists of about 100 members, including four institutional members: DMV (Deutsche Mathematiker-Vereinigung), GAMM (Gesellschaft für angewandte Mathematik und Mechanik), EMS (European Mathematical Society) and the Förderverein. The GMF is the legal owner of the site and of the buildings of the MFO.

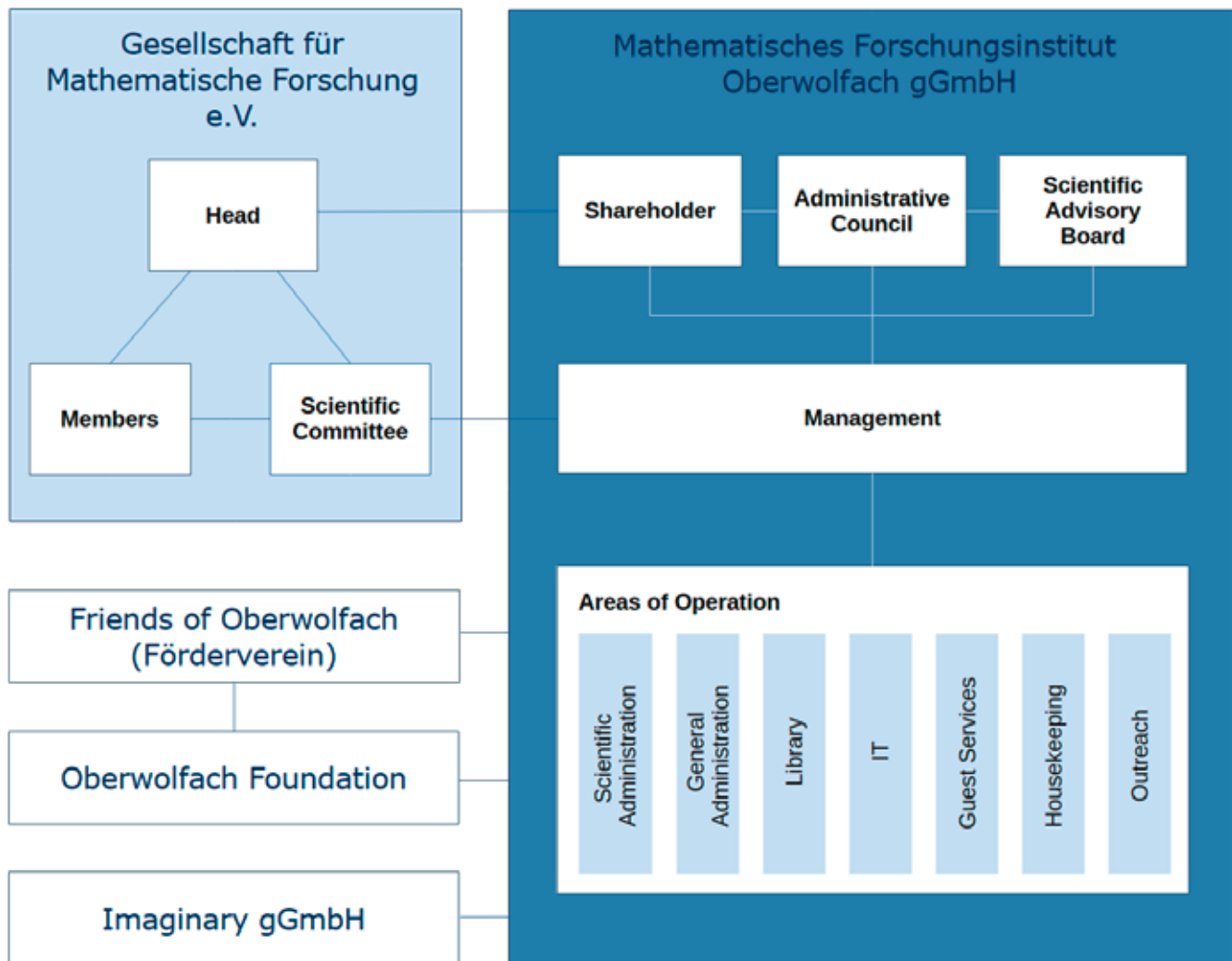
Vorstand der GMF 2024 / Head of the GMF 2024
Prof. Dr. Friedrich Götze, Bielefeld (Vorstandsvorsitzender/Chair)
Prof. Dr. Felix Otto, Leipzig (Vorsitzender der wiss. Kommission/Chair of Scientific Committee)
Prof. Dr. Joachim Schwermer, Wien (Schatzmeister/Treasurer)

Verwaltungsrat

Der Verwaltungsrat entscheidet als wichtigstes Aufsichtsgremium des Instituts u.a. über die mittel- und langfristige Finanzplanung. Als Mitglied der Leibniz-Gemeinschaft wird das MFO von der Bundesrepublik Deutschland und den Bundesländern im Rahmen der Forschungsförderung nach Artikel 91b GG gemeinschaftlich finanziert, wobei das Sitzland Baden-Württemberg eine besondere Rolle einnimmt. Die Zuwendungsgeber

Administrative Council

The Administrative Council is the most important supervisory panel and decides on the medium- and long-term finance- and budgetplanning. As the MFO is a member of the Leibniz Association the financing of the Institute is shared by the Federal Republic of Germany and the federal states according to article 91b of the Basic Law of the Federal Republic of Germany with emphasis on the local state of Baden-Württemberg.



Übersicht über die Organisationsstruktur / Overview on the structure of the organization

sind im Verwaltungsrat vertreten. Den Vorsitz und stellvertretenden Vorsitz übernehmen jeweils ein Vertreter des Ministeriums für Wissenschaft, Forschung und Kunst des Landes Baden-Württemberg (MWK) sowie ein Vertreter des Bundesministeriums für Forschung, Technologie und Raumfahrt (BMFTR).

The financial partners are represented in the Administrative Council of the MFO. The Chair and vice chair are held by representatives of the Ministry of Science, Research and the Arts of the State of Baden-Württemberg (MWK) and the Federal Ministry of Research, Technology and Space (BMFTR).

Mitglieder des Verwaltungsrats / Members of the Administrative Council 2024

Dr. André Schmandke, MWK Baden-Württemberg (Vorsitzender/Chair)

Dr. Jonas Frister, BMFTR (stellvertretender Vorsitzender/Vice Chair)

Prof. Dr. Jean-Pierre Bourguignon, IHÉS/Past President of the European Research Council

Dr. Franz Dettenwanger, VolkswagenStiftung, Hannover

Prof. Dr. Friedrich Götze, Fakultät für Mathematik, Universität Bielefeld

Prof. Dr. Rafael Lang, Geschäftsführer der Klaus Tschira Stiftung gGmbH, Heidelberg

Christian Mees, Ministerium für Wirtschaft, Innovation, Digitales und Energie des Saarlandes

Prof. Dr. Felix Otto, Max-Planck-Institut für Mathematik in den Naturwissenschaften, Leipzig

Prof. Dr. Thomas Schick, Universität Göttingen

Wissenschaftlicher Beirat

Der wissenschaftliche Beirat (SAB) bewertet in regelmäßigen Abständen die wissenschaftliche Arbeit des MFO und berät den Verwaltungsrat und die Geschäftsführung. Dem Beirat gehören 6–8 international angesehene Mathematikerinnen und Mathematiker an.

Scientific Advisory Board

The Scientific Advisory Board (SAB) regularly evaluates the scientific work of the MFO and gives advice to the Administrative Council and the management. The Advisory Board consists of 6–8 internationally renowned mathematicians.

Mitglieder des SAB / Members of the SAB 2024
Prof. Dr. Irit Dinur, Rehovot
Prof. Dr. Maria Esteban, Paris
Prof. Dr. Barbara Fantechi, Trieste
Prof. Dr. Marlis Hochbruck, Karlsruhe
Prof. Dr. Annette Huber-Klawitter, Freiburg (vice chair)
Prof. Dr. Thomas Schick, Göttingen (chair)

Wissenschaftliche Kommission der GMF

Die wissenschaftliche Kommission der GMF besteht aus ca. 20–25 international angesehenen Mathematikerinnen und Mathematikern und ist in Abstimmung mit der Geschäftsführung des MFO zuständig für die Forschungs- und Entwicklungsplanung sowie die aktuelle wissenschaftliche Arbeitsplanung des Instituts.

Scientific Committee of the GMF

The Scientific Committee of the GMF is composed of about 20 to 25 internationally renowned mathematicians and is responsible for the research and development planning, as well as for running decisions on scientific proposals, in agreement with the management of the MFO.

Wissenschaftliche Kommission der GMF / Scientific Committee of the GMF 2024
Prof. Dr. Karen Aardal, Delft
Prof. Dr. Arthur Bartels, Münster
Prof. Dr. Jean-Benoit Bost, Orsay
Prof. Dr. Sébastien Boucksom, Paris
Prof. Dr. Eric Cancès, Paris
Prof. Dr. Thierry Coquand, Göteborg
Prof. Dr. Hugo Duminil-Copin, Genève/Bures-sur-Yvette
Prof. Dr. Alessio Figalli, Zürich
Prof. Dr. Colin Guillarmou, Orsay
Prof. Dr. Daniel Huybrechts, Bonn
Prof. Dr. Özlem Imamoglu, Zürich
Prof. Dr. Bernhard Keller, Paris
Prof. Dr. Gitta Kutyniok, München
Prof. Dr. Klaus-Robert Müller, Berlin
Prof. Dr. Felix Otto, MIS Leipzig (chair)
Prof. Dr. Markus Reineke, Bochum
Prof. Dr. Eero Saksman, Helsinki
Prof. Dr. Karl-Theodor Sturm, Bonn
Prof. Dr. Benjamin Sudakov, Zürich
Prof. Dr. Andreas Thom, Dresden (vice chair)

Wissenschaftliche Kommission der GMF / Scientific Committee of the GMF 2024

Prof. Dr. Corinna Ulcigrai, Zürich

Prof. Dr. Sara van de Geer, Zürich

Prof. Dr. Eva Viehmann, Münster

Prof. Dr. Anna Wienhard, Leipzig

Prof. Dr. Barbara Wohlmuth, München

Geschäftsführung

Der Direktor leitet das Institut und führt dessen laufende Geschäfte. Er wird in seiner Arbeit vom stellvertretenden Direktor unterstützt. Die Geschäftsführung ist insbesondere verantwortlich für die laufende wissenschaftliche Arbeitsplanung, in Abstimmung mit der wissenschaftlichen Kommission der GMF.

Management

The Director manages the Institute and conducts its day-to-day business. He is supported in his work by the Vice Director. The management is responsible in particular for ongoing scientific work planning, in consultation with the GMF's Scientific Committee.

Belegschaft

Die Belegschaft des MFO gliedert sich in die Bereiche wissenschaftliche Verwaltung, allgemeine Verwaltung, Bibliothek, IT, Öffentlichkeitsarbeit, sowie Gästebetreuung und Hauswirtschaft.

Staff

The staff of the MFO subdivides into the areas scientific administration, general administration, library, IT, outreach and media, guest services and housekeeping.

Geschäftsführung und Belegschaft / Management and Staff 2024

Prof. Dr. Gerhard Huisken	Direktor	Director
Prof. Dr. Matthias Hieber	Stellv. Direktor	Vice Director
apl. Prof. Dr. Stephan Klaus	Wiss. Administrator	Scientific Administrator
Susanne Riester	Verwaltungsleiterin	Head of Administration
Dr. Tatjana Ruf	Wiss. Mitarbeiterin	Scientific Assistant
Andrea Klaußner (<i>ab 11/24</i>)	Sekretärin für das wissenschaftliche Programm	Scientific program secretary
Silke Okon	Sekretärin für das wissenschaftliche Programm	Scientific program secretary
Andrea Schillinger (<i>bis 11/24</i>)	Sekretärin für das wissenschaftliche Programm	Scientific program secretary
Verena Franke	Bibliothekarin	Librarian
Jennifer Hinneburg	Fachangestellte für Medien und Informationsdienste (FaMI)	Library Assistant
Gisela Lehmann	Bibliotheksassistentin	Library Assistant
Alex Györek (<i>ab 5/24</i>)	IT	IT
Helmut Kastenholz	IT	IT
Christoph Weber	IT	IT
Petra Lein (<i>bis 6/2024</i>)	Gästebüro	Guest office/reception
Stefanie Reith	Gästebüro	Guest office/reception
Marlene Ruf (<i>ab 5/24</i>)	Gästebüro	Guest office/reception
Katrin Schmid	Gästebüro	Guest office/reception
Charlotte Endres	Hauswirtschaftsleiterin	Housekeeping Manager
Anton Hermann	Hausmeister	Caretaker
ca. 8,5 full time equivalents	Weitere Beschäftigte	Further housekeeping staff

Beteiligung an Imaginary

IMAGINARY begann im Jahr 2008 anlässlich des Wissenschaftsjahres der Mathematik als Projekt der Öffentlichkeitsarbeit des MFO. 2016 wurde eine eigenständige gemeinnützige GmbH ausgegründet, die heute als vielseitiger Dienstleister im Bereich der Mathematik-Kommunikation tätig ist. Das MFO ist ein Gesellschafter der IMAGINARY gGmbH und kooperiert mit dieser im Bereich der Öffentlichkeitsarbeit.

Shareholding in Imaginary

IMAGINARY started in 2008 as a public relations project of the MFO on the occasion of the Year of Mathematics. In 2016, an independent non-profit company was spun off, which today operates as a versatile service provider in the field of mathematics communication. The MFO is a shareholder of IMAGINARY gGmbH and cooperates with it in the field of public relations.

Förderverein und Oberwolfach Stiftung

Der Verein zur Förderung des Mathematischen Forschungsinstituts Oberwolfach e.V. (Förderverein, Friends of Oberwolfach) wurde 1992 von Mathematikern als eigenständige Organisation gegründet, mit dem Ziel das Institut zusätzlich finanziell zu unterstützen. Dazu leisten die Vereinsmitglieder Mitgliedsbeiträge. Die Oberwolfach Stiftung, die im Förderverein als nicht rechtsfähige Stiftung gegründet wurde, sammelt Stiftungskapital aus dem wirtschaftlichen und dem privaten Bereich.

Friends of Oberwolfach and Oberwolfach Foundation

The Verein zur Förderung des Mathematischen Forschungsinstituts Oberwolfach e.V. (Förderverein, Friends of Oberwolfach) was founded in 1992 by mathematicians as an independent organization with the aim of providing additional financial support to the Institute. To this end, the association members pay membership fees. The Oberwolfach Foundation, a foundation of public utility within the Förderverein provides further financial support by economic and private means.

