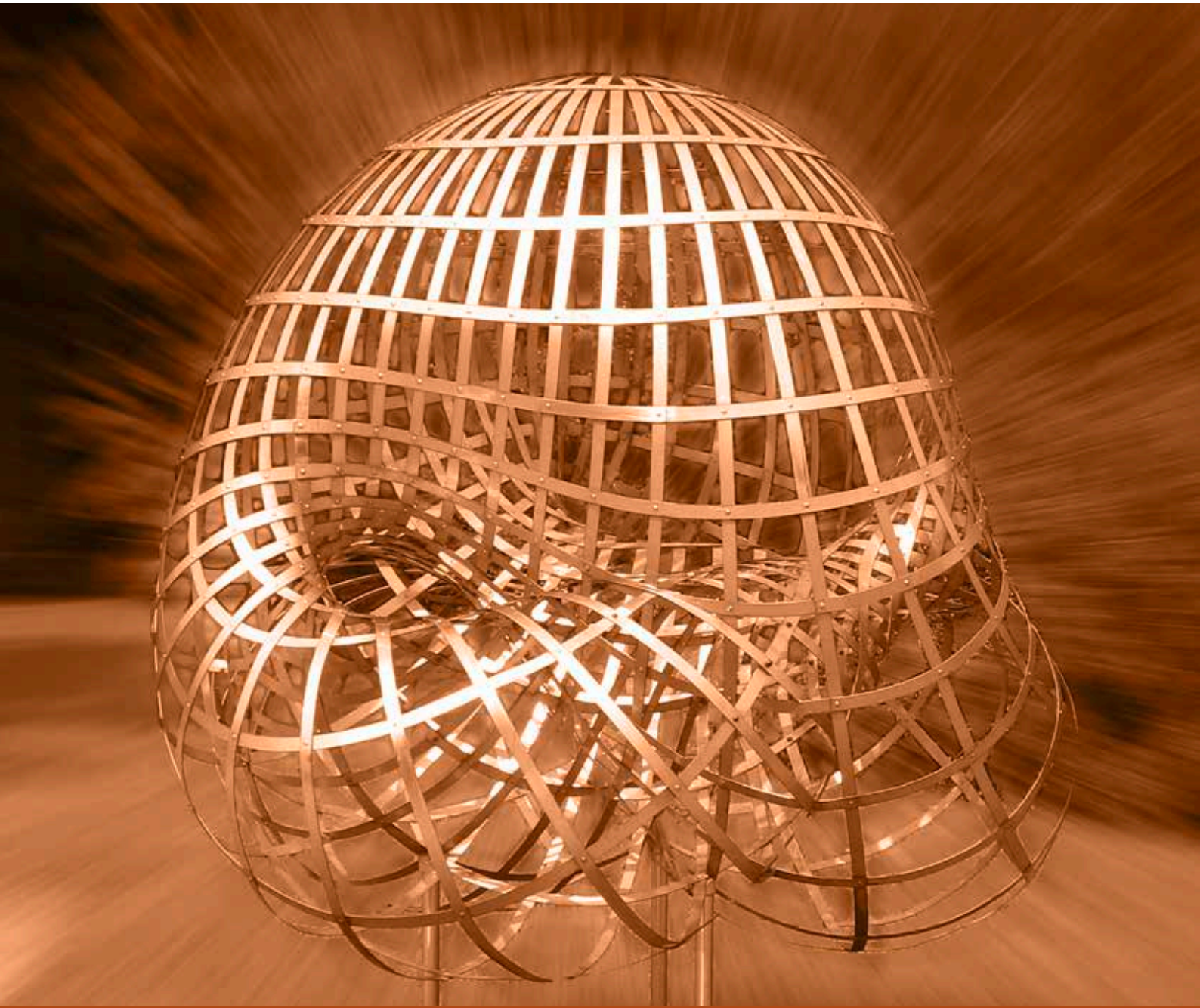
Mathematisches
Forschungsinstitut
Oberwolfach

Mitglied der Leibniz Gemeinschaft

Jahresbericht 2018
Annual Report



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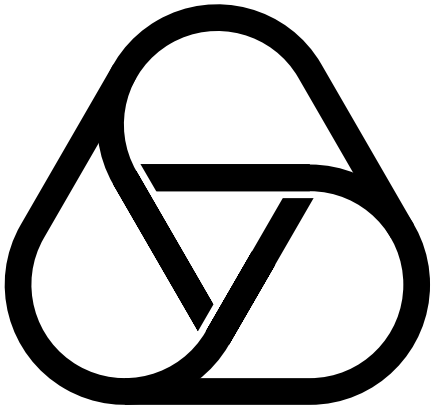

Herausgeber/Published by

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Jahresbericht 2018 – Annual Report 2018

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Gerhard Huisken (Foto: Gerd Fischer)

Vorwort des Direktors

Im Sommer 2018 blickte die Welt der Mathematik gespannt nach Rio de Janeiro, wo in diesem Jahr der Internationale Mathematikerkongress (ICM) stattfand. Neben vielen spannenden Themen und Vorträgen bewegte wie immer auch die Frage: Wer würde dieses Mal mit der Fields-Medaille ausgezeichnet werden? Auch am MFO verfolgte man das Geschehen mit großem Interesse. Im gleichzeitig stattfindenden Workshop „Calculus of Variations" durften die Teilnehmerinnen und Teilnehmer nach der Preisverleihung eine besondere Überraschung feiern: Alessio Figalli, der den Oberwolfach Workshop mit organisiert hatte, erhielt neben Caucher Birkar, Peter Scholze und Akshay Venkatesh eine der vier Medaillen. Er konnte aufgrund der Preisverleihung nicht persönlich in Oberwolfach teilnehmen und musste den Grund für seine Abwesenheit bis zur offiziellen Bekanntgabe geheim halten. In den folgenden Tagen ermöglichte eine Videokonferenz den Austausch mit den Workshop-Teilnehmern.

Solche Begebenheiten ragen natürlich heraus. Aber auch in den anderen 49 Wochen des Jahres, in denen Oberwolfach offen für fast 3000 Gäste aus aller Welt war, wurden unsere wissenschaftlichen Veranstaltungen regelmäßig von den führenden Spezialistinnen und Spezialisten eines Fachgebiets organisiert, wie der vorliegende Bericht dokumentiert. Dank der ehrenamtlichen

Director's foreword

In summer 2018 the mathematical community was looking intently towards Rio de Janeiro, where the International Congress of Mathematicians (ICM) took place. As always, besides the many exciting topics and lectures, the most compelling question was: Who would receive the prestigious Fields Medal this time? At the MFO one observed the event also with great interest. After the award ceremony the participants of the Oberwolfach Workshop "Calculus of Variations", taking place during the same time, could celebrate an exceptional surprise: Alessio Figalli, who co-organized the Oberwolfach Workshop, received one of the four Fields Medals awarded this year. Due to the ceremony he could not attend the Workshop personally and had to keep the reason of his absence secret until the official announcement. In the following days a videoconference enabled the communication with the participants of the Workshop.

Of course, such happenings are outstanding. Nevertheless, also during the other 49 weeks of the year when Oberwolfach welcomed almost 3000 vistors from around the world, our scientific events were regularly organized by the leading specialists of their mathematical field, as documented in this report. Thanks to the voluntary work of the members of the Scientific

Arbeit der Mitglieder der Wissenschaftlichen Kommission, die eine Vielzahl an Anträgen und Bewerbungen aus der ganzen Welt begutachteten, war unser Jahresprogramm für 2018 wieder vollgepackt mit hervorragenden Workshops, Miniworkshops, Seminaren, Arbeitsgemeinschaften und Forschungsaufenthalten von kleineren Gruppen und Einzelpersonen.

Committee, who examined a large number of proposals and applications from all over the world, the schedule of 2018 was fully packed with high-quality Workshops, Mini-Workshops, Seminars, Study Groups and research stays of smaller groups and individuals.

Ein Highlight des Jahres war die inzwischen traditionelle Oberwolfach Vorlesung beim jährlichen Treffen der Mitglieder der Gesellschaft für Mathematische Forschung (GMF) und der beratenden Gremien des MFO. Sie wurde diesmal von Gerd Faltings gehalten. Für den spannenden Vortrag und die schriftliche Fassung auf den folgenden Seiten, ein herzliches Dankeschön!

A highlight of the year was the meanwhile traditional Oberwolfach Lecture during the annual meeting of the members of the Gesellschaft für Mathematische Forschung (GMF) and the boards of the MFO. This time it was held by Gerd Faltings. A big thank-you for the exciting lecture and the written version, which is presented on the following pages!

Zusätzlich zu den sechs jährlichen Oberwolfach Seminaren wurden weitere Angebote für den wissenschaftlichen Nachwuchs eröffnet: Gemeinsam mit dem Banach Center des Instituts für Mathematik der Polnischen Akademie der Wissenschaften (IMPAN) planen wir einige zusätzliche Seminare, von denen das erste im Herbst 2019 in Będlewo stattfinden wird. Schon länger nimmt das MFO am Leibniz Forschungsnetzwerk „Mathematical Modelling and Simulation" (MMS) teil. Im Jahr 2018 beherbergte das Institut erstmals die Leibniz MMS Summerschool für Nachwuchswissenschaftlerinnen und -wissenschaftler aus den Instituten der Leibniz-Gemeinschaft, parallel zu einem regulären Workshop.

In addition to the six Oberwolfach Seminars further offers for young researchers could be implemented: Together with the Banach Center of the Institute of Mathematics of the Polish Academy of Sciences (IMPAN) we are planning additional Seminars, of which the first one will be held in Będlewo in autumn 2019. For several years, the MFO has been participating in the Leibniz research network "Mathematical Modeling and Simulation" (MMS). In 2018 the MFO for the first time hosted the Leibniz MMS Summerschool for junior scientists from the institutes of the Leibniz Association.

Die IMAGINARY gGmbH, deren Ausgründung im Jahr 2016 stattfand, wurde bis 2018 von der Leibniz-Gemeinschaft unterstützt und steht danach erfolgreich auf eigenen Füßen. Bei der Verbreitung der „Snapshots" und der Wartung der mathematischen Exponate im „MiMa" erwies sie sich im vergangenen Jahr erneut als wichtiger Partner des MFO.

The IMAGINARY gGmbH, whose spin-off took place in 2016, has been supported by the Leibniz Association until 2018 and is now standing on its own feet. During the last year, the company has again been an important partner of the MFO in the publication of the "snapshots" and the maintenance of the mathematical exhibits at the "MiMa".

Das wissenschaftliche Programm des MFO und unsere Angebote für die wissenschaftliche Gemeinschaft stützen sich auf eine weiterhin gute finanzielle Ausstattung. Dafür danken wir dem Bund und den Ländern, insbesondere dem Land Baden-Württemberg, die im Rahmen der Leibniz-Gemeinschaft den Hauptteil unserer Haushaltsmittel bereitstellen. Wertvolle Unterstützung kam wie immer auch von der Oberwolfach Stiftung und dem Förderverein. Ich danke allen, die sich dort engagiert und gespendet haben. Ebenso danke ich unseren Drittmittelgebern: Der Carl Friedrich von Siemens Stiftung für die Förderung der Oberwolfach Seminare und der Bibliothek, der National Science Foundation der USA für die Unterstützung des wissenschaftlichen Nachwuchses bei den Reisekosten und der

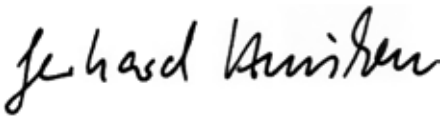
The scientific program of the MFO and our services for the scientific community are based on continued stable financial resources. We would like to thank the federal and state governments, in particular the state of Baden-Württemberg, for providing the bulk of our budget within the Leibniz Association. Valuable support came again from the Oberwolfach Foundation and the Friends of Oberwolfach. A big thank-you to everybody who donated or lend support in other ways! I would also like to thank our third-party donors: The Carl Friedrich von Siemens Foundation for the promotion of the Oberwolfach Seminars and the library, the National Science Foundation of the United States for the support of junior researchers in travel expenses and the Simons Foundation for the promotion of

Simons Foundation für die Förderung der Zusammenarbeit von Forschenden in und außerhalb Europas.

Ich bedanke mich außerdem bei allen ehrenamtlichen Mitgliedern in den beratenden Gremien, den Mitgliedern der GMF sowie unserer Belegschaft. Auf Ihrem Engagement beruht der Erfolg des Instituts ganz wesentlich. Ich freue mich darauf, auch 2019 wieder mit Ihnen zusammenzuarbeiten!

cooperation between researchers in and outside of Europe.

Furthermore, I would like to thank all honorary members of our advisory committees, the members of the Gesellschaft für Mathematische Forschung and our staff. The success of the Institute largely depends on your commitment. I am looking forward to cooperate with you again in 2019!



Gerhard Huisken

1. Institutsnachrichten

1.1. Oberwolfach Vorlesung 2018

Im Oktober 2018 hielt Prof. Dr. Gerd Faltings die inzwischen traditionelle Oberwolfach Vorlesung im Rahmen des jährlichen Treffens der Mitglieder der Gesellschaft für Mathematische Forschung und der beratenden Gremien des MFO. Wir bedanken uns sehr für den spannenden Vortrag und die nachfolgend dargestellte schriftliche Fassung.

1. News from the Institute

1.1. Oberwolfach Lecture 2018

In October 2018 Prof. Dr. Gerd Faltings gave the meanwhile traditional Oberwolfach Lecture during the annual meeting of the members of the Gesellschaft für Mathematische Forschung and the boards of the MFO. We are very grateful for the exciting lecture and the written version presented below.

ALGEBRAIC LOOP GROUPS

GERD FALTINGS

1. Introduction

Algebraic loop groupes appear im many contexts, for example in the study of moduli spaces or of Deligne-Lusztig varieties. This note gives an overview of their construction. Its content has been subject to a lecture in Oberwolfach.

2. indschemes

Indschemes have been defined by Grothendieck. They are functors on schemes which are a filtering inductive limit of schemes:

$$\mathcal{X} = \underset{\rightarrow}{lim} X_\alpha.$$

An example is the formal additive group $\hat{G}_a$ with

$$\hat{G}_a(R) \subset R$$

consisting of nilpotent elements. It is the inductive limit of $Spec(\mathbb{Z}[t]/(t^n)])$. This example shows that an indscheme can be formally smooth without being the limit of smooth schemes. That is "formally smooth" does not mean as much as for usual schemes. In general geometric arguments are not very useful for indschemes.

Another example is obtained by

$$\mathcal{X}(R) = X(R[t]),$$

for an affine scheme X. If we bound the degrees of a set of generators f of $\mathcal{O}_X$ we obtain usual schemes whose inductive limit represents $\mathcal{X}$.

3. Definition of loopgroups

Suppose G is a simple and and simply connected groupscheme over $\mathbb{Z}$, for example SL_d or $Sp(2d)$. Define a functor LG by the rule

$$LG(R) = G(R((t))),$$

where

$$R((t)) = \{ \sum_{n \gg -\infty}^{\infty} a_n t^n \}$$

is the ring auf Laurent series. The subfunctor

$$L^{\geq 0} G(R) = G(R[[t]]$$

is represented by an affine scheme which is not of finite type, parametrising the coefficients of t^n. If we bound the degree of t^{-1} we also obtain schemes of finite type whose iductive limit is LG. It occurs in the description of moduli spaces of G-torsors: Assume C is a smooth connected projective curve over an algebraically

Key words and phrases. Kac-Moody groups.

closed field k, and $* \in C$ a k-point. Then a G torsor on C is trivial on $C^0 = C - *$ and on the formal completion $\hat{C}$ in $*$. If we choose a local coordinate t in $*$ then $\hat{C}$ becomes isomorphic to the formal spectrum of $k[[t]]$, and the two trivialisations differ by an element of LG. Thus G-torsors on C are classified by the stack

$$\Gamma(C^0, G)\backslash LG/L^{\geq 0}G.$$

Here $\Gamma(C^0, G)$ is an indgroup which is the inductive linit of affine schemes of finite type, and $L^{\geq 0}G$ an affine groupscheme which is not of finite type. The quotient (called affine Grassmannian)

$$XG = LG/L^{\geq 0}G$$

is an inductive limit of projective schemes. For example for $G = SL_d$ it classifies lattices $L \subset R((t))^d$ with trivial determinant. Here a lattice L is a projective $R[[t]]$-module with

$$t^N R[[t]]^d \subset L \subset t^{-N} R[[t]]^d$$

for some $N \gg 0$. If we fix N these L's are represented by a projective scheme. For general G we can use embeddings into SL_d.

The loopgroup LG is a special case of a Kac-Moody group. Its Weylgroup W_{aff} is an extension of the usual Weylgroup W of G by the group of coweights, that is cocharacters of the maximal torus T. For such a cocharacter $\rho : \mathbb{G}_m \to T$ the element in the affine Weylgroup can be represented by $\rho(t)$. W_{aff} is a Coxeter group whose Dynkin diagram is obtained by adding to that of W a vertex defined by the negative of the maximal root.

On the affine Grassmannian we can define as usual Bruhat cells, or better two versions where either the dimension or codimension is finite. For the first the definition poses no difficulties, but for the second one has to define the closure of an orbit in the indscheme XG. This is achieved by using that XG is the union of opens U on which a certain subgroup $\mathcal{N}(n)$ of $L^{\leq 0}LG$ acts freely such that U becomes isomorphic to the product of $\mathcal{N}(n)$ with an affine space $\mathbb{A}^r$, and that on U our objects are $\mathcal{N}(n)$-invariant. Thus all indschemee complications appear in $\mathcal{N}(n)$, and it sufices to consider closure in the finite dimensional scheme $\mathcal{A}^r$. If U increases $\mathcal{N}(n)$ decreases and r increases as well.

The orbit of codimension one defines a linebundle on XG. For example for $G = SL_d$ it is the "R-determinant" of the lattice L. That is choose N with $t^n R[[t]] \subset L$ and consider the determinant of $L/t^N R[[t]]$. This is independant of N and the action of an element of LG induces an isomorphism. However this only defines an action of a central $\mathbb{G}_m$-extension of LG. More precisely the quotient of two $det(L)$'s is equivariant.

4. Normality of Schubert cells

The Schubert cells are the closures of finite dimensional orbits. As for G itself it can be shown that in characteristic p they admit a Frobenius splitting, which implies vanishing of cohomoloy for ample bundles. It also follows that their normalisations form a nice inductive system where the maps become closed immersions. In characteristic 0 this implies that they coincide with their normalisations, by using the theory of integrable representations of Kac-Moody Liealgebras. Finally one derives this over $\mathbb{Z}$ by using that the inductive limit of the normalisations admits an action of LG.

The Schubertcells admit smooth resolutions by Demazure varieties which allows to compute various cohomologies. In [2] the affine Grassmannian is defined as the inductive limit of normalised Schubert cells. This works for more general Kac-Moody groups, and avoids questions of normality, but allws no simple description via $R((t))$.

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[1] G.Faltings *Algebraic loop groups and moduli spaces of bundles,* J. Eur. Math. Soc. 5 (2003), 41-68

[2] O. Mathieu *Formules de charactères pour les algébres de Kac-Moody générales,* Astérisque 159/160 (1988)

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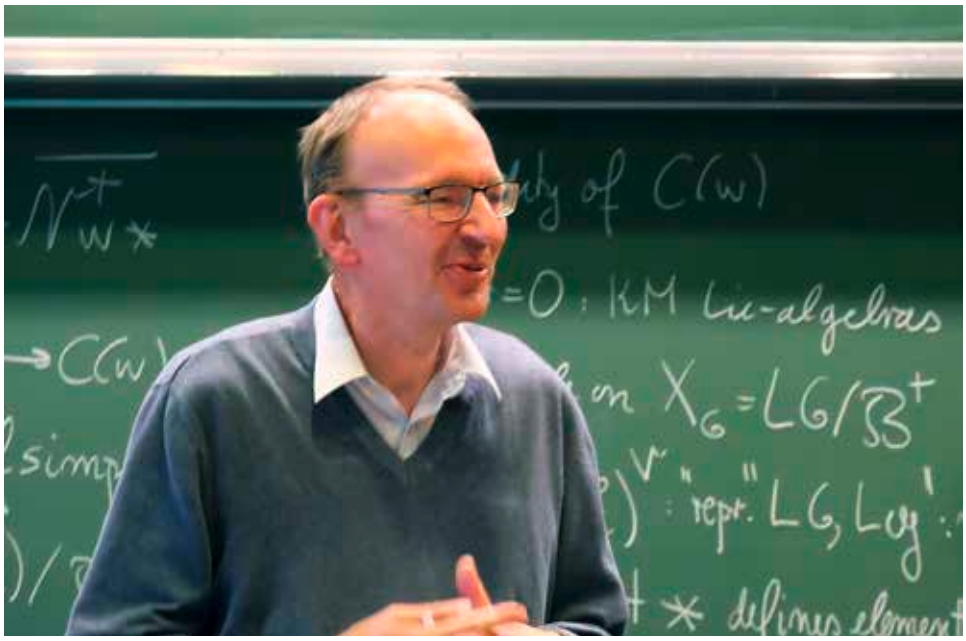


2. Wissenschaftliches Programm

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.

2.1. Übersicht der Aktivitäten

Das Mathematische Forschungsinstitut Oberwolfach hat sechs zentrale wissenschaftliche Programme: Workshops, Miniworkshops, die Oberwolfach Arbeitsgemeinschaft, die Oberwolfach Seminare, das Research in Pairs Programm und die Oberwolfach Leibniz Fellows. Im Rahmen dieser Programme gibt es spezielle Fördermöglichkeiten für den wissenschaftlichen Nachwuchs sowie etablierte Forscherinnen und Forscher.

Das Workshop Programm

Der Hauptteil des Programms besteht aus etwa 40 einwöchigen Workshops pro Jahr an denen jeweils ca. 50 Personen teilnehmen. Alternativ können zwei Workshops halber Größe parallel stattfinden. Die Workshops werden von international führenden Expertinnen und Experten der jeweiligen Fachgebiete organisiert. Teilnehmen kann nur, wer auf ihre Empfehlung hin vom Direktor persönlich eingeladen wurde.

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 Euro pro Tag des Gastaufenthalts an der Universität und wird für bis zu zwei Wochen gezahlt. Die beteiligten Universitäten stellen Unterkünfte für die Dauer des Besuches 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.

2. 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.

2.1. Overview on the activities

The Mathematisches Forschungsinstitut Oberwolfach focuses on six central scientific programs: Workshops, Mini-Workshops, the Oberwolfach Arbeitsgemeinschaft, the Oberwolfach Seminars, the Research in Pairs program, and the Oberwolfach Leibniz Fellows. Within these programs, there are special funding opportunities for junior researchers and established researchers.

The Workshop program

The main scientific program consists of about 40 week-long Workshops per year, each with about 50 participants. Alternatively, there can be two parallel Workshops of half size (about 25 participants). The Workshops are organized by internationally leading experts in the relevant fields. Participation is subject to a personal invitation by the Director after recommendation of the organizers.

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 Euro 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.

Das Miniworkshop Programm

Im Rahmen dieses Programms können jährlich 12 einwöchige Miniworkshops mit jeweils etwa 15 Teilnehmenden 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.

The Mini-Workshop program

This program offers 12 week-long Mini-Workshops per year, each with about 15 participants. These Mini-Workshops are aimed especially at junior researchers. Since the subjects are fixed only half a year before the Mini-Workshops take place, they allow to react to recent developments.

Die 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 zweimal jährlich für jeweils eine Woche statt und wird von Prof. Dr. Christopher Deninger und Prof. Dr. Gerd Faltings organisiert. Sie richtet sich sowohl an den wissenschaftlichen Nachwuchs als auch an etablierte Forscherinnen und Forscher.

The 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 twice per year for one week each time and is organized by Prof. Dr. Christopher Deninger and Prof. Dr. Gerd Faltings. It is aimed both at senior and junior researchers.

Die 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, 25 Teilnehmerinnen und Teilnehmer in ein besonders aktuelles Arbeitsgebiet einzuführen.

The 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 address postdocs and Ph.D. students from all over the world. They aim at introducing 25 participants to a particularly hot development.

Wir freuen uns, dass die Carl Friedrich von Siemens Stiftung die Oberwolfach Seminare von Sommer 2008 bis 2022 substanziell unterstützt.

We are pleased that the Carl Friedrich von Siemens Foundation substiantially supports the Oberwolfach Seminars from summer 2008 to 2022.

Das Research in Pairs Programm

Ein weiterer Schwerpunkt ist das Programm Research in Pairs (RiP). Dieses Programm ermöglicht es jeweils zwei bis vier Forschungsgästen aus verschiedenen Institutionen am MFO gemeinsam an einem vorher festzulegenden Projekt zu arbeiten. Ein Aufenthalt dauert zwischen zwei Wochen und drei Monaten.

The Research in Pairs program

A further main activity of the Institute is the Research in Pairs (RiP) program. This program is aimed at small groups of two to four researchers from different places working together at the Mathematisches Forschungsinstitut Oberwolfach for two weeks up to three months on a specific project.

Oberwolfach Leibniz Fellows

In diesem Postdoktoranden-Programm werden besonders qualifizierte Nachwuchsforscherinnen und -forscher in einer entscheidenden Phase ihrer wissenschaftlichen Laufbahn durch die Bereitstellung idealer Arbeitsbedingungen in einem internationalen Umfeld gefördert. Einzelpersonen oder Kleingruppen können sich für die Durchführung eines Forschungsprojekts in Oberwolfach von einem bis zu drei Monaten bewerben. Entscheidend ist die Einbindung der Oberwolfach Leibniz Fellows in eine

Oberwolfach Leibniz Fellows

The focus of this postdoctoral program is to support excellent junior researchers in an important period of their scientific career by providing ideal working conditions in an international atmosphere. Outstanding junior researchers can apply to carry out a research project, individually or in small groups, for a period from one to three months. Oberwolfach Leibniz Fellows should be involved in an active research group with an established senior researcher at a university or another research institute.

aktive Arbeitsgruppe mit einem etablierten Wissenschaftler einer Universität oder einer Forschungseinrichtung.

Wir danken der Leibniz-Gemeinschaft für die Anschubfinanzierung des Projekts in den Jahren 2007-2009.

Oberwolfach Leibniz Graduate Students

Seit Beginn des Jahres 2009 unterstützt das MFO die Teilnahme von im Durchschnitt fünf Oberwolfach Leibniz Graduate Students (OWLG) an den Oberwolfach Workshops. Gefördert werden exzellente Doktorandinnen und Doktoranden oder frisch Promovierte bis zu zwei Jahre nach der Promotion, insbesondere durch Reisekostenunterstützung. Es handelt sich um fünf zusätzliche Plätze pro Workshop, die für die OWLG reserviert sind und nicht durch etablierte Forscher besetzt werden dürfen.

Wir danken der Leibniz-Gemeinschaft für die Anschubfinanzierung des Projekts in den Jahren 2009-2011.

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).

Publikationen

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

Um die Ergebnisse der Workshops einem international weiten Kreis zugänglich zu machen wurde 2004 die Buchserie „Oberwolfach Reports" (OWR) in Zusammenarbeit mit dem Publishing House der European Mathematical Society gegründet. Sie erscheint jährlich mit vier Ausgaben von insgesamt mehr als 3.000 Seiten in einer Auflage von 300 Stück. Die OWR beinhalten erweiterte Kurzfassungen aller Vorträge der Workshops, Miniworkshops und Arbeitsgemeinschaften im Umfang von jeweils ein bis drei Seiten.

„Oberwolfach Seminars" (OWS) ist eine Buchreihe in Zusammenarbeit mit Springer Nature, die den Inhalt der Oberwolfach Seminare für ein größeres Publikum zugänglich macht.

We thank the Leibniz Association for the initial funding of the project in the years 2007-2009.

Oberwolfach Leibniz Graduate Students

Since the beginning of 2009, the MFO has been supporting the participation of an average of five doctoral students per Oberwolfach Workshop. This program fosters excellent graduate students and recent post docs (the Ph.D./Dr. degree must be received not more than two years ago), in particular by the reimbursement of travel costs. For this program, each Oberwolfach Workshop is given an extra capacity of five places which may not be taken by senior researchers.

We thank the Leibniz Association for the initial funding of the project in the years 2009-2011.

US Junior Oberwolfach Fellows

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

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".

The Oberwolfach Reports (OWR) were initiated in 2004 in collaboration with the Publishing House of the European Mathematical Society. They appear quarterly in an edition of 300 copies. The four issues comprise more than 3,000 pages per year. The OWR are comprised of official reports of every workshop, containing extended abstracts of the given talks during Workshops, Mini-Workshops and Arbeitsgemeinschaften, of one up to three pages per talk.

"Oberwolfach Seminars" (OWS) is a book series in collaboration with Springer Nature. In this series, the material of the Oberwolfach Seminars for junior researchers is made available to an even larger audience.

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

Die „Schnappschüsse moderner Mathematik aus Oberwolfach" richten sich an die mathematisch interessierte Öffentlichkeit und erklären mathematische Ideen und Probleme in verständlicher Art und Weise. Sie werden von Teilnehmenden des wissenschaftlichen Programms am MFO geschrieben. Ein Team aus Editorinnen und Editoren unterstützt sie bei der Aufbereitung der komplizierten Sachverhalte für ein breites Publikum.

Preise

Der Oberwolfach Preis wird etwa alle drei Jahre von der Gesellschaft für Mathematische Forschung e.V. und der Oberwolfach Stiftung an europäische Nachwuchsforscherinnen und -forscher verliehen. Der Preis ist für ausgezeichnete Errungenschaften in jeweils wechselnden Gebieten der Mathematik ausgelobt. 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 Oberwolfach Preis ist mit 10.000 Euro und der John Todd Award 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 2018 beschäftigten sich insgesamt 25 einwöchige Veranstaltungen mit verschiedenen Aspekten dieses Forschungsfeldes. In diesem Jahr war das Institut außerdem erstmals Gastgeber für die Leibniz MMS Summerschool für Nachwuchsforscherinnen- und forscher aus den Leibniz-Instituten.

Weitere Aktivitäten und Dienste

Das Institut beherbergte im Jahr 2018 erneut die abschließende Trainingswoche für besonders begabte Schülerinnen und Schüler zur Vorbereitung auf die Internationale Mathematik-Olympiade. Als Dienste für die Öffentlichkeit sind außerdem das Museum für Mineralien und Mathematik (MiMa), die Oberwolfach Fotosammlung und die Oberwolfach References for Mathematical Software (ORMS) zu nennen.

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

The "snapshots of modern mathematics from Oberwolfach" address to everyone who is interested in mathematics and explain mathematical problems and ideas in an accessible and understandable way. They are written by participants of the scientific program at the MFO, who volunteer to explain an important aspect of their research. A team of editors assists them in communicating complicated matters to a broad audience.

Prizes

The Oberwolfach Prize is awarded by the Gesellschaft für Mathematische Forschung e.V. and by the Oberwolfach Foundation to European junior researchers. The prize is awarded for excellent achievements in changing fields of mathematics. Furthermore, the Oberwolfach Foundation awards in cooperation with the MFO approximately every three years the John Todd Award to junior scientists in numerical analysis. The Oberwolfach Prize amounts to 10,000 Euro and the John Todd Award 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 2018 a total of 25 week-long events covered various aspects of the MMS area of research. This year, for the first time, the Institute also hosted the Leibniz MMS Summerschool for junior researchers from the Leibniz Institutes.

Further activities and services

In 2018 the Institute again hosted the final training week for especially gifted pupils to prepare for the International Mathematical Olympiad. As further services provided for the general public the Museum for Minerals and Mathematics (MiMa), the Oberwolfach Photo Collection and the Oberwolfach References for Mathematical Software (ORMS) are to be mentioned.

2.2. Jahresprogramm 2018

Im Jahr 2018 wurden während 41 Wochen 43 Workshops durchgeführt, 12 Miniworkshops während 4 Wochen, 6 Oberwolfach Seminare während 3 Wochen und 2 Arbeitsgemeinschaften während 2 Wochen. Insgesamt nahmen mehr als 2600 Forscherinnen und Forscher aus aller Welt an allen Programmen teil, davon ca. 23% aus Deutschland, 40% aus anderen europäischen Ländern und 37% aus dem nichteuropäischen Ausland. Das Institut legt großen Wert darauf, dass alle Gebiete der Mathematik und ihre Grenzgebiete, auch im Hinblick auf Anwendungen, vertreten sind. Das folgende Tagungsprogramm belegt diese Politik.

2.2. Annual schedule 2018

In the year 2018 43 workshops have taken place during 41 weeks, as well as 12 Mini-Workshops during 4 weeks, 6 Oberwolfach Seminars during 3 weeks and 2 Arbeitsgemeinschaften during 2 weeks. In total, more than 2600 researchers from all over the world attended the Oberwolfach research program, about 23% from Germany, 40% from other European countries, and 37% from non-European countries. The Institute emphasizes that all fields of mathematics and related areas are represented, including applications. The following scientific program gives proof of this policy.

Workshops

07.01. – 13.01.2018 **Computability Theory**
Organizers: Vasco Brattka, Neubiberg
Rod Downey, Wellington
Julia F. Knight, Notre Dame
Steffen Lempp, Madison

14.01. – 20.01.2018 **Topology of Arrangements and Representation Stability**
Organizers: Graham Denham, London ON
Giovanni Gaiffi, Pisa
Rita Jiménez Rolland, Oaxaca de Juárez
Alexander Suciu, Boston

21.01. – 27.01.2018 **Statistics for Data with Geometric Structure**
Organizers: Aasa Feragen, Copenhagen
Thomas Hotz, Ilmenau
Stephan Huckemann, Göttingen
Ezra Miller, Durham

28.01. – 03.02.2018 **Strongly Correlated Random Interacting Processes**
Organizers: Ron Peled, Tel Aviv
Vladas Sidoravicius, New York/Shanghai
Alexandre Stauffer, Bath

04.02. – 10.02.2018 **Variational Methods for the Modelling of Inelastic Solids**
Organizers: Georg Dolzmann, Regensburg
Adriana Garroni, Roma
Klaus Hackl, Bochum
Michael Ortiz, Bonn

11.02. – 17.02.2018 **Interplay of Analysis and Probability in Applied Mathematics**
Organizers: Volker Betz, Darmstadt
Nicolas Dirr, Cardiff
Wolfgang König, Berlin
Florian Theil, Warwick

18.02. – 24.02.2018 **Design and Analysis of Infectious Disease Studies**
Organizers: Martin Eichner, Tübingen
M. Elizabeth Halloran, Seattle
Philip O'Neill, Nottingham

25.02. – 03.03.2018 **The Mathematics of Mechanobiology and Cell Signaling**
Organizers: Davide Ambrosi, Milano
Chun Liu, University Park
Matthias Röger, Dortmund
Angela Stevens, Münster

11.03. – 17.03.2018 **Statistical Inference for Structured High-dimensional Models**
Organizers: Anatoli Juditsky, Saint Martin d'Hères
Alexandre Tsybakov, Malakoff
Cun-Hui Zhang, Piscataway

18.03. – 24.03.2018 **Mathematical Methods in Quantum Chemistry**
Organizers: Eric Cancès, Paris
Gero Friesecke, München
Trygve Ulf Helgaker, Oslo
Lin Lin, Berkeley

25.03. – 31.03.2018 **Applied Harmonic Analysis and Data Processing**
Organizers: Ingrid Daubechies, Durham
Gitta Kutyniok, Berlin
Holger Rauhut, Aachen
Thomas Strohmer, Davis

08.04. – 14.04.2018 **Challenges in Optimal Control of Nonlinear PDE-Systems**
Organizers: Michael Hintermüller, Berlin
Karl Kunisch, Graz
Günter Leugering, Erlangen
Elisabetta Rocca, Pavia

22.04. – 28.04.2018 **Nonlinear Data: Theory and Algorithms**
Organizers: Philipp Grohs, Wien
Oliver Sander, Dresden
Jean-Luc Starck, Gif-sur-Yvette
Johannes Wallner, Graz

29.04. – 05.05.2018 **Quadratic Forms and Related Structures over Fields**
Organizers: Karim Johannes Becher, Antwerp
Detlev Hoffmann, Dortmund
Anne Quéguiner-Mathieu, Paris

06.05. – 12.05.2018 **Interactions between Operator Space Theory and Quantum Probability with Applications to Quantum Information**
Organizers: Uwe Franz, Besançon
Marius Junge, Champaign
Gilles Pisier, College Station
Quanhua Xu, Besançon

13.05. – 19.05.2018 **Enumerative Combinatorics**
Organizers: Mireille Bousquet-Mélou, Talence
Michael Drmota, Vienna
Christian Krattenthaler, Vienna
Marc Noy, Barcelona

27.05. – 02.06.2018 **Interactions between Algebraic Geometry and Noncommutative Algebra**
Organizers: Markus Reineke, Bochum
Toby Stafford, Manchester
Catharina Stroppel, Bonn
Michel Van den Bergh, Diepenbeek

03.06. – 09.06.2018 **Field Arithmetic**
Organizers: Lior Bary-Soroker, Tel Aviv
Florian Pop, Philadelphia
Jakob Stix, Frankfurt

03.06. – 09.06.2018 **Cohomological and Metric Properties of Groups of Homeomorphisms of R**
Organizers: José Burillo, Barcelona
Kai-Uwe Bux, Bielefeld
Brita Nucinkis, London

10.06. – 16.06.2018 **Geometrie**
Organizers: John Lott, Berkeley
André Neves, London
Iskander Taimanov, Novosibirsk
Burkhard Wilking, Münster

17.06. – 23.06.2018 **Subgroups of Cremona Groups**
Organizers: Fabrizio Catanese, Bayreuth
Ivan Cheltsov, Edinburgh
Julie Déserti, Paris
Yuri Prokhorov, Moscow

17.06. – 23.06.2018 **Matrix Estimation Meets Statistical Network Analysis: Extracting low-dimensional structures in high dimension**
Organizers: Florentina Bunea, Ithaca
Angelika Rohde, Freiburg
Patrick Wolfe, London
Harrison Zhou, New Haven

24.06. – 30.06.2018 **Algebraische Zahlentheorie**
Organizers: Guido Kings, Regensburg
Ramdorai Sujatha, Vancouver
Eric Urban, New York
Otmar Venjakob, Heidelberg

01.07. – 07.07.2018 **Topologie**
Organizers: Mark Behrens, Notre Dame
Ruth Charney, Waltham
Peter Teichner, Bonn/Berkeley
Michael Weiss, Münster

08.07. – 14.07.2018 **Non-commutative Geometry, Index Theory and Mathematical Physics**
Organizers: Alain Connes, Paris
Ryszard Nest, Copenhagen
Thomas Schick, Göttingen
Guoliang Yu, College Station

15.07. – 21.07.2018 **Classical Algebraic Geometry**
Organizers: Olivier Debarre, Paris
David Eisenbud, Berkeley
Gavril Farkas, Berlin
Ravi Vakil, Stanford

22.07. – 28.07.2018 **Explicit Methods in Number Theory**
Organizers: Karim Belabas, Bordeaux
Bjorn Poonen, Cambridge MA
Fernando Rodriguez Villegas, Trieste

29.07. – 04.08.2018 **Calculus of Variations**
Organizers: Alessio Figalli, Zürich
Robert V. Kohn, New York
Tatiana Toro, Seattle
Neshan Wickramasekera, Cambridge UK

05.08. – 11.08.2018 **Mathematical General Relativity**
Organizers: Carla Cederbaum, Tübingen
Mihalis Dafermos, Princeton
Jim Isenberg, Eugene
Hans Ringström, Stockholm

12.08. – 18.08.2018 **Geometric Methods of Complex Analysis**
Organizers: Mats Andersson, Göteborg
Bo Berndtsson, Göteborg
John Erik Fornaess, Trondheim
Nikolay Shcherbina, Wuppertal

19.08. – 25.08.2018 **New Directions in Stochastic Optimisation**
Organizers: Jesús De Loera, Davis
Darinka Dentcheva, Hoboken
Georg Ch. Pflug, Vienna
Rüdiger Schultz, Essen

26.08. – 01.09.2018 **Reactive Flows in Deformable, Complex Media**
Organizers: Margot Gerritsen, Stanford
Iuliu Sorin Pop, Diepenbeek
Florin Adrian Radu, Bergen
Barbara Wohlmuth, Garching

02.09. – 08.09.2018 **New Trends in Teichmüller Theory and Mapping Class Groups**
Organizers: Ken'ichi Ohshika, Osaka
Athanase Papadopoulos, Strasbourg
Robert C. Penner, Bures-sur-Yvette
Anna Wienhard, Heidelberg

09.09. – 15.09.2018 **Scaling Limits in Models of Statistical Mechanics**
Organizers: Dmitry Ioffe, Haifa
Gady Kozma, Rehovot
Fabio Toninelli, Lyon

16.09. – 22.09.2018 **Flat Surfaces and Algebraic Curves**
Organizers: Samuel Grushevsky, Stony Brook
Martin Möller, Frankfurt
Anton Zorich, Paris

23.09. – 29.09.2018 **Differential Equations arising from Organising Principles in Biology**
Organizers: José Antonio Carrillo, London
Alexander Lorz, Thuwal/Paris
Anna Marciniak-Czochra, Heidelberg
Benoît Perthame, Paris

21.10. – 27.10.2018 **Computational Engineering**
Organizers: Olivier Allix, Cachan
Annalisa Buffa, Lausanne
Carsten Carstensen, Berlin
Joerg Schroeder, Essen

28.10. – 03.11.2018 **Emergence of Structures in Particle Systems: Mechanics, Analysis and Computation**
Organizers: Andrea Braides, Rome
Bernd Schmidt, Ausgburg
Ulisse Stefanelli, Vienna
Florian Theil, Warwick

04.11. – 10.11.2018 **Combinatorial Optimization**
Organizers: Jesús De Loera, Davis
Satoru Iwata, Tokyo
Martin Skutella, Berlin

11.11. – 17.11.2018 **Complexity Theory**
Organizers: Peter Bürgisser, Berlin
Irit Dinur, Rehovot
Oded Goldreich, Rehovot
Salil Vadhan, Cambridge MA

25.11. – 01.12.2018 **Enveloping Algebras and Geometric Representation Theory**
Organizers: Iain Gordon, Edinburgh
Bernard Leclerc, Caen
Wolfgang Soergel, Freiburg

02.12. – 08.12.2018 **Free Probability Theory**
Organizers: Alice Guionnet, Lyon
Roland Speicher, Saarbrücken
Dan Voiculescu, Berkeley

09.12. – 15.12.2018 **Convex Geometry and its Applications**
Organizers: Franck Barthe, Toulouse
Martin Henk, Berlin
Monika Ludwig, Wien

Miniworkshops

04.03. – 10.03.2018 **Chromatic Phenomena and Duality in Homotopy Theory and Representation Theory**
Organizers: Tobias Barthel, Copenhagen
Henning Krause, Bielefeld
Vesna Stojanoska, Urbana

04.03. – 10.03.2018 **Entropy, Information and Control**
Organizers: Fritz Colonius, Augsburg
Tomasz Downarowicz, Wroclaw
Christoph Kawan, Passau
Girish Nair, Melbourne

04.03. – 10.03.2018 **Deep Learning and Inverse Problems**
Organizers: Simon Arridge, London
Maarten de Hoop, Houston
Peter Maaß, Bremen
Carola Schönlieb, Cambridge UK

15.04. – 21.04.2018 **Arithmetic Geometry and Symmetries around Galois and Fundamental Groups**
Organizers: Benjamin Collas, Bayreuth
Pierre Dèbes, Villeneuve d'Ascq
Michael D. Fried, Billings

15.04. – 21.04.2018 **Gibbs Measures for Nonlinear Dispersive Equations**
Organizers: Giuseppe Genovese, Zürich
Benjamin Schlein, Zürich
Vedran Sohinger, Coventry

15.04. – 21.04.2018 **Superexpanders and Their Coarse Geometry**
Organizers: Anastasia Khukhro, Neuchatel
Tim de Laat, Münster
Mikael de la Salle, Lyon

30.09. – 06.10.2018 **Positional Games**
Organizers: Dan Hefetz, Ariel
Michael Krivelevich, Tel Aviv
Milos Stojakovic, Novi Sad
Tibor Szabo, Berlin

30.09. – 06.10.2018 **Asymptotic Invariants of Homogeneous Ideals**
Organizers: Thomas Bauer, Marburg
Susan Cooper, Manitoba
Brian Harbourne, Lincoln
Justyna Szpond, Krakow

30.09. – 06.10.2018 **Algebraic, Geometric, and Combinatorial Methods in Frame Theory**
Organizers: Emily J. King, Bremen
Christopher Manon, Lexington
Dustin G. Mixon, Columbus
Cynthia Vinzant, Raleigh

16.12. – 22.12.2018 **Numerical Analysis for Non-Smooth PDE-Constrained Optimal Control Problems**
Organizers: Susanne C. Brenner, Baton Rouge
Dmitriy Leykekhman, Storrs
Boris Vexler, Garching

16.12. – 22.12.2018 **Innovative Trends in the Numerical Analysis and Simulation of Kinetic Equations**
Organizers: José A. Carrillo, London
Martin Frank, Karlsruhe
Jingwei Hu, West Lafayette
Lorenzo Pareschi, Ferrara

16.12. – 22.12.2018 **Mathematical and Numerical Analysis of Maxwell's Equations**
Organizers: Monique Dauge, Rennes
Ulrich Langer, Linz
Peter Monk, Newark
Dirk Pauly, Essen

Oberwolfach Seminare

20.05. – 26.05.2018 **Statistical Inference for Complex Data: Random Matrices, Random Functions and Geometry and Topology**
Organizers: Alexander Aue, Davis
Wolfgang Polonik, Davis

20.05. – 26.05.2018 **Spectral Estimates on Noncompact Manifolds and Applications to Geometry**
Organizers: Nadine Große, Freiburg
Luciano Mari, Pisa
Ben Sharp, Leeds

14.10. – 20.10.2018 **Optimal Transport Theory and Hydrodynamics (from Euler to Monge and vice versa)**
Organizers: Yann Brenier, Paris
Mikaela Iacobelli, Durham
Filippo Santambrogio, Orsay

14.10. – 20.10.2018 **Mathematics of Deep Learning**
Organizers: Gitta Kutyniok, Berlin
Philipp Grohs, Wien

18.11. – 24.11.2018 **Syntomic Cohomology and p-adic Hodge Theory**
Organizers: Wieslawa Niziol, Lyon
Bruno Chiarellotto, Padua
Pierre Colmez, Paris

18.11. – 24.11.2018 **Character Formulas for Reductive Algebraic Groups**
Organizers: Pramod Achar, Baton Rouge
Simon Riche, Aubière
Laura Rider, Athens

Arbeitsgemeinschaften

01.04. – 07.04.2018 **Topological Cyclic Homology**
Organizers: Lars Hesselholt, Copenhagen
Peter Scholze, Bonn

07.10. – 12.10.2018 **Rigidity of Stationary Measure**
Organizers: Yves Benoist, Paris
Jean-Francois Quint, Bordeaux

Fortbildungen/Training activities

13.05. – 19.05.2018 **Trainings- und Abschluss-Seminar für die Internationale Mathematik-Olympiade**
Organizer: Jürgen Prestin, Lübeck

03.09. – 07.09.2018 **Leibniz MMS Summerschool on Statistical Modeling and Data Analysis**
Organizers: Clara Happ, München
Jörg Polzehl, Berlin
Heidi Seibold, München
Almond Stöcker, München
Alexandra Suvorikova, Potsdam

2.3. Workshops

Workshop 1802

07.01. – 13.01.2018 **Computability Theory**

Organizers: Vasco Brattka, Neubiberg
Rod Downey, Wellington
Julia F. Knight, Notre Dame
Steffen Lempp, Madison

Abstract

Computability and computable enumerability are two of the fundamental notions of mathematics. Interest in effectiveness is already apparent in the famous Hilbert problems, in particular the second and tenth, and in early 20th century work of Dehn, initiating the study of word problems in group theory. The last decade has seen both completely new subareas develop as well as remarkable growth in two-way interactions between classical computability theory and areas of applications. There is also a great deal of work on algorithmic randomness, reverse mathematics, computable analysis, and in computable structure theory/computable model theory. The goal of this workshop was to bring together researchers representing different aspects of computability theory to discuss recent advances, and to stimulate future work.

Participants

Ambos-Spies, Klaus (Heidelberg), Andrews, Uri (Madison), Barmpalias, George (Beijing), Becher, Verónica (Buenos Aires), Bienvenu, Laurent (Montpellier), Brattka, Vasco (Neubiberg), Cholak, Peter (Notre Dame), Chong, Chi Tat (Singapore), Day, Adam R. (Wellington), Downey, Rod (Wellington), Dzhafarov, Damir D. (Storrs), Franklin, Johanna (Hempstead), Goncharov, Sergey S. (Novosibirsk), Greenberg, Noam (Wellington), Harrison-Trainor, Matthew (Waterloo), Hirschfeldt, Denis Roman (Chicago), Ho, Meng-Che (West Lafayette), Jockusch, Carl (Urbana), Kalimullin, Iskander (Kazan), Khoussainov, Bakhadyr (Auckland), Kihara, Takayuki (Nagoya), Knight, Julia F. (Notre Dame), Kohlenbach, Ulrich (Darmstadt), Lempp, Steffen (Madison), Lewis-Pye, Andrew E.M. (London), Lutz, Jack H. (Ames), Marcone, Alberto (Udine), Mayordomo, Elvira (Zaragoza), Melnikov, Alexander G. (Auckland), Miller, Joseph S. (Madison), Miller, Russell (Flushing), Monin, Benoit (Créteil), Nandakumar, Satyadev (Kanpur), Ng, Keng Meng (Singapore), Nies, Andre O. (Auckland), Patey, Ludovic (Villeurbanne), Pauly, Arno M. (Swansea), San Mauro, Luca (Wien), Schweber, Noah D. (Madison), Shafer, Paul E. (Leeds), Shlapentokh, Alexandra (Greenville), Shore, Richard A. (Ithaca), Slaman, Theodore A. (Berkeley), Solomon, Reed (Storrs), Soskova, Mariya (Madison), Turetsky, Dan (Notre Dame), Wang, Wei (Guangzhou), Weihrauch, Klaus (Hagen), Weisshaar, Rose (Notre Dame), Westrick, Linda (Storrs), Wu, Guohua (Singapore), Yang, Yue (Singapore), Yokoyama, Keita (Ishikawa), Yu, Liang (Nanjing)

14.01. – 20.01.2018
Organizers:

Topology of Arrangements and Representation Stability
Graham Denham, London ON
Giovanni Gaiffi, Pisa
Rita Jiménez Rolland, Oaxaca de Juárez
Alexander Suciu, Boston

Abstract
The workshop brought together two directions of research: the topology and geometry of hyperplane, toric and elliptic arrangements, and the homological and representation stability of configuration spaces and related families of spaces and discrete groups. The participants were mathematicians working at the interface between several very active areas of research in topology, geometry, algebra, representation theory, and combinatorics. The workshop provided a thorough overview of current developments, highlighted significant progress in the field, and fostered an increasing amount of interaction between specialists in areas of research.

Participants
Abe, Takuro (Fukuoka), Bibby, Christin N. (Ann Arbor), Boyd, Rachael Jane (Aberdeen), Brendle, Tara (Glasgow), Callegaro, Filippo (Pisa), Caputi, Luigi (Regensburg), Casto, Kevin P. (Chicago), Chen, Weiyan (Minneapolis), Cohen, Daniel C. (Baton Rouge), Dancso, Zsuzsanna (Sydney), Delucchi, Emanuele (Fribourg), Denham, Graham (London), Deshpande, Priyavrat (Siruseri), Dimca, Alexandru (Nice), Djament, Aurélien (Nantes), Falk, Michael J. (Flagstaff), Feichtner, Eva Maria (Bremen), Gadish, Nir (Chicago), Gaiffi, Giovanni (Pisa), Harman, Nathan (Chicago), Jiménez Rolland, Rita (Oaxaca de Juárez), Knudsen, Benjamin (Cambridge), Kohno, Toshitake (Tokyo), Liu, Ye (Sapporo), Maguire, Megan L. (Madison), Marin, Ivan (Amiens), Miller, Alexander R. (Wien), Miller, Jeremy K. (West Lafayette), Pagaria, Roberto (Pisa), Paris, Luis (Dijon), Patzt, Peter (West Lafayette), Petersen, Dan (København), Raicu, Claudiu (Notre Dame), Ramos, Eric G. (Ann Arbor), Röhrle, Gerhard (Bochum), Salvetti, Mario (Pisa), Sam, Steven V. (Madison), Satoh, Takao (Tokyo), Snowden, Andrew (Ann Arbor), Soulié, Arthur (Strasbourg), Stump, Christian (Berlin), Suciu, Alexander I. (Boston), Vespa, Christine (Strasbourg), Wahl, Nathalie (København), Wakefield, Max D. (Annapolis), Welker, Volkmar (Marburg), Wilson, Jennifer (Stanford), Wiltshire-Gordon, John (Madison), Wolfson, Jesse P. (Irvine), Xicoténcatl, Miguel A. (México), Yoshinaga, Masahiko (Sapporo)

21.01. – 27.01.2018 **Statistics for Data with Geometric Structure**

Organizers: Aasa Feragen, Copenhagen
Thomas Hotz, Ilmenau
Stephan Huckemann, Göttingen
Ezra Miller, Durham

Abstract

In the past years, data with geometric structure play an increasingly important role in statistics and lead to a surge in the application of geometric and topological concepts in statistical data analysis. Two major classes of approaches are pursued in this field. The first approach seeks to represent geometric objects as points in a non-Euclidean data space, while the second approach seeks to extract the major features of the geometric object to achieve a refined representation, not necessarily in a non-Euclidean space. The results presented in the workshop are great accomplishments of collaboration between mathematicians from statistics, geometry and topology and the open problems which were discussed show the need for an expansion of this interdisciplinary effort, which could also tie in more closely with computer science.

Participants

Allassonnière, Stéphanie (Palaiseau), Anell, Stefan (Göttingen), Arnaudon, Marc (Talence), Bauer, Martin (Tallahassee), Cheng, Ming Yen (Kowloon), Edelsbrunner, Herbert (Klosterneuburg), Eltzner, Benjamin (Göttingen), Feragen, Aasa (København), Garcia-Portugués, Eduardo (Leganes), Gasparovic, Ellen (Schenectady), Glazyrin, Aleksei (Brownsville), Glock, Matthias (Ilmenau), Harrington, Heather A. (Oxford), Hauberg, Soren (Lyngby), Hotz, Thomas (Ilmenau), Huckemann, Stephan (Göttingen), Joshi, Sarang (Salt Lake City), Jung, Sungkyu (Pittsburgh), Kent, John T. (Leeds), Király, Franz J. (London), Kühnel, Line (København), Kume, Alfred (Canterbury), Kwitt, Roland (Salzburg), Le, Huiling (Nottingham), Mallasto, Anton Jussi Olavi (København), Marron, James Stephen (Chapel Hill), Mémoli, Facundo (Columbus), Miller, Ezra (Durham), Mio, Washington (Tallahassee), Miolane, Nina (Sophia-Antipolis), Monod, Anthea (New York), Nye, Tom (Newcastle upon Tyne), Owen, Megan (Bronx), Panaretos, Victor (Lausanne), Pennec, Xavier (Sophia-Antipolis), Pizer, Stephen M. (Chapel Hill), Pokern, Yvo (London), Richter, Robin (Göttingen), Sommer, Stefan (København), Sturm, Karl-Theodor (Bonn), Telschow, Fabian (La Jolla), Tran, Do (Durham), Turner, Katharine (Acton), Vedel Jensen, Eva B. (Aarhus), Wieditz, Johannes (Göttingen), Wood, Andrew (Nottingham), Xu, Jie (Boston), Yoshida, Ruriko (Monterey)

28.01. – 03.02.2018
Organizers:

Strongly Correlated Random Interacting Processes
Ron Peled, Tel Aviv
Vladas Sidoravicius, New York/Shanghai
Alexandre Stauffer, Bath

Abstract
The focus of the workshop was to discuss the recent developments and future research directions in the area of large scale random interacting processes, with main emphasis in models where local microscopic interactions either produce strong correlations at macroscopic levels, or generate non-equilibrium dynamics. This report contains extended abstracts of the presentations, which featured research in several directions including selfinteracting random walks, spātially growing processes, strongly dependent percolation, spin systems with long-range order, and random permutations.

Participants
Angel, Omer (Vancouver), Berger, Noam (Garching bei München), Bolthausen, Erwin (Zürich), Candellero, Elisabetta (Coventry), Caputo, Pietro (Roma), Caraceni, Alessandra (Bath), Cipriani, Alessandra (Delft), Collevecchio, Andrea (Clayton), Crawford, Nicholas J. (Haifa), Damarackas, Julius (Vilnius), Duminil-Copin, Hugo (Bures-sur-Yvette), Elboim, Dor (Ramat Aviv, Tel Aviv), Faggionato, Alessandra (Roma), Glazman, Alexander (Ramat Aviv, Tel Aviv), Gracar, Peter (Bath), Harel, Matan (Bures-sur-Yvette), Helmuth, Tyler (Bristol), Hilario, Marcelo R. (Belo Horizonte), Hofer-Temmel, Christoph (Den Helder), Hutchcroft, Thomas (Cambridge), Ioffe, Dmitri (Haifa), Jarai, Antal (Bath), Khanin, Konstantin M. (Toronto), Kious, Daniel (Shanghai Shi), Kozma, Gady (Rehovot), Lacoin, Hubert (Rio de Janeiro), Lelli, Andrea (Bath), Lupu, Titus (Zürich), Magazinov, Alexander (Tel Aviv), Manolescu, Ioan (Fribourg), Martin, James B. (Oxford), Martinelli, Fabio (Roma), Peled, Ron (Ramat Aviv, Tel Aviv), Sabot, Christophe (Villeurbanne), Shlosman, Senya B. (Marseille), Sidoravicius, Vladas (New York), Silvestri, Vittoria (Cambridge), Spinka, Yinon (Ramat Aviv, Tel Aviv), Stauffer, Alexandre (Bath), Subag, Eliran (New York), Sznitman, Alain-Sol (Zürich), Taggi, Lorenzo (Darmstadt), Tarrès, Pierre (Paris), Tassion, Vincent (Zürich), Teixeira, Augusto (Rio de Janeiro), Theret, Marie (Paris), Toth, Balint (Budapest), Turner, Amanda G. (Lancaster), Ueltschi, Daniel (Coventry), Véchambre, Grégoire (Shanghai Shi), Velenik, Yvan (Genève), Wu, Hao (Genève), Zeng, Xiaolin (Ramat Aviv, Tel Aviv)

04.02. – 10.02.2018 **Variational Methods for the Modelling of Inelastic Solids**

Organizers: Georg Dolzmann, Regensburg
Adriana Garroni, Roma
Klaus Hackl, Bochum
Michael Ortiz, Bonn

Abstract

This workshop brought together experts from mathematics and mechanics working on a wide range of questions related to the understanding and the prediction of processes in solids. Common tools in the analysis include the development of models within the broad framework of continuum mechanics, calculus of variations, nonlinear partial differential equations, nonlinear functional analysis, Gamma convergence, dimension reduction, homogenization, discretization methods and numerical simulations. The applications of these theories include but are not limited to nonlinear models in plasticity, microscopic theories at different scales, the role of pattern forming processes, effective theories, and effects in singular structures like blisters or folding patterns in thin sheets, passage from atomistic or discrete models to continuum models, interaction of scales and passage from the consideration of one specific time step to the continuous evolution of the system, including the evolution of appropriate measures of the internal structure of the system.

Participants

Ariza Moreno, Maria del Pilar (Sevilla), Bach, Annika (Münster), Balzani, Daniel (Bochum), Braides, Andrea (Roma), Carstensen, Carsten (Berlin), Cicalese, Marco (Garching bei München), Dal Maso, Gianni (Trieste), Davoli, Elisa (Wien), Dolzmann, Georg (Regensburg), Dondl, Patrick W. (Freiburg i. Br.), Francfort, Gilles A. (Villetaneuse Cedex), Frenzel, Thomas (Berlin), Friedrich, Manuel (Wien), Garroni, Adriana (Roma), Ginster, Janusz (Pittsburgh), Govindjee, Sanjay (Berkeley), Hackl, Klaus (Bochum), Heyden, Stefanie (Bonn), Hochrainer, Thomas (Graz), Junker, Philipp (Bochum), Klinge, Sandra (Dortmund), Knees, Dorothee (Kassel), Kochmann, Dennis M. (Zürich), Kreisbeck, Carolin (Utrecht), Kreutz, Leonard (Wien), Luckhaus, Stephan (Leipzig), Mielke, Alexander (Berlin), Mora, Maria Giovanna (Pavia), Mosler, Jörn (Dortmund), Müller, Ralf (Kaiserslautern), Müller, Stefan (Bonn), Neff, Patrizio (Essen), Negri, Matteo (Pavia), Ortiz, Michael (Bonn), Reese, Stefanie (Aachen), Reina, Celia (Philadelphia), Rüland, Angkana (Leipzig), Scardia, Lucia (Bath), Schlömerkemper, Anja (Würzburg), Schmidt, Bernd (Augsburg), Schweiger, Florian (Bonn), Schweizer, Ben (Dortmund), Stephan, Artur (Berlin), Svendsen, Bob (Aachen), Thomas, Marita (Berlin), Truskinovsky, Lev (Paris), Waimann, Johanna (Bochum), Weinberg, Kerstin (Siegen), Wieners, Christian (Karlsruhe), Zurlo, Giuseppe (Galway)

11.02. – 17.02.2018 **Interplay of Analysis and Probability in Applied Mathematics**

Organizers: Volker Betz, Darmstadt
Nicolas Dirr, Cardiff
Wolfgang König, Berlin
Florian Theil, Warwick

Abstract
This workshop continued to foster the collaboration between researchers working in analysis and probability, respectively. Some core areas, in which this happens with high success, belong to the objectives of this meeting: stochastic homogenization of various quantities in random media and random operators, metastability in several particle models with stochastic input that are triggered by physics reasonings, emergence of macroscopic effects in large random structures like graphs or permutations. A main feature present was the exploration of the benefit of a high-level combination of methods from both fields: analysis and probability.

Participants
Adams, Stefan (Coventry), Andres, Sebastian (Cambridge), Armendáriz, Inés (Buenos Aires), Bertini, Lorenzo (Roma), Betz, Volker (Darmstadt), Bianchi, Alessandra (Padova), Boukhadra, Omar (Constantine), Cardaliaguet, Pierre (Paris), Chiarini, Alberto (Zürich), Dereich, Steffen (Münster), Deuschel, Jean Dominique (Berlin), Dirr, Nicolas (Cardiff), Dragoni, Federica (Cardiff), Embacher, Peter (Cardiff), Faggionato, Alessandra (Roma), Feng, Jin (Lawrence), Flegel, Franziska (Berlin), Giuliani, Alessandro (Roma), Gloria, Antoine (Bruxelles), Grosskinsky, Stefan (Coventry), Heida, Martin (Berlin), Jansen, Sabine C. (Brighton), König, Wolfgang (Berlin), Kumagai, Takashi (Kyoto), Lees, Benjamin (Darmstadt), Lelievre, Tony (Marne-la-Vallée), Loulakis, Michail (Athens), Luckhaus, Stephan (Leipzig), Maas, Jan (Klosterneuburg), Mailler, Cécile (Bath), Mathieu, Pierre (Marseille), Mörters, Peter (Köln), Neukamm, Stefan (Dresden), Nguyen, Tuan Anh (Essen), Norris, James R. (Cambridge), Otto, Felix (Leipzig), Patterson, Robert I.A. (Berlin), Peletier, Mark A. (Eindhoven), Piatnitski, Andrey (Narvik), Sandier, Etienne (Créteil), Schlichting, André (Bonn), Schmidt, Bernd (Augsburg), Slowik, Martin (Berlin), Souganidis, Panagiotis E. (Chicago), Stefanelli, Ulisse (Wien), Theil, Florian (Coventry), Ueltschi, Daniel (Coventry), von Renesse, Max (Leipzig), Zeindler, Dirk (Lancaster), Zimmer, Johannes (Bath)

18.02. – 24.02.2018 **Design and Analysis of Infectious Disease Studies**

Organizers: Martin Eichner, Tübingen
M. Elizabeth Halloran, Seattle
Philip O'Neill, Nottingham

Abstract

This was the fifth workshop on mathematical and statistical methods on the transmission of infectious diseases. Building on epidemiologic models which were the subject of earlier workshops, this workshop concentrated on disentangling who infected whom by analysing high-resolution genomic data of pathogens which were routinely collected during disease outbreaks. Following the trail of the small mutations which continuously occur in different places of the pathogens' genomes, mathematical tools and computational algorithms were used to reconstruct transmission trees and contact networks.

Participants

Auranen, Kari (University of Turku), Ball, Frank G. (Nottingham), Black, Allison (Seattle), Bootsma, Martin (Utrecht), Bracher, Johannes (Zürich), Bratton Nelson, Kristin (Atlanta), Britton, Tom (Stockholm), Colijn, Caroline (London), Cooper, Ben (Bangkok), Eichner, Martin (Tübingen), Frost, Simon D.W. (Cambridge), Gibson, Gavin J. (Edinburgh), Halloran, M. Elizabeth (Seattle), Hens, Niel (Diepenbeek), Ionides, Edward L. (Ann Arbor), Isham, Valerie S. (London), Keiding, Niels (København), Kenah, Eben E. (Columbus), Kendall, Michelle L. (Oxford), King, Aaron (Ann Arbor), Klinkenberg, Don (Bilthoven), Koopman, Jim (Ann Arbor), Kretzschmar, Mirjam (Bilthoven), Kypraios, Theodore (Nottingham), Lehtinen, Sonja (Oxford), Leung, KaYin (Stockholm), Longini, Ira M. (Gainesville), McBryde, Emma (Townsville), Minin, Vladimir N. (Irvine), Mollison, Denis (Musselburgh), Müller, Johannes (Garching bei München), O'Neill, Philip D. (Nottingham), Pellis, Lorenzo (Manchester), Prem, Kiesha (Singapore), Ratmann, Oliver (London), Roberts, Mick G. (Auckland), Scalia-Tomba, Gianpaolo (Roma), Schwehm, Markus (Leinfelden), Spencer, Simon E. (Coventry), Stocks, Theresa (Stockholm), Struchiner, Claudio J. (Rio de Janeiro), Touloupou, Panayiota (Coventry), Trapman, Pieter (Stockholm), van Boven, Michiel (Bilthoven), Wallinga, Jacco (Bilthoven), Welding, Jessica (Lancaster), Wilson, Daniel (Oxford), Wolkewitz, Martin (Freiburg i. Br.), Wymant, Chris (Oxford), Xu, Jason Q. (Los Angeles)

25.02. – 03.03.2018
Organizers:

The Mathematics of Mechanobiology and Cell Signaling
Davide Ambrosi, Milano
Chun Liu, University Park
Matthias Röger, Dortmund
Angela Stevens, Münster

Abstract
The workshop focused on the mathematical modeling and analysis of the mutual interaction among living cells, their interaction with the environment, and the resulting morphogenetic processes. The interplay of bio-mechanical processes and molecular signaling and their combined effect on the emergence of shape and function in cell clusters, tissues, and organs was addressed. Classical methods of continuum mechanics and necessary extensions were discussed at a formal and a rigorous mathematical level. Several introductory talks were given by experimentalists.

Participants
Agosti, Abramo (Milano), Ambrosi, Davide (Milano), Bellettini, Giovanni (Siena), Bevilacqua, Giulia (Milano), Bodor, Dani (London), Cohen, Fredric (Chicago), Dabrock, Nils (Dortmund), Degond, Pierre (London), Dondl, Patrick W. (Freiburg i. Br.), Eisenberg, Bob S. (Chicago), Fuhrmann, Jan (Mainz), Garcke, Harald (Regensburg), Goriely, Alain (Oxford), Hiiragi, Takashi (Heidelberg), Hillen, Thomas (Edmonton), Horstmann, Dirk (Köln), Huang, Huaxiong (North York), Iber, Dagmar (Basel), King, John R. (Nottingham), Liang, Jie (Chicago), Lipowsky, Reinhard (Potsdam), Liu, Chun (University Park), Liu, Pei (University Park), Mackey, Michael C. (Montreal), Mirrahimi, Sepideh (Toulouse), Neukamm, Stefan (Dresden), Neuss-Radu, Maria (Erlangen), Ölz, Dietmar (Brisbane), Poelstra, Klaas Hendrik (Dortmund), Preziosi, Luigi (Torino), Ptashnyk, Mariya (Dundee), Rätz, Andreas (Dortmund), Recho, Pierre (Saint-Martin-d'Hères), Rendall, Alan (Mainz), Riccobelli, Davide (Milano), Rocca, Elisabetta (Pavia), Röger, Matthias (Dortmund), Rüland, Angkana (Leipzig), Scheel, Arnd (Minneapolis), Schlömerkemper, Anja (Würzburg), Schmeiser, Christian (Wien), Schneider, Isabelle (Berlin), Schroer, Alexander (Münster), Stevens, Angela (Münster), Taffetani, Matteo (Oxford), Trappmann, Britta (Münster), Uatay, Aydar (Kaiserslautern), Velazquez, Juan J. L. (Bonn), Weijer, Kees J. (Dundee), Wirth, Benedikt (Münster), Zwicknagl, Barbara (Berlin)

11.03. – 17.03.2018 **Statistical Inference for Structured High-dimensional Models**

Organizers: Anatoli Juditsky, Saint Martin d'Hères
Alexandre Tsybakov, Malakoff
Cun-Hui Zhang, Piscataway

Abstract

High-dimensional statistical inference is a newly emerged direction of statistical science in the 21st century. Its importance is due to the increasing dimensionality and complexity of models needed to process and understand the modern real world data. The main idea making possible meaningful inference about such models is to assume suitable lower dimensional underlying structure or low-dimensional approximations, for which the error can be reasonably controlled. Several types of such structures have been recently introduced including sparse high-dimensional regression, sparse and/or low rank matrix models, matrix completion models, dictionary learning, network models (stochastic block model, mixed membership models) and more. The workshop focused on recent developments in structured sequence and regression models, matrix and tensor estimation, robustness, statistical learning in complex settings, network data, and topic models.

Participants

Babichev, Dmitry (Paris), Bellec, Pierre (Piscataway), Bühlmann, Peter (Zürich), Bunea, Florentina (Ithaca), Butucea, Cristina (Malakoff), Cai, T. Tony (Philadelphia), Candes, Emmanuel (Stanford), Carpentier, Alexandra (Magdeburg), Chinot, Geoffrey (Palaiseau), Collier, Olivier (Nanterre), Cuturi, Marco (Palaiseau), Dalalyan, Arnak (Palaiseau), Deng, Hang (New Brunswick), Foygel Barber, Rina (Chicago), Gao, Chao (Chicago), Goldenshluger, Alexander (Haifa), Juditsky, Anatoli (Saint-Martin-d'Hères), Ke, Zheng T. (Chicago), Kolar, Mladen (Chicago), Koltchinskii, Vladimir (Atlanta), Lecué, Guillaume (Palaiseau), Lei, Jing (Pittsburgh), Lember, Jüri (Tartu), Lepski, Oleg (Marseille), Li, Housen (Göttingen), Löffler, Matthias (Cambridge), Lounici, Karim (Atlanta), Ma, Zongming (Philadelphia), Mammen, Enno (Heidelberg), Minsker, Stanislav (Los Angeles), Montanari, Andrea (Stanford), Munk, Axel (Göttingen), Nadler, Boaz (Rehovot), Ndaoud, Mohamed (Palaiseau), Nickl, Richard (Cambridge), Rohde, Angelika (Freiburg i. Br.), Samworth, Richard (Cambridge), Schmidt-Hieber, Johannes (Leiden), Spokoiny, Vladimir G. (Berlin), Tánczos, Ervin (Madison), Tsybakov, Alexandre B. (Palaiseau), Usmanova, Ilnura (Zürich), van de Geer, Sara (Zürich), Verzelen, Nicolas (Montpellier), Wahl, Martin (Berlin), Weed, Jonathan (Cambridge), Wu, Yihong (New Haven), Xia, Dong (New York), Yu, Bin (Berkeley), Zhang, Anru (Madison), Zhang, Cun-Hui (Piscataway), Zhou, Huibin (New Haven)

18.03. – 24.03.2018 **Mathematical Methods in Quantum Chemistry**

Organizers:
Eric Cancès, Paris
Gero Friesecke, München
Trygve Ulf Helgaker, Oslo
Lin Lin, Berkeley

Abstract

The field of quantum chemistry is concerned with the modelling and simulation of the behaviour of molecular systems on the basis of the fundamental equations of quantum mechanics. Since these equations exhibit an extreme case of the curse of dimensionality, the quantum-chemical simulation of even moderate-size molecules already requires highly sophisticated model-reduction, approximation, and simulation techniques. The Workshop brought together selected quantum chemists and physicists, and the growing community of mathematicians working in the area, to report and discuss recent advances on topics such as coupled-cluster theory, direct approximation schemes in full configuration-interaction (FCI) theory, interacting Green's functions, foundations and computational aspects of densityfunctional theory (DFT), low-rank tensor methods, quantum chemistry in the presence of a strong magnetic field, and multiscale coupling of quantum simulations.

Participants

Behr, Sören (Garching bei München), Cancès, Eric (Marne-la-Vallée), Cao, Lingling (Marne-la-Vallée), Damle, Anil (Ithaca), Dusson, Geneviève (Coventry), Ehrlacher, Virginie (Marne-la-Vallée), Faulstich, Fabian M. (Oslo), Flad, Heinz-Jürgen (Garching bei München), Friesecke, Gero (Garching bei München), Gauss, Jürgen (Mainz), Gontier, David (Paris), Helgaker, Trygve (Oslo), Herbst, Michael F. (Heidelberg), Khoromskaia, Venera (Leipzig), Khoromskij, Boris N. (Leipzig), Kvaal, Simen (Oslo), Laestadius, Andre (Oslo), Lasser, Caroline (Garching bei München), Levitt, Antoine (Marne-la-Vallée), Lewin, Mathieu (Paris), Lin, Lin (Berkeley), Lindsey, Michael J. (Berkeley), Lubich, Christian (Tübingen), Ortner, Christoph (Coventry), Oseledets, Ivan (Moscow), Panati, Gianluca (Roma), Pedersen, Thomas Bondo (Oslo), Polak, Elias (Genève), Reining, Lucia (Palaiseau), Saue, Trond (Toulouse), Savin, Andreas (Paris), Schneider, Reinhold (Berlin), Siraj-Dine, Sami (Marne-la-Vallée), Stamm, Benjamin (Aachen), Teale, Andrew (Nottingham), Tellgren, Erik (Oslo), Thicke, Kyle (Durham), van Leeuwen, Robert (Jyväskylä), Yang, Chao (Berkeley), Yserentant, Harry (Berlin), Zepeda-Núñez, Leonardo (Berkeley), Zhou, Aihui (Beijing)

25.03. – 31.03.2018 **Applied Harmonic Analysis and Data Processing**

Organizers: Ingrid Daubechies, Durham
Gitta Kutyniok, Berlin
Holger Rauhut, Aachen
Thomas Strohmer, Davis

Abstract

Massive data sets have their own architecture. Each data source has an inherent structure, which we should attempt to detect in order to utilize it for applications, such as denoising, clustering, anomaly detection, knowledge extraction, or classification. Harmonic analysis revolves around creating new structures for decomposition, rearrangement and reconstruction of operators and functions – in other words inventing and exploring new architectures for information and inference. Two previous very successful workshops on applied harmonic analysis and sparse approximation have taken place in 2012 and in 2015. This workshop was the an evolution and continuation of these workshops and intended to bring together world leading experts in applied harmonic analysis, data analysis, optimization, statistics, and machine learning to report on recent developments, and to foster new developments and collaborations.

Participants

Alaifari, Rima (Zürich), Balan, Radu V. (College Park), Boche, Holger (München), Bodmann, Bernhard G. (Houston), Bouchot, Jean-Luc (Aachen), Boyer, Claire (Paris), Calderbank, A. Robert (Durham), Charina, Maria (Wien), Chen, Yuxin (Princeton), Cloninger, Alexander (San Diego), Cohen, Albert (Paris), Cohen, Nadav (Princeton), Daubechies, Ingrid (Durham), De Mol, Christine (Bruxelles), Dirksen, Sjoerd (Aachen), Feichtinger, Hans Georg (Wien), Foucart, Simon (College Station), Gao, Tingran (Chicago), Genzel, Martin (Berlin), Gribonval, Remi (Rennes), Gröchenig, Karlheinz (Wien), Grohs, Philipp (Wien), Groß, David (Köln), Hassibi, Babak (Pasadena), Jüstel, Dominik (Neuherberg), Keiper, Sandra (Berlin), Krahmer, Felix (Garching bei München), Kümmerle, Christian (Garching bei München), Küng, Richard (Pasadena), Lin, Chen-Yun (Durham), Ling, Shuyang (New York), Maggioni, Mauro (Baltimore), Marshall, Nicholas (New Haven), März, Maximilian (Berlin), Mhaskar, Hrushikesh N. (Claremont), Mixon, Dustin G. (Columbus), Petersen, Philipp Christian (Berlin), Pfander, Götz (Eichstätt), Rauhut, Holger (Aachen), Romberg, Justin (Atlanta), Schaudt, Oliver (Aachen), Schnass, Karin (Innsbruck), Soltanolkotabi, Mahdi (Los Angeles), Steidl, Gabriele (Kaiserslautern), Stollenwerk, Alexander (Aachen), Strohmer, Thomas (Davis), Talmon, Ronen (Haifa), Villar, Soledad (New York), Voigtlaender, Felix (Eichstätt)

08.04. – 14.04.2018 **Challenges in Optimal Control of Nonlinear PDE-Systems**

Organizers: Michael Hintermüller, Berlin
Karl Kunisch, Graz
Günter Leugering, Erlangen
Elisabetta Rocca, Pavia

Abstract

The workshop focused on various aspects of optimal control problems for systems of nonlinear partial differential equations. In particular, discussions around keynote presentations in the areas of optimal control of nonlinear/non-smooth systems, optimal control of systems involving nonlocal operators, shape and topology optimization, feedback control and stabilization, sparse control, and associated numerical analysis as well as design and analysis of solution algorithms were promoted. Moreover, also aspects of control of fluid structure interaction problems as well as problems arising in the optimal control of quantum systems were considered.

Participants

Alphonse, Amal C. (Berlin), Azmi, Behzad (Linz), Bergounioux, Maitine (Orléans), Breiten, Tobias (Graz), Brokate, Martin (Garching bei München), Burns, John Allen (Blacksburg), Casas, Eduardo (Santander), Colli, Pierluigi (Pavia), Colturato, Michele (Pavia), Frankowska, Hélène (Paris), Giorgini, Andrea (Milano), Hante, Falk (Erlangen), Heinkenschloss, Matthias (Houston), Herzog, Roland (Chemnitz), Hintermüller, Michael (Berlin), Hinze, Michael (Hamburg), Hömberg, Dietmar (Berlin), Huber, Olivier (Madison), Ito, Kazufumi (Raleigh), Kalise, Dante (London), Kunisch, Karl (Graz), Leugering, Günter (Erlangen), Löbhard, Caroline (Berlin), Marinoschi, Gabriela G. (Bucharest), Meinlschmidt, Hannes (Linz), Meyer, Christian (Dortmund), Mophou, Gisèle M. (Limbe), Münch, Arnaud Diego (Aubière), Neitzel, Ira (Bonn), Pfeiffer, Laurent (Graz), Rautenberg, Carlos (Berlin), Raymond, Jean-Pierre (Toulouse), Rocca, Elisabetta (Pavia), Rodrigues, Sérgio S. (Linz), Rösch, Arnd (Essen), Sachs, Ekkehard (Trier), Schulz, Volker (Trier), Sprekels, Jürgen (Berlin), Stengl, Steven-Marian (Berlin), Surowiec, Thomas M. (Marburg), Thomas, Marita (Berlin), Tiba, Dan (Bucharest), Tröltzsch, Fredi (Berlin), Tucsnak, Marius (Talence), Ulbrich, Michael (Garching bei München), Ulbrich, Stefan (Darmstadt), Vexler, Boris (Garching bei München), Wachsmuth, Daniel (Würzburg), Yousept, Irwin (Essen)

22.04. – 28.04.2018 **Nonlinear Data: Theory and Algorithms**

Organizers:
Philipp Grohs, Wien
Oliver Sander, Dresden
Jean-Luc Starck, Gif-sur-Yvette
Johannes Wallner, Graz

Abstract

Techniques and concepts from differential geometry are used in many parts of applied mathematics today. However, there is no joint community for users of such techniques. The workshop on Nonlinear Data assembled researchers from fields like numerical linear algebra, partial differential equations, and data analysis to explore differential geometry techniques, share knowledge, and learn about new ideas and applications.

Participants

Bauer, Robert (Dresden), Blesgen, Thomas (Bingen am Rhein), Böhmer, Christian (London), Boyarski, Amit (Haifa), Bronstein, Alexander (Haifa), Chien, Edward (Cambridge), Digne, Julie (Villeurbanne), Dyn, Nira (Tel Aviv), Ehler, Martin (Wien), Elbrächter, Dennis (Wien), Gawlik, Evan (La Jolla), Grohs, Philipp (Wien), Hardering, Hanne (Dresden), Harms, Philipp (Freiburg i. Br.), Hüning, Svenja (Graz), Hüper, Knut (Würzburg), Ignat, Radu (Toulouse), Iserles, Arieh (Cambridge), Klock, Timo (Lysaker), Komineas, Stavros (Heraklion), Koppensteiner, Sarah (Wien), Kressner, Daniel (Lausanne), Leok, Melvin (La Jolla), Lim, Lek-Heng (Chicago), Moosmüller, Caroline (Baltimore), Mula, Olga (Paris), Münch, Ingo (Karlsruhe), Naumova, Valeriya (Lysaker), Nebel, Lisa Julia (Dresden), Pennec, Xavier (Sophia-Antipolis), Pottmann, Helmut (Wien), Pusztai, Tamás (Budapest), Reif, Ulrich (Darmstadt), Rottensteiner, David (Wien), Sander, Oliver (Dresden), Sepulchre, Rodolphe (Cambridge), Steidl, Gabriele (Kaiserslautern), Storath, Martin (Heidelberg), Waldspurger, Irène (Paris), Wallner, Johannes (Graz), Wardetzky, Max (Göttingen), Weinmann, Andreas (Darmstadt), Wirth, Benedikt (Münster), Younes, Laurent (Baltimore), Zimmermann, Ralf (Odense)

29.04. – 05.05.2018
Organizers:

Quadratic Forms and Related Structures over Fields
Karim Johannes Becher, Antwerp
Detlev Hoffmann, Dortmund
Anne Quéguiner-Mathieu, Paris

Abstract
The range of topics discussed at the workshop included core themes from the algebraic theory of quadratic and hermitian forms and their Witt groups, several aspects of the theory of linear algebraic groups and homogeneous varieties, cohomological invariants as well as some arithmetic aspects pertaining to the theory of quadratic forms over certain types of ground fields, e.g., function fields.

Participants
Alsaody, Seidon (Villeurbanne), Aravire, Roberto (Iquique), Astier, Vincent (Dublin), Bachmayr, Annette (Bonn), Baek, Sanghoon (Daejeon), Barry, Demba (Bamako), Bayer-Fluckiger, Eva (Lausanne), Becher, Karim Johannes (Antwerpen), Bingöl, Kader (Antwerpen), Calmes, Baptiste (Lens), Chapman, Adam (Upper Galilee), Chernousov, Vladimir (Edmonton), Colliot-Thélène, Jean-Louis (Orsay), De Clercq, Charles (Villetaneuse), Dolphin, Andrew (Gent), First, Uriya A. (Haifa), Florence, Mathieu (Paris), Garrel, Nicolas (Villetaneuse), Gilat, Shira (Ramat-Gan), Gille, Stefan (Edmonton), Gladki, Pawel (Katowice), Grimm, David (Santiago), Gupta, Parul (Dresden), Hartmann, Julia (Philadelphia), Haution, Olivier (München), Hoffmann, Detlev (Dortmund), Hu, Yong (Shenzhen), Izquierdo, Diego (Paris), Karpenko, Nikita (Edmonton), Knebusch, Manfred (Regensburg), Krashen, Daniel (Piscataway), Kunyavskii, Boris (Ramat-Gan), Laghribi, Ahmed (Lens), Lee, Ting-Yu (Dortmund), Leep, David B. (Lexington), Lorenz, Nico (Dortmund), Mahmoudi, Mohammad (Teheran), McKinnie, Kelly (Missoula), Mishra, Sumit Chandra (Atlanta), Panin, Ivan A. (St. Petersburg), Parimala, Raman (Atlanta), Quéguiner-Mathieu, Anne (Villetaneuse), Scully, Stephen (Edmonton), Semenov, Nikita (München), Serre, Jean-Pierre (Paris), Sobiech, Marco (Dortmund), Tignol, Jean-Pierre (Louvain-la-Neuve), Unger, Thomas (Dublin), Veraa, Sten (Antwerpen), Verstraete, Joachim (Louvain-la-Neuve), Vishik, Alexander (Nottingham), Vishne, Uzi (Ramat-Gan), Zhykhovich, Maksim (München)

06.05. – 12.05.2018

Interactions between Operator Space Theory and Quantum Probability with Applications to Quantum Information

Organizers:
Uwe Franz, Besançon
Marius Junge, Champaign
Gilles Pisier, College Station
Quanhua Xu, Besançon

Abstract
Operator space theory was the joining element of our workshop. This theory is a quantisation of the theory of Banach spaces. The talks at our meeting investigated the interactions of operator space theory with operator algebras and other areas of functional analysis, with classical and quantum probability, with noncommutative harmonic analysis, and, in particular, with quantum information theory.

Participants
Banica, Teodor (Cergy-Pontoise), Baraquin, Isabelle (Besançon), Blecher, David (Houston), Bozejko, Marek (Wrocław), Cadilhac, Léonard (Caen), Carlen, Eric A. (Piscataway), Caspers, Martijn (Utrecht), Collins, Benoit (Kyoto), de la Salle, Mikael (Villeurbanne), Dykema, Ken (College Station), Franz, Uwe (Besançon), Freslon, Amaury (Orsay), Gerhold, Malte (Greifswald), Gromada, Daniel (Saarbrücken), Hong, Guixiang (Wuhan), Junge, Marius (Urbana), Katavolos, Aristides (Athens), Köstler, Claus Michael (Cork), Kuznetsova, Yulia (Besançon), Labuschagne, Louis E. (Potchefstroom), Lancien, Cécilia (Madrid), Lee, Hun Hee (Seoul), Lindsay, J. Martin (Lancaster), Mei, Tao (Waco), Musat, Magdalena E. (København), Nechita, Ion (Garching bei München), Ozawa, Narutaka (Kyoto), Parcet, Javier (Madrid), Pisier, Gilles (College Station), Qiu, Yanqi (Beijing), Ricard, Eric (Caen), Rordam, Mikael (København), Schmidt, Simon (Saarbrücken), Schürmann, Michael (Greifswald), Skalski, Adam (Warszawa), Skeide, Michael (Campobasso), Sołtan, Piotr (Warszawa), Sukochev, Fedor (Sydney), Vergara, Ignacio (Lyon), Vergnioux, Roland (Caen), Wang, Simeng (Saarbrücken), Wang, Xumin (Besançon), Wasilewski, Mateusz (Warszawa), Weber, Moritz (Saarbrücken), Wills, Stephen (Cork), Winter, Andreas (Bellaterra), Wysoczańska-Kula, Anna (Wrocław), Wysoczánski, Janusz (Wrocław), Xia, Runlian (Besançon), Xu, Quanhua (Besançon), Zhang, Haonan (Besançon)

13.05. – 19.05.2018 **Enumerative Combinatorics**

Organizers: Mireille Bousquet-Mélou, Talence
Michael Drmota, Vienna
Christian Krattenthaler, Vienna
Marc Noy, Barcelona

Abstract

Enumerative Combinatorics focusses on the exact and asymptotic counting of combinatorial objects. It is strongly connected to the probabilistic analysis of large combinatorial structures and has fruitful connections to several disciplines, including statistical physics, algebraic combinatorics, graph theory and computer science. This workshop brought together experts from all these various fields, including also computer algebra, with the goal of promoting cooperation and interaction among researchers with largely varying backgrounds.

Participants

Albert, Michael H. (Dunedin), Behrend, Roger (Cardiff), Bostan, Alin (Palaiseau), Bousquet-Mélou, Mireille (Talence), Bouttier, Jérémie (Gif-sur-Yvette), Bouvel, Mathilde (Zürich), Chapuy, Guillaume (Paris), Corteel, Sylvie (Paris), de Tilière, Béatrice (Créteil), Dousse, Jehanne (Zürich), Drmota, Michael (Wien), Elizalde, Sergi (Hanover), Elvey Price, Andrew (Melbourne), Féray, Valentin (Zürich), Fischer, Ilse (Wien), Fusy, Éric (Palaiseau), Gao, Jason Z. (Ottawa), Georgakopoulos, Agelos (Coventry), Gittenberger, Bernhard (Wien), Guttmann, Tony (Melbourne), Haglund, James (Philadelphia), Höngesberg, Hans (Wien), Josuat-Vergès, Matthieu (Marne-la-Vallée), Kang, Mihyun (Graz), Kauers, Manuel (Linz), Kim, Jang Soo (Suwon), Konvalinka, Matjaz (Ljubljana), Koutschan, Christoph (Linz), Krattenthaler, Christian (Wien), Majumder, Pritam (Mumbai), Mandelshtam, Olya (Providence), McKay, Brendan (Canberra), Miermont, Grégory (Lyon), Mishna, Marni (Burnaby), Morales, Alejandro (Amherst), Noy, Marc (Barcelona, Catalonia), Pak, Igor (Los Angeles), Panagiotou, Konstantinos (München), Panova, Greta (Princeton), Raschel, Kilian (Tours), Reiner, Victor (Minneapolis), Requilé, Clément (Wien), Rué Perna, Juanjo (Castelldefels), Salvy, Bruno (Lyon), Schaeffer, Gilles (Palaiseau), Sportiello, Andrea (Villetaneuse), Stufler, Benedikt (Lyon), Sulzgruber, Robin (Stockholm), Wagner, Stephan (Stellenbosch), Williams, Lauren K. (Berkeley), Williams, Nathan F. (Richardson), Yee, Ae Ja (University Park)

27.05. – 02.06.2018

Interactions between Algebraic Geometry and Noncommutative Algebra

Organizers:
Markus Reineke, Bochum
Toby Stafford, Manchester
Catharina Stroppel, Bonn
Michel Van den Bergh, Diepenbeek

Abstract
The workshop explored the application of ideas and techniques from algebraic geometry to noncommutative algebra and vice versa. There has been a considerable amount of activities at the interface between these different areas, with several very recent exciting developments. A broad range of these interfaces was reflected in the participants' research activities and the talks, including Hall algebras, symplectic and Poisson geometry, categorification, noncommutative resolutions of singularities, and noncommutative algebraic geometry.

Participants
Bell, Jason P. (Waterloo), Bellamy, Gwyn (Glasgow), Belmans, Pieter (Bonn), Berest, Yuri (Ithaca), Bocklandt, Rafael (Amsterdam), Brown, Ken A. (Glasgow), Chan, Daniel (Sydney), Crawley-Boevey, William (Bielefeld), Davison, Ben (Glasgow), De Laet, Kevin (Antwerpen-Wilrijk), Dönmez, Arif (Bochum), Franzen, Hans (Bochum), Goodearl, Kenneth R. (Santa Barbara), Gordon, Iain (Edinburgh), Hara, Wahei (Tokyo), Huisgen-Zimmermann, Birge (Santa Barbara), Ingalls, Colin (Ottawa), Iyama, Osamu (Nagoya), Kaledin, Dmitry (Moscow), Karmazyn, Joseph (Sheffield), Keller, Bernhard (Paris), Kirkman, Ellen E. (Winston-Salem), Lenagan, Thomas H. (Edinburgh), Lunts, Valery A. (Bloomington), McGerty, Kevin R. (Oxford), Miemietz, Vanessa (Norwich), Murphy, Eoin (Sheffield), Nevins, Thomas A. (Urbana), Norton, Emily (Bonn), Okawa, Shinnosuke (Osaka), Przezdziecki, Tomasz (Glasgow), Pütz, Alexander (Bochum), Raedschelders, Theo (Bruxelles), Reineke, Markus (Bochum), Rizzardo, Alice (Liverpool), Sauter, Julia (Bielefeld), Schedler, Travis (London), Scherotzke, Sarah (Münster), Sierra, Susan J. (Edinburgh), Spenko, Spela (Bruxelles), Stafford, J. Toby (Manchester), Stroppel, Catharina (Bonn), Van den Bergh, Michel (Diepenbeek), Walde, Tashi (Bonn), Walton, Chelsea (Urbana), Webster, Ben (Charlottesville), Wemyss, Michael (Glasgow), Yakimov, Milen (Baton Rouge), Zhang, James (Seattle)

03.06. – 09.06.2018 **Field Arithmetic**

Organizers: Lior Bary-Soroker, Tel Aviv
Florian Pop, Philadelphia
Jakob Stix, Frankfurt

Abstract

Field Arithmetic studies the interrelation between arithmetic properties of fields and their absolute Galois groups. It is an interdisciplinary area that uses methods of algebraic number theory, commutative algebra, algebraic geometry, arithmetic geometry, finite and profinite groups, and nonarchimedean analysis. Some of the results are motivated by questions of model theory and used to establish results in (un-)decidability.

Participants

Bary-Soroker, Lior (Tel Aviv), Cadoret, Anna (Palaiseau), Colliot-Thélène, Jean-Louis (Orsay), Dittmann, Philip (Oxford), Efrat, Ido (Beer-Sheva), Entin, Alexej (Ramat Aviv, Tel Aviv), Fehm, Arno (Dresden), Geyer, Wulf-Dieter (Erlangen), Gorodetsky, Ofir (Ramat Aviv, Tel Aviv), Haran, Dan (Tel Aviv), Harbater, David (Philadelphia), Ivanov, Alexander (Bonn), Jarden, Moshe (Tel Aviv), Karemaker, Valentijn (Philadelphia), Koenigsmann, Jochen (Oxford), Lüdtke, Martin (Frankfurt am Main), Neftin, Danny (Haifa), Park, Jennifer (Ann Arbor), Poonen, Bjorn (Cambridge), Pop, Florian (Philadelphia), Ramiharimanana, Nantsoina Cynthia (Stellenbosch), Schindler, Damaris (Utrecht), Stix, Jakob (Frankfurt am Main), Topaz, Adam (Oxford), Zywina, David (Ithaca)

03.06. – 09.06.2018 **Cohomological and Metric Properties of Groups of Homeomorphisms of R**

Organizers: José Burillo, Barcelona
Kai-Uwe Bux, Bielefeld
Brita Nucinkis, London

Abstract
In recent years, the family of groups sharing features or design principles with classical Thompson groups has grown considerably. The workshop highlighted new developments in this field with special emphasis on algorithmic questions, cohomological properties, and smoothability of actions. In addition to 17 talks two discussion sessions took place. The first concerned the broken Baumslag-Solitar groups. The second was a session about open problems.

Participants
Bieri, Robert (Frankfurt am Main), Bleak, Collin (St. Andrews), Brin, Matthew G. (Binghamton), Burillo, José (Barcelona, Catalonia), Bux, Kai-Uwe (Bielefeld), Cleary, Sean (New York), Elder, Murray (Broadway), Lodha, Yash (Lausanne), Martinez-Perez, Conchita (Zaragoza), Matucci, Francesco (Campinas), Moore, Justin Tatch (Ithaca), Nucinkis, Brita E.A. (London), Reeves, Lawrence (Parkville), Röver, Claas (Galway H91 TK33), Santos de Oliveira Tosti, Altair (Campinas), Santos Rego, Yuri (Bielefeld), Sapir, Mark V. (Nashville), Sergiescu, Vlad (Saint-Martin-d'Hères), Stein, Melanie (Hartford), Taback, Jennifer (Brunswick), Winstone, Nick (Egham), Witzel, Stefan (Bielefeld), Zaremsky, Matt (Albany)

10.06. – 16.06.2018
Organizers:

Geometrie
John Lott, Berkeley
André Neves, London
Iskander Taimanov, Novosibirsk
Burkhard Wilking, Münster

Abstract
The workshop Geometrie was well attended with over 53 participants with broad geographic representation from all continents, and held in a very active atmosphere. During the meeting, various interesting topics in geometry were discussed, such as geometric flows, Kähler geometry, manifolds with nonnegative or positive curvature, and minimal surfaces. The workshop consisted of 17 one hour talks, 2 half hour talks and 4 half hour after dinner talks. The after dinner talks were given by PhD students and very recent PhD's.

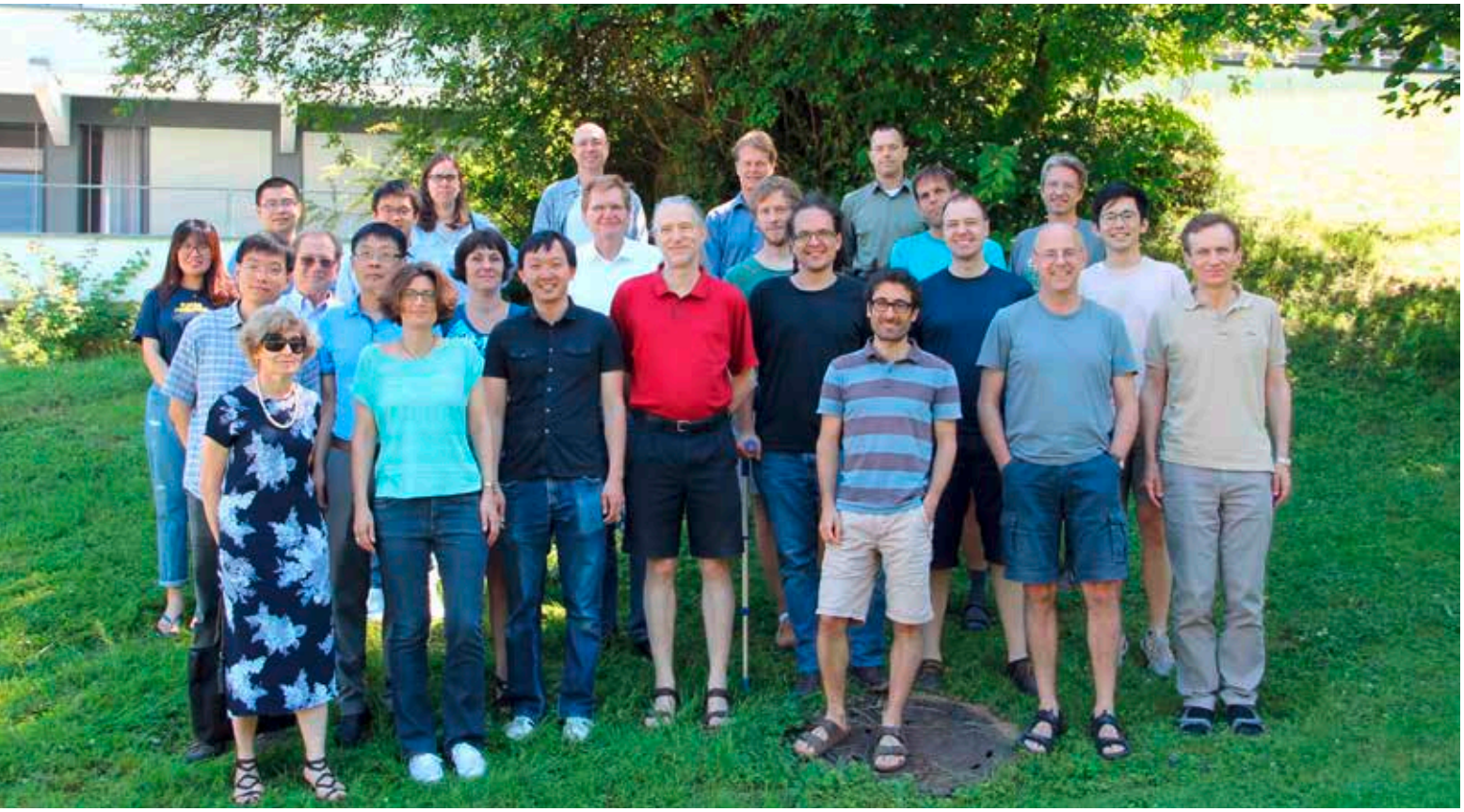
Participants
Beitz, Franziska (Münster), Benoist, Yves (Orsay), Biquard, Olivier (Paris), Böhm, Christoph (Münster), Carlotto, Alessandro (Zürich), Cederbaum, Carla (Tübingen), Creutz, Paul (Köln), Darvas, Tamás (College Park), Deruelle, Alix (Paris), Dessai, Anand N. (Fribourg), Fraser, Ailana M. (Vancouver), Galaz-Garcia, Fernando (Bonn), Hamenstädt, Ursula (Bonn), Haslhofer, Robert (Toronto), Huisken, Gerhard (Tübingen), Ivanov, Sergei V. (St. Petersburg), Kapovich, Misha (Davis), Kennard, Lee (Norman), Kerin, Martin (Münster), Krishnan, Anusha M. (Philadelphia), Lafuente, Ramiro (Münster), Lamm, Tobias (Karlsruhe), Lange, Christian (Köln), Lebedeva, Nina (St. Petersburg), Leeb, Bernhard (München), Lotay, Jason (London), Lott, John (Berkeley), Lytchak, Alexander (Köln), Malchiodi, Andrea (Pisa), Mantoulidis, Christos (Cambridge), Matthiesen, Henrik (Bonn), Mendes, Ricardo (Köln), Méndez Guaraco, Marco A. (Chicago), Nepechiy, Artem (Münster), Neves, André A. (London), Perales, Raquel (México), Petrunin, Anton (University Park), Qian, Chao (Münster), Rademacher, Hans-Bert (Leipzig), Radeschi, Marco (Notre Dame), Roos, Saskia (Bonn), Schulze, Felix (London), Searle, Catherine (Wichita), Siffert, Anna (Bonn), Song, Antoine (Princeton), Song, Jian (Piscataway), Speranca, Llohann (Köln), Stadler, Stephan (München), Tuschmann, Wilderich (Karlsruhe), Wang, Lu (Madison), Wiemeler, Michael (Münster), Wilking, Burkhard (Münster), Wunderlich, Marcel (Münster)

17.06. – 23.06.2018
Organizers:

Subgroups of Cremona Groups
Fabrizio Catanese, Bayreuth
Ivan Cheltsov, Edinburgh
Julie Déserti, Paris
Yuri Prokhorov, Moscow

Abstract
There have been recent breakthroughs in two related questions: the study of Cremona groups, and the problem of rationality of algebraic varieties. Our workshop brought together algebraic geometers, who discussed and tried to solve problems that are relevant to the classification of finite subgroups of Cremona groups. Priority was given to the following four related areas: automorphisms of algebraic varieties, birational geometry of Mori fibre spaces, and rationality problems.

Participants
Ahmadinezhad, Hamid (Loughborough), Avilov, Artem (Moscow), Bauer-Catanese, Ingrid (Bayreuth), Blanc, Jeremy (Basel), Böhning, Christian (Coventry), Cantat, Serge (Rennes), Catanese, Fabrizio (Bayreuth), Cheltsov, Ivan (Edinburgh), Dubouloz, Adrien (Dijon), Duncan, Alexander R. (Columbia), Kaloghiros, Anne-Sophie (Uxbridge), Krylov, Igor (Bayreuth), Lonjou, Anne (Basel), Mangolte, Frédéric (Angers), Mauri, Mirko (London), Moser-Jauslin, Lucy (Dijon), Oguiso, Keiji (Tokyo), Park, Jihun (Korea), Prokhorov, Yuri (Moscow), Przyjalkowski, Victor V. (Moscow), Schneider, Julia Noemi (Basel), Shramov, Konstantin (Moscow), Urech, Christian (London), Yasinsky, Egor (Moscow), Zimmermann, Susanna (Toulouse)



17.06. – 23.06.2018

Matrix Estimation Meets Statistical Network Analysis: Extracting low-dimensional structures in high dimension

Organizers:
Florentina Bunea, Ithaca
Angelika Rohde, Freiburg
Patrick Wolfe, London
Harrison Zhou, New Haven

Abstract
The study of complex relationships among the elements of a large collection of random variables lead to the development of a number of areas in probability and statistics such as probabilistic network analysis or random matrix theory. The aim of the workshop was to address the challenge to develop a coherent mathematical framework within which these areas can be integrated, for a successful analysis of massive and complicated data sets.

Participants
Altmeyer, Randolf (Berlin), Bickel, Peter J. (Berkeley), Bing, Mike (Ithaca), Borgs, Christian (Cambridge), Bunea, Florentina (Ithaca), Dette, Holger (Bochum), Fan, Zhou (Stanford), Feng, Derek (New Haven), Giraud, Christophe (Palaiseau), Hoffmann, Marc (Paris), Ma, Zongming (Philadelphia), Mammen, Enno (Heidelberg), Meister, Alexander (Rostock), Nadler, Boaz (Rehovot), Olhede, Sofia (London), Pensky, Marianna (Orlando), Reiß, Markus (Berlin), Rohde, Angelika (Freiburg i. Br.), Steinberger, Lukas (Freiburg i. Br.), Tsybakov, Alexandre B. (Palaiseau), van der Vaart, Aad W. (Leiden), Wahl, Martin (Berlin), Wu, Weichi (Bochum), Zhou, Huibin (New Haven)

24.06. – 30.06.2018 **Algebraische Zahlentheorie**

Organizers: Guido Kings, Regensburg
Ramdorai Sujatha, Vancouver
Eric Urban, New York
Otmar Venjakob, Heidelberg

Abstract

The origins of Algebraic Number Theory can be traced to over two centuries ago, wherein algebraic techniques are used to glean information about integers and rational numbers. It continues to be at the forefront of modern research as it evolves to straddle wider areas of Mathematics. The workshop was well attended with 48 participants, with wide ranging diversity in lectures and participation. The quality of talks was exceptional both in depth and breadth and it is worth noting that around half a dozen talks at the workshop were in areas related to the work of Fields Medallists in 2018, as well as invited talks in ICM 2018.

Participants

Andreatta, Fabrizio (Milano), Ardakov, Konstantin (Oxford), Berger, Laurent (Lyon), Bertolini, Massimo (Essen), Beuzart-Plessis, Raphael (Marseille), Burungale, Ashay A. (Princeton), Castella, Francesc (Princeton), Colmez, Pierre (Paris), Darmon, Henri René (Montreal), Dasgupta, Samit (Santa Cruz), Esnault, Hélène (Berlin), Fütterer, Michael (Heidelberg), Gatti, Francesca (Barcelona, Catalonia), Gräf, Peter (Heidelberg), Hellmann, Eugen (Münster), Huber-Klawitter, Annette (Freiburg i. Br.), Hübner, Katharina (Heidelberg), Ichino, Atsushi (Kyoto), Jetchev, Dimitar (Lausanne), Kakde, Mahesh (London), Kedlaya, Kiran S. (La Jolla), Kezuka, Yukako (Regensburg), Kings, Guido (Regensburg), Kisin, Mark (Cambridge), Kobayashi, Shinichi (Fukuoka), Kufner, Han-Ung (Regensburg), Lang, Jaclyn (Bonn), Liu, Ruochuan (Beijing), Loeffler, David A. (Coventry), Nakamura, Kentaro (Sapporo), Nekovar, Jan (Paris), Niziol, Wieslawa (Lyon), Palvannan, Bharathwaj (Philadelphia), Paskunas, Vytautas (Essen), Prasanna, Kartik (Ann Arbor), Schmidt, Alexander (Heidelberg), Schmidt, Tobias (Rennes), Schneider, Peter (Münster), Shah, Shrenik (New York), Sprang, Johannes (Regensburg), Sujatha, Ramdorai (Vancouver), Thomas, Oliver (Heidelberg), Urban, Eric (New York), Venjakob, Otmar (Heidelberg), von Pippich, Anna (Darmstadt), Wan, Xin (Beijing), Werner, Annette (Frankfurt am Main), Zerbes, Sarah (London)

01.07. – 07.07.2018
Organizers:

Topologie
Mark Behrens, Notre Dame
Ruth Charney, Waltham
Peter Teichner, Bonn/Berkeley
Michael Weiss, Münster

Abstract
The talks in this workshop covered advances in algebraic *K*-theory and topological cyclic homology, geometric group theory, low dimensional topology relying on a mixture of combinatorial and analytic methods, classification of highdimensional manifolds and more. Special emphasis was given to a recent breakthrough on the question of triangulability of high-dimensional manifolds. About 50 mathematicians participated in the workshop.

Participants
Arone, Gregory (Stockholm), Arzhantseva, Goulnara N. (Wien), Ausoni, Christian (Villetaneuse), Avramidi, Grigori (Münster), Barthel, Tobias (København), Behrens, Stefan (Bielefeld), Behrstock, Jason (Bronx), Berglund, Alexander (Stockholm), Boavida de Brito, Pedro (Lisboa), Boyd, Rachael Jane (Trondheim), Brantner, Lukas (Bonn), Bregman, Corey (Waltham), Conway, Anthony (Durham), Davis, Michael W. (Columbus), Drutu Badea, Cornelia (Oxford), Ebert, Johannes (Münster), Feller, Peter (Zürich), Furuta, Mikio (Tokyo), Galatius, Soren (København), Hebestreit, Fabian (Bonn), Hedden, Matthew (East Lansing), Heuts, Gijs (Utrecht), Hom, Jennifer (Atlanta), Horel, Geoffroy (Villetaneuse), Iozzi, Alessandra (Zürich), Juhasz, Andras (Oxford), Kasprowski, Daniel (Bonn), Kosanovic, Danica (Bonn), Krause, Achim (Bonn), Kupers, Alexander (Cambridge), Lafont, Jean-Francois (Columbus), Land, Markus (Regensburg), Lin, Francesco (Princeton), Lück, Wolfgang (Bonn), Manolescu, Ciprian (Los Angeles), Mathew, Akhil (Chicago), Merling, Mona (Philadelphia), Naumann, Niko (Regensburg), Osorno, Angelica (Portland), Patchkoria, Irakli (Bonn), Powell, Mark (Durham), Randal-Williams, Oscar (Cambridge), Rasmussen, Jacob A. (Cambridge), Ray, Arunima (Bonn), Richter, Birgit (Hamburg), Sisto, Alessandro (Zürich), Stipsicz, Andras (Budapest), Stoffregen, Matthew (Cambridge), Teichner, Peter (Bonn), Tillmann, Steffen (Münster), Weiss, Michael (Münster), Zentner, Raphael (Regensburg)

08.07. – 14.07.2018 **Non-commutative Geometry, Index Theory and Mathematical Physics**

Organizers: Alain Connes, Paris
Ryszard Nest, Copenhagen
Thomas Schick, Göttingen
Guoliang Yu, College Station

Abstract
Non-commutative geometry today is a new but mature branch of mathematics shedding light on many other areas from number theory to operator algebras. In the 2018 meeting two of these connections were highlighted. For once, the applications to mathematical physics, in particular quantum field theory. Indeed, it was quantum theory which told us first that the world on small scales inherently is non-commutative. The second connection was to index theory with its applications in differential geometry. Here, non-commutative geometry provides the fine tools to obtain higher information.

Participants
Aastrup, Johannes (Hannover), Arici, Francesca (Leipzig), Azzali, Sara (Potsdam), Bahns, Dorothea (Göttingen), Barrett, John W. (Nottingham), Carey, Alan (Canberra), Cecchini, Simone (Göttingen), Connes, Alain (Bures-sur-Yvette), Consani, Caterina (Baltimore), Cuntz, Joachim (Münster), Dabrowski, Ludwik (Trieste), Debord, Claire (Aubière), Engel, Alexander (Regensburg), Ewert, Eske Ellen (Göttingen), Fathizadeh, Farzad (Swansea), Goffeng, Magnus (Göteborg), Grosse, Harald (Wien), Güntner, Erik (Honolulu), Higson, Nigel (University Park), Kaad, Jens (Odense), Khalkhali, Masoud (London), Landi, Giovanni (Trieste), Lesch, Matthias (Bonn), Lizzi, Fedele (Napoli), Mesland, Bram (Hannover), Meyer, Ralf (Göttingen), Moscovici, Henri (Columbus), Neira Jiménez, Carolina (Bogotá), Neshveyev, Sergey (Oslo), Nest, Ryszard (København), Oyono-Oyono, Hervé (Metz), Paycha, Sylvie Jane Ann (Golm), Perrot, Denis (Villeurbanne), Pflaum, Markus (Boulder), Piazza, Paolo (Roma), Ponge, Raphael (Seoul), Proietti, Valerio (København), Puschnigg, Michael (Marseille), Rivasseau, Vincent (Orsay), Schick, Thomas (Göttingen), Seyedhosseini, Mehran (Göttingen), Skandalis, Georges (Paris), Tang, Xiang (St. Louis), van Suijlekom, Walter D. (Nijmegen), Wahl, Charlotte (Hannover), Willett, Rufus E. (Honolulu), Wulkenhaar, Raimar (Münster), Xie, Zhizhang (College Station), Yamashita, Mayuko (Tokyo), Yao, Yi-Jun (Shanghai Shi), Yu, Guoliang (College Station)

15.07. – 21.07.2018 **Classical Algebraic Geometry**

Organizers: Olivier Debarre, Paris
David Eisenbud, Berkeley
Gavril Farkas, Berlin
Ravi Vakil, Stanford

Abstract

Progress in algebraic geometry often comes through the introduction of new tools and ideas to tackle the classical problems in the development of the field. Examples include new invariants that capture some aspect of geometry in a novel way, such as the derived category, and the extension of the class of geometric objects considered to allow constructions not previously possible, such as the transition from varieties to schemes or from schemes to stacks. Many famous old problems and outstanding conjectures have been resolved in this way over the last 50 years. While the new theories are sometimes studied for their own sake, they are in the end best understood in the context of the classical questions they illuminate. The goal of the workshop was to study new developments in algebraic geometry, with a view toward their application to the classical problems.

Participants

Abramovich, Dan (Providence), Adiprasito, Karim (Jerusalem), Agostini, Daniele (Leipzig), Aprodu, Marian (Bucharest), Auel, Asher (New Haven), Barros Reyes, Ignacio (Berlin), Bauer-Catanese, Ingrid (Bayreuth), Beauville, Arnaud (Nice), Benoist, Olivier (Strasbourg), Catanese, Fabrizio (Bayreuth), Debarre, Olivier (Paris), Dolgachev, Igor (Ann Arbor), Ein, Lawrence (Chicago), Eisenbud, David (Berkeley), Erman, Daniel (Madison), Farkas, Gavril (Berlin), Grushevsky, Samuel (Stony Brook), Harris, Joseph (Cambridge), Hassett, Brendan (Providence), Hering, Milena (Edinburgh), Hulek, Klaus (Hannover), Huybrechts, Daniel (Bonn), Kebekus, Stefan (Freiburg i. Br.), Kemeny, Michael (Stanford), Kirwan, Frances C. (Oxford), Kuznetsov, Alexander (Moscow), Mboro, René (Palaiseau), Mukai, Shigeru (Kyoto), Mustata, Mircea (Ann Arbor), Ortega, Angela (Berlin), Ottem, John Christian (Oslo), Petersen, Dan (Stockholm), Pirola, Gian Pietro (Pavia), Popa, Mihnea (Evanston), Raicu, Claudiu (Notre Dame), Ranestad, Kristian (Oslo), Rieß, Ulrike (Zürich), Saccà, Giulia (Cambridge), Sam, Steven V. (Madison), Schmitt, Johannes (Zürich), Schreyer, Frank-Olaf (Saarbrücken), Schütt, Matthias (Hannover), Szemberg, Tomasz (Kraków), Tommasi, Orsola (Padova), Totaro, Burt (Los Angeles), Vakil, Ravi (Stanford), Várilly-Alvarado, Anthony (Houston), Viray, Bianca (Seattle), Voisin, Claire (Paris), Wang, Botong (Madison), Weyman, Jerzy (Storrs), Yin, Qizheng (Beijing), Zimmermann, Susanna (Angers)

22.07. – 28.07.2018 **Explicit Methods in Number Theory**

Organizers: Karim Belabas, Bordeaux
Bjorn Poonen, Cambridge MA
Fernando Rodriguez Villegas, Trieste

Abstract

The aim of the Oberwolfach meetings on "Explicit methods in number theory" is to bring together people attacking key problems in number theory via techniques involving concrete or computable descriptions. Here, number theory is interpreted broadly, including algebraic and analytic number theory, Galois theory and inverse Galois problems, arithmetic of curves and higher-dimensional varieties, zeta and L-functions and their special values, modular forms and functions. The meeting provides a forum for presenting new methods and results on concrete aspects of number theory. Considerable attention is paid to computational issues, but the emphasis is on aspects that are of interest to the pure mathematician. The 2018 meeting featured a mini-course on nonabelian Chabauty theory, so several of the talks were on this topic; the other talks covered a broad range of topics in number theory.

Participants

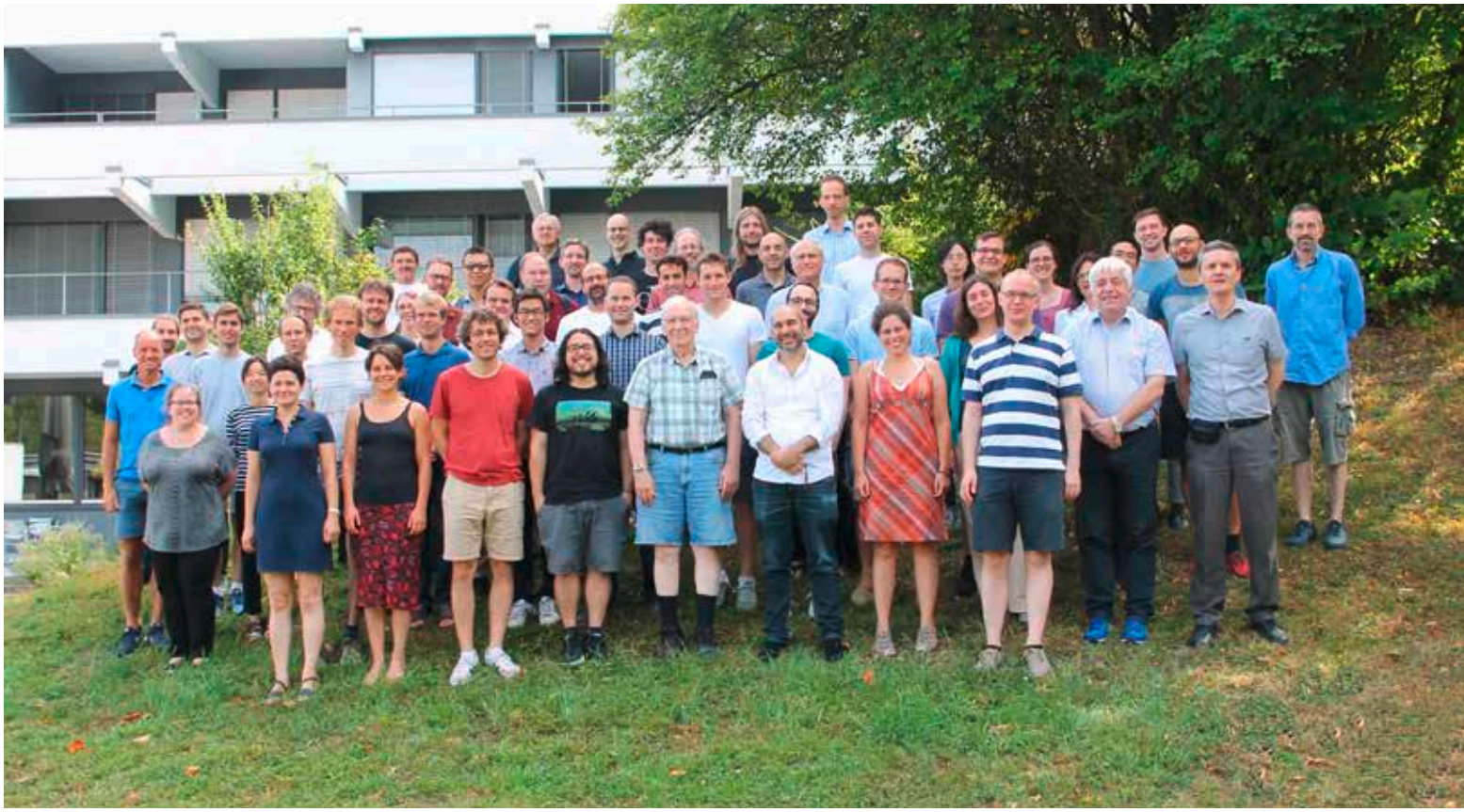
Alpoge, Levent (Princeton), Balakrishnan, Jennifer S. (Boston), Belabas, Karim (Talence), Bell, Renee H. (Cambridge), Bennett, Michael A. (Vancouver), Besser, Amnon (Beer-Sheva), Beukers, Frits (Utrecht), Bhargava, Manjul (Princeton), Booker, Andrew (Bristol), Bouw, Irene I. (Ulm), Bruin, Nils (Burnaby), Calegari, Frank (Chicago), Cohen, Henri (Talence), Corwin, David (Cambridge), Cremona, John E. (Coventry), Dan-Cohen, Ishai (Beer-Sheva), Dogra, Netan (London), Dokchitser, Tim (Bristol), Edixhoven, Bas (Leiden), Eisentraeger, Kirsten (University Park), Ezome Mintsa, Tony Mack Robert (Franceville), Flynn, Eugene Victor (Oxford), Gunnells, Paul E. (Amherst), Harvey, David (Sydney), Karemaker, Valentijn (Philadelphia), Klüners, Jürgen (Paderborn), Lawrence, Brian (New York), Lenstra, Hendrik W. (Leiden), Logan, Adam (Ottawa), Lorenzo Garcia, Elisa (Rennes), Müller, Jan Steffen (Groningen), Park, Jennifer (Columbus), Poonen, Bjorn (Cambridge), Pries, Rachel (Fort Collins), Rabinoff, Joseph (Atlanta), Radchenko, Danylo (Bonn), Roberts, David (Morris), Rodriguez-Villegas, Fernando (Trieste), Sawin, Will (New York), Schoof, René (Roma), Siksek, Samir (Coventry), Stoll, Michael (Bayreuth), Sutherland, Andrew (Cambridge), Ulmer, Douglas (Tucson), Viray, Bianca (Seattle), Vogt, Isabel (Cambridge), Voight, John (Hanover), Wang, Jiuya (Madison), Watkins, Mark J. (Sydney), Wewers, Stefan (Ulm), Wickelgren, Kirsten G. (Atlanta), Zagier, Don B. (Bonn), Zureick-Brown, David (Atlanta)

29.07. – 04.08.2018
Organizers:

Calculus of Variations
Alessio Figalli, Zürich
Robert V. Kohn, New York
Tatiana Toro, Seattle
Neshan Wickramasekera, Cambridge UK

Abstract
The Calculus of Variations is at once a classical subject, and a very modern one. Its scope encompasses a broad range of topics in geometric analysis, and deep questions about PDE. New frontiers are constantly emerging, where problems from mechanics, physics, and other applications introduce new challenges. The 2018 Calculus of Variations workshop reflected this breadth and diversity.

Participants
Becker-Kahn, Spencer T. (Seattle), Bellettini, Costante (London), Bernstein, Jacob (Baltimore), Bourni, Theodora (Knoxville), Cherkaev, Elena (Salt Lake City), Cinti, Eleonora (Bologna), David, Guy (Orsay), De Rosa, Antonio (New York), Edelen, Nick (Cambridge), Engelstein, Max (Cambridge), Feldman, Will M. (Chicago), Fernández-Real Girona, Xavier (Zürich), Golden, Kenneth M. (Salt Lake City), Grabovsky, Yury (Philadelphia), Hynd, Ryan (Philadelphia), Jerrard, Robert L. (Toronto), Jhaveri, Yash (Zürich), Kohn, Robert V. (New York), Krummel, Brian J. (Berkeley), Lewicka, Marta (Pittsburgh), Maggi, Francesco (Austin), Mantoulidis, Christos (Cambridge), Michelat, Alexis (Zürich), Mihaila, Cornelia (Austin), Mooney, Connor (Zürich), Neumayer, Robin (Evanston), Nimer, Abdalla Dali (Chicago), O'Brien, Ethan (Pittsburgh), Olbermann, Heiner (Leipzig), Otto, Felix (Leipzig), Pigati, Alessandro (Zürich), Rüland, Angkana (Leipzig), Rupflin, Melanie (Oxford), Schulze, Felix (London), Shen, Zhongwei (Lexington), Smart, Charles K. (Chicago), Smit-Vega Garcia, Mariana (Seattle), Spadaro, Emanuele Nunzio (Leipzig), Struwe, Michael (Zürich), Tobasco, Ian S. (Ann Arbor), Tonegawa, Yoshihiro (Tokyo), Topping, Peter M. (Coventry), Toro, Tatiana (Seattle), White, Brian (Stanford), Wickramasekera, Neshan (Cambridge), Wirth, Benedikt (Münster), Zeppieri, Caterina (Münster)



05.08. – 11.08.2018 **Mathematical General Relativity**

Organizers: Carla Cederbaum, Tübingen
Mihalis Dafermos, Princeton
Jim Isenberg, Eugene
Hans Ringström, Stockholm

Abstract

General Relativity is one of the triumphs of twentieth century physics. Its spectacular predictions include gravitational waves, black holes, and spacetime singularities. The mathematical study of this theory leads to deep problems connecting the areas of partial differential equations, geometry and topology with physics. The talks of the workshop illustrated the rapid progress in this subject over the last few years.

Participants

Allen, Paul Tyler (Portland), Andréasson, Hakan (Göteborg), Beyer, Florian (Dunedin), Bieri, Lydia (Ann Arbor), Bizon, Piotr (Kraków), Brehm, Bernhard (Stockholm), Cabrera Pacheco, Armando Jose (Tübingen), Cederbaum, Carla (Tübingen), Cha, Ye-Sle (Berlin), Chrusciel, Piotr T. (Wien), Corvino, Justin (Easton), Dafermos, Mihalis (Cambridge), Figueras Barnera, Pau (London), Friedrich, Helmut (Golm), Gabach-Clement, Maria Eugenia (Córdoba), Galloway, Gregory (Coral Gables), Gicquaud, Romain (Tours), Graf, Melanie (Wien), Green, Stephen (Potsdam), Hadzic, Mahir (London), Hintz, Peter (Cambridge), Holst, Michael (La Jolla), Holzegel, Gustav (London), Huisken, Gerhard (Tübingen), Huneau, Cécile (Palaiseau), Jahns, Sophia (Tübingen), Jauregui, Jeffrey (Schenectady), Kehle, Christoph (Cambridge), Layne, Adam (Stockholm), LeFloch, Philippe G. (Paris), Luk, Jonathan (Stanford), Mars, Marc (Salamanca), Maxwell, David (Fairbanks), McCormick, Stephen (Uppsala), Miao, Pengzi (Coral Gables), Moschidis, Georgios (Princeton), Oh, Sung-Jin (Seoul), Oliynyk, Todd (Clayton), Paetz, Tim Torben (Wien), Reiris, Martin (Montevideo), Ringström, Hans (Stockholm), Rinne, Oliver (Berlin), Roesch, Henri (Irvine), Sakovich, Anna (Uppsala), Sbierski, Jan (Cambridge), Schlue, Volker (Paris), Schoen, Richard (Irvine), Shlapenthok-Rothman, Yakov (Princeton), Smulevici, Jacques (Orsay), Sormani, Christina (New York), Taylor, Martin (London), Vasy, Andras (Stanford), Wald, Robert (Chicago), Wang, Qian (Oxford)

12.08. – 18.08.2018 **Geometric Methods of Complex Analysis**

Organizers: Mats Andersson, Göteborg
Bo Berndtsson, Göteborg
John Erik Fornaess, Trondheim
Nikolay Shcherbina, Wuppertal

Abstract

The purpose of this workshop was to discuss recent results in Several Complex Variables, Complex Geometry and Complex Dynamical Systems with a special focus on the exchange of ideas and methods among these areas. The main topics of the workshop included Holomorphic Dynamics and Foliations; L^2-methods and Cohomologies; Plurisubharmonic Functions and Pluripotential Theory; Singular Metrics on Vector Bundles, Chern Forms and Residue Currents; Geometric Questions of Complex Analysis (including Uniformization, Polynomial Convexity, Levi-flat Surfaces etc.).

Participants

Abate, Marco (Pisa), Andersson, Mats (Göteborg), Bedford, Eric D. (Bloomington), Blocki, Zbigniew (Kraków), Brinkschulte, Judith (Leipzig), Brünnig, Michael (Wuppertal), Chen, Bo-Yong (Shanghai Shi), Demailly, Jean-Pierre (Gières), Deng, Fusheng (Beijing), Dong, Xin (Irvine), Drinovec Drnovsek, Barbara (Ljubljana), Ebenfelt, Peter (La Jolla), Fornaess, John Erik (Trondheim), Fornaess Wold, Erlend (Oslo), Globevnik, Josip (Ljubljana), Gupta, Purvi (New Brunswick), Harz, Tobias (Wuppertal), Herrmann, Hendrik (Köln), Joericke, Burglind (Aarhus), Joo, Seungro (Pohang), Kim, Kang-Tae (Pohang), Kolodziej, Slawomir (Kraków), Kutzschebauch, Frank (Bern), Lärkäng, Richard (Göteborg), Lempert, Laszlo (West Lafayette), Low, Erik (Oslo), Lu, Hoang Chinh (Orsay), Nemirovski, Stefan (Moscow), Ohsawa, Takeo (Nagoya), Peters, Han (Amsterdam), Poletsky, Evgeny A. (Syracuse), Raissy, Jasmin (Toulouse), Rong, Feng (Shanghai Shi), Ruppenthal, Jean (Wuppertal), Samuelsson Kalm, Hakan (Göteborg), Shafikov, Rasul (London), Shcherbina, Nikolay (Wuppertal), Sibony, Nessim (Orsay), Stensones, Berit (Trondheim), Sukhov, Alexander (Villeneuve-d'Ascq), Tardini, Nicoletta (Firenze), Tumanov, Alexander (Urbana), Vivas, Liz (Columbus), Wan, Xueyuan (Göteborg), Wang, Xu (Trondheim), Winkelmann, Jörg (Bochum), Witt Nyström, David (Göteborg), Wu, Jingcao (Göteborg), Wulcan, Elizabeth (Göteborg), Zhang, Liyou (Beijing), Zhou, Xiangyu (Beijing), Zimmer, Andrew (Williamsburg)

19.08. – 25.08.2018 **New Directions in Stochastic Optimisation**

Organizers: Jesús De Loera, Davis
Darinka Dentcheva, Hoboken
Georg Ch. Pflug, Vienna
Rüdiger Schultz, Essen

Abstract

Recent work in stochastic programming draws on interaction with Algebraic and Combinatorial Models, Numerical Analysis of PDEs, Risk Analysis, Mathematical Equilibrium, Minimax, and Stochastic Games. For the first time ever, the workshop brought together scholars from these fields to exchange experience and identify promising topics for future research. The workshop was well attended by 54 participants with broad geographic representation.

Participants

Ahmed, Shabbir (Atlanta), Burtscheidt, Johanna (Essen), Claus, Matthias (Essen), Consigli, Giorgio (Bergamo-BG), De Loera, Jesús A. (Davis), Dempe, Stephan (Freiberg), Dentcheva, Darinka (Hoboken), Deride Silva, Julio Alejandro (Albuquerque), Escudero, Laureano F. (Mostoles, Madrid), Feinberg, Eugene A. (Stony Brook), Ferris, Michael (Madison), Geiersbach, Caroline (Wien), Gugat, Martin (Erlangen), Gupte, Akshay (Clemson), Haddock, Jamie (Los Angeles), Harbrecht, Helmut (Basel), Heinkenschloss, Matthias (Houston), Helmberg, Christoph (Chemnitz), Henrion, Rene (Berlin), Hintermüller, Michael (Berlin), Indyk, Ihor (Hoboken), Jaśkiewicz, Anna (Wrocław), Jofré, Alejandro (Santiago de Chile), Koeppe, Matthias (Davis), Kostina, Ekaterina A. (Heidelberg), Kuhn, Daniel (Lausanne), Lejeune, Miguel (Washington), Lin, Yang (Hoboken), Lu, Shu (Chapel Hill), Luedtke, Jim (Madison), Ma, Anna (San Diego), Maggioni, Francesca (Bergamo-BG), Noyan, Nilay (Tuzla, Istanbul), Parrilo, Pablo A. (Cambridge), Pflug, Georg (Wien), Philpott, Andy (Auckland), Pichler, Alois (Chemnitz), Pohl, Mathias (Wien), Ralph, Daniel (Cambridge), Romeijnders, Ward (Groningen), Römisch, Werner (Berlin), Royset, Johannes (Monterey), Rumpf, Martin (Bonn), Ruszczynski, Andrzej (Piscataway), Sachs, Ekkehard (Trier), Sagastizabal, Claudia (Rio de Janeiro), Schillings, Claudia (Mannheim), Schultz, Rüdiger (Essen), Sen, Suvrajeet (Los Angeles), Solodov, Mikhail V. (Rio de Janeiro), Spürkel, Kai Arne (Essen), Surowiec, Thomas M. (Marburg), von Stengel, Bernhard (London), Xu, Huifu (Southampton)

26.08. – 01.09.2018 **Reactive Flows in Deformable, Complex Media**

Organizers: Margot Gerritsen, Stanford
Iuliu Sorin Pop, Diepenbeek
Florin Adrian Radu, Bergen
Barbara Wohlmuth, Garching

Abstract

Many processes of highest actuality in the real life are described through systems of equations posed in complex domains. Of particular interest is the situation when the domain is changing in time, undergoing deformations that depend on the unknown quantities of the model. Such kind of problems are encountered as mathematical models in the subsurface, material science, or biological systems.The emerging mathematical models account for various processes at different scales, and the key issue is to integrate the domain deformation in the multi-scale context. The focus in this workshop was on novel techniques and ideas in the mathematical modelling, analysis, the numerical discretization and the upscaling of problems as described above.

Participants

Ahmed, Elyes (Bergen), Arbogast, Todd (Austin), Bastidas, Manuela (Diepenbeek), Battiato, Ilenia (Stanford), Bause, Markus (Hamburg), Berge, Runar (Bergen), Berre, Inga (Bergen), Boon, Wietse (Stuttgart), Both, Jakub (Bergen), Bringedal, Carina (Diepenbeek), Castelletto, Nicola (Livermore), Engquist, Björn (Austin), Eymard, Robert (Marne-la-Vallée), Fattahi Evati, Ehsan (Freising), Formaggia, Luca (Milano), Gahn, Markus (Heidelberg), Gaspar, Francisco J. (Zaragoza), Gjerde, Ingeborg (Bergen), Gupta, Shubhangi (Kiel), Helmig, Rainer (Stuttgart), Jäger, Willi (Heidelberg), Knabner, Peter (Erlangen), Kraus, Johannes (Essen), Kumar, Kundan (Bergen), Kuzmin, Dmitri (Dortmund), Luckhaus, Stephan (Leipzig), Mattis, Steven (Garching bei München), Mikelic, Andro (Villeurbanne), Mitra, Koondanibha (Eindhoven), Muntean, Adrian (Karlstad), Neuss-Radu, Maria (Erlangen), Nordbotten, Jan Martin (Bergen), Oden, J. Tinsley (Austin), Ohlberger, Mario (Münster), Pichot, Géraldine (Paris), Pop, Iuliu Sorin (Diepenbeek), Putti, Mario (Padova), Radu, Florin Adrian (Bergen), Ray, Nadja (Erlangen), Rodrigo Cardiel, Carmen (Zaragoza), Rohde, Christian (Stuttgart), Rüde, Ulrich (Erlangen), Schweizer, Ben (Dortmund), Sharmin, Sohely (Diepenbeek), Stevens, Angela (Münster), Vohralik, Martin (Paris), Wheeler, Mary Fanett (Austin), Wick, Thomas (Hannover), Wohlmuth, Barbara (Garching bei München), Yotov, Ivan (Pittsburgh), Zikatanov, Ludmil (University Park), Zunino, Paolo (Milano)

02.09. – 08.09.2018 **New Trends in Teichmüller Theory and Mapping Class Groups**

Organizers: Ken'ichi Ohshika, Osaka
Athanase Papadopoulos, Strasbourg
Robert C. Penner, Bures-sur-Yvette
Anna Wienhard, Heidelberg

Abstract
In this workshop, various topics in Teichmüller theory and mapping class groups were discussed. The workshop was attended by 50 participants, including a number of young researchers, with broad geographic representation. 23 talks dealing with classical topics and new directions in the field were given. A relatively large amount of time for discussion was left and a problem session was organized on Thursday evening.

Participants
A'Campo, Norbert (Basel), Alessandrini, Daniele (Heidelberg), Baba, Shinpei (Osaka), Bhattacharya, Gourab (Bures-sur-Yvette), Burger, Marc (Zürich), Danciger, Jeffrey (Austin), Daskalopoulos, Georgios D. (Providence), Disarlo, Valentina (Heidelberg), Fanoni, Federica (Heidelberg), Freidin, Brian (Providence), Funar, Louis (Saint-Martin-d'Hères), Gekhtman, Dmitri (Pasadena), Goldman, William Mark (College Park), Gongopadhyay, Krishnendu (Nagar), Guichard, Olivier (Strasbourg), Gupta, Subhojoy (Bengaluru), Hamano, Sachiko (Osaka), Huang, Yi (Beijing), Ishibashi, Tsukasa (Tokyo), Kashaev, Rinat M. (Genève), Kawazumi, Nariya (Tokyo), Kim, Sang-hyun (Seoul), Koberda, Thomas Michael (Charlottesville), Kuno, Yusuke (Tokyo), Lanier, Justin (Atlanta), Liu, Lixin (Guangzhou), Markovic, Vladimir (Pasadena), Matsumoto, Yukio (Tokyo), Miyachi, Hideki (Ishikawa), Mj, Mahan (Mumbai), Ohshika, Ken'ichi (Osaka), Penner, Robert C. (Bures-sur-Yvette), Pozzetti, Maria Beatrice (Heidelberg), Sakasai, Takuya (Tokyo), Saric, Dragomir (Flushing), Satoh, Takao (Tokyo), Senapati, Himalaya (Chennai, Tamilnadu), Seshadri, Harish (Bengaluru), Shiga, Hiroshige (Tokyo), Stecker, Florian (Heidelberg), Su, Weixu (Shanghai Shi), Suzuki, Masaaki (Tokyo), Tan, Ser Peow (Singapore), Uludag, A. Muhammed (Tuzla, Istanbul), Wienhard, Anna Katharina (Heidelberg), Wolpert, Scott A. (College Park), Yamada, Sumio (Tokyo), Yasar, Firat (Strasbourg), Yurttas, S. Öykü (Diyarbakir), Zeitlin, Anton M. (Baton Rouge), Zhang, Tengren (Singapore)

09.09. – 15.09.2018 **Scaling Limits in Models of Statistical Mechanics**

Organizers: Dmitry Ioffe, Haifa
Gady Kozma, Rehovot
Fabio Toninelli, Lyon

Abstract

This conference aimed to cover the interplay between probability and mathematical statistical mechanics. Specific topics addressed during the 22 talks include: Universality and critical phenomena, disordered models, Gaussian free field (GFF), random planar graphs and unimodular planar maps, reinforced random walks and non-linear σ-models, non-equilibrium dynamics. Less stress was given to topics which have Oberwolfach conferences devoted to them specifically, such as random matrices or integrable models and KPZ universality class. There were 50 participants, including 9 postdocs and graduate students, working in diverse intertwining areas of probability, statistical mechanics and mathematical physics.

Participants

Basu, Riddhipratim (Bengaluru), Bauerschmidt, Roland (Cambridge), Belius, David (Zürich), Berger, Quentin (Paris), Biskup, Marek (Los Angeles), Bolthausen, Erwin (Zürich), Boutillier, Cedric (Paris), Caputo, Pietro (Roma), Caravenna, Francesco (Milano), Cipriani, Alessandra (Delft), Cosco, Clément (Paris), Crawford, Nicholas J. (Haifa), den Hollander, Frank (Leiden), de Tilière, Béatrice (Créteil), Duminil-Copin, Hugo (Bures-sur-Yvette), Garban, Christophe (Villeurbanne), Giacomin, Giambattista (Paris), Hartung, Lisa (New York), Hutchcroft, Thomas (Cambridge), Jagannath, Aukosh S. (Cambridge), Kotecký, Roman (Praha), Kozma, Gady (Rehovot), Lacoin, Hubert (Rio de Janeiro), Louidor, Oren (Haifa), Lupu, Titus (Zürich), Manolescu, Ioan (Fribourg), Marêché, Laure (Paris), Miller, Jason P. (Cambridge), Ott, Sébastien (Genève), Pete, Gabor (Budapest), Raoufi, Aran (Bures-sur-Yvette), Rodriguez, Pierre-Francois (Los Angeles), Rolles, Silke (Garching bei München), Ruszel, Wioletta M. (Delft), Sabot, Christophe (Villeurbanne), Seppäläinen, Timo (Madison), Shlosman, Senya B. (Marseille), Sidoravicius, Vladas (New York), Sousi, Perla (Cambridge), Subag, Eliran (New York), Sun, Rongfeng (Singapore), Tarrès, Pierre (Paris), Tassion, Vincent (Zürich), Tassy, Martin (Hanover), Toninelli, Fabio (Villeurbanne), Torri, Niccolo (Paris), Toth, Balint (Bristol), Velenik, Yvan (Genève), Werner, Wendelin (Zürich), Zygouras, Nikolaos (Coventry)

16.09. – 22.09.2018 **Flat Surfaces and Algebraic Curves**

Organizers: Samuel Grushevsky, Stony Brook
Martin Möller, Frankfurt
Anton Zorich, Paris

Abstract

This workshop brought together two distinct communities: "flat" geometers, studying the moduli of flat surfaces, and Teichmüller dynamics, and algebraic geometers studying the moduli space of curves. While both communities study similar or often the same objects, very different viewpoints and toolboxes lead to different questions being addressed, and different progress being made. The workshop sought to educate each community about the techniques of the other, and to foster communication between the two groups. One particular focus was enumerative geometry.

Participants

Aggarwal, Amol (Cambridge), Apisa, Paul (New Haven), Athreya, Jayadev S. (Seattle), Aulicino, David (Brooklyn), Bainbridge, Matthew (Bloomington), Benirschke, Frederik (Stony Brook), Blankers, Vance (Fort Collins), Boissy, Corentin (Toulouse), Buryak, Alexandr (Leeds), Chavez Caliz, Ana Cristina (University Park), Chen, Dawei (Chestnut Hill), Costantini, Matteo (Frankfurt am Main), Delecroix, Vincent (Talence), Deroin, Bertrand (Paris), Do, Trong Hoang (Hanoi), Engel, Philip (Cambridge), Eskin, Alex (Chicago), Farkas, Gavril (Berlin), Fedorchuk, Maksym (Chestnut Hill), Filip, Simion (Cambridge), Fougeron, Charles (Bonn), Gendron, Quentin (Morelia), Goujard, Elise (Talence), Govere, Weston Darlington (Fernhill), Grushevsky, Samuel (Stony Brook), Hamenstädt, Ursula (Bonn), Hu, Xuntao (Stony Brook), Kass, Jesse Leo (Columbia), Krichever, Igor (New York), Lando, Sergei K. (Moscow), Lanneau, Erwan (Saint-Martin-d'Hères), Lelièvre, Samuel (Orsay), Markwig, Hannah (Tübingen), Masur, Howard (Chicago), Matheus, Carlos (Villetaneuse), Möller, Martin (Frankfurt am Main), Mondello, Gabriele (Roma), Mullane, Scott (Frankfurt am Main), Nguyen, Duc-Manh (Talence), Norbury, Paul (Melbourne), Pixton, Aaron (Cambridge), Rennig, Markus (Frankfurt am Main), Rossi, Paolo (Dijon), Sauvaget, Adrien (Paris), Schmitt, Johannes (Zürich), Skripchenko, Alexandra (Moscow), Smillie, John (Coventry), Torres-Teigell, David (Frankfurt am Main), Ulirsch, Martin (Frankfurt am Main), Valdez Lorenzo, Jose Ferrán (Bonn), Weitze-Schmithüsen, Gabriela (Saarbrücken), Wienhard, Anna Katharina (Heidelberg), Zachhuber, Jonathan (Frankfurt am Main), Zorich, Anton (Paris)

23.09. – 29.09.2018 **Differential Equations arising from Organising Principles in Biology**

Organizers: José Antonio Carrillo, London
Alexander Lorz, Thuwal/Paris
Anna Marciniak-Czochra, Heidelberg
Benoît Perthame, Paris

Abstract
This workshop brought together experts in modeling and analysis of organising principles of multi-scale biological systems such as cell assemblies, tissues and populations. We focused on questions arising in systems biology and medicine which are related to emergence, function and control of spatial and inter-individual heterogeneity in population dynamics. There were three main areas represented of differential equation models in mathematical biology. The first area involved the mathematical description of structured populations. The second area concerned invasion, pattern formation and collective dynamics. The third area treated the evolution and adaptation of populations, following the Darwinian paradigm. These problems led to differential equations, which frequently are non-trivial extensions of classical problems.

Participants
Alarcon, Tomas (Bellaterra), Alber, Mark S. (Riverside), Berestycki, Henri (Paris), Berlyand, Leonid (University Park), Bubba, Federica (Paris), Cáceres, Maria Jose (Granada), Calvez, Vincent (Lyon), Carrère, Cécile (Paris), Carrillo de la Plata, José Antonio (London), Chou, Tom (Los Angeles), Clairambault, Jean (Le Chesnay), Cosner, Chris (Coral Gables), Degond, Pierre (London), Desvillettes, Laurent (Paris), Diekmann, Odo (Utrecht), Doelman, Arjen (Leiden), Doumic-Jauffret, Marie (Paris), Eftimie, Raluca (Dundee), Gimperlein, Heiko (Edinburgh), Gwiazda, Piotr (Warszawa), Gyllenberg, Mats (University of Helsinki), Haskovec, Jan (Jeddah), Hecht, Sophie (London), Hilhorst, Danielle (Orsay), Hubert, Florence (Marseille), Jäger, Willi (Heidelberg), Kondo, Shigeru (Osaka), Levy, Doron (College Park), Lorenzi, Tommaso (St. Andrews), Marciniak-Czochra, Anna (Heidelberg), Michels, Dominik (Jeddah), Mirrahimi, Sepideh (Toulouse), Painter, Kevin (Edinburgh), Perthame, Benoit (Paris), Pouradier-Duteil, Nastassia (Paris), Rodriguez-Bunn, Nancy (Boulder), Röger, Matthias (Dortmund), Salort, Delphine (Paris), Schmidtchen, Markus (London), Stevens, Angela (Münster), Stiehl, Thomas (Heidelberg), Sun, Weiran (Burnaby), Swierczewska-Gwiazda, Agnieszka (Warszawa), Tang, Min (Shanghai Shi), Vauchelet, Nicolas (Villetaneuse), Venkataraman, Chandrasekhar (Brighton), Volkening, Alexandria (Columbus), Winkler, Michael (Paderborn)

21.10. – 27.10.2018 **Computational Engineering**

Organizers: Olivier Allix, Cachan
Annalisa Buffa, Lausanne
Carsten Carstensen, Berlin
Joerg Schroeder, Essen

Abstract

This Workshop treated a variety of finite element methods and applications in computational engineering and expanded their mathematical foundation in engineering analysis. Among the 53 participants were mathematicians and engineers with focus on mixed and nonstandard finite element schemes and their applications. The thirty talks, including an evening session, fostered fruitful discussions between mathematicians and engineers and layed the groundwork for future collaborations.

Participants

Allix, Olivier (Cachan), Antonietti, Paola (Milano), Bänsch, Eberhard (Erlangen), Bartels, Sören (Freiburg i. Br.), Bertrand, Fleurianne (Berlin), Bochev, Pavel B. (Albuquerque), Boffi, Daniele (Pavia), Brenner, Susanne C. (Baton Rouge), Buffa, Annalisa (Lausanne), Carstensen, Carsten (Berlin), Chanon, Ondine (Lausanne), Demkowicz, Leszek F. (Austin), Figueroa Schibber, Erika (Pasadena), Gallistl, Dietmar (Enschede), Gedicke, Joscha (Wien), Giannelli, Carlotta (Firenze), Gil, Antonio J. (Swansea), Gopalakrishnan, Jay (Portland), Gravouil, Anthony (Villeurbanne), Gudi, Thirupathi (Bengaluru), Hellwig, Friederike (Berlin), Heuer, Norbert (Santiago), Hu, Jun (Beijing), Huerta, Antonio (Barcelona, Catalonia), Jüttler, Bert (Linz), Keith, Brendan (Garching bei München), Kim, Mi-Young (Incheon), Ladevèze, Pierre (Cachan), Ma, Rui (Berlin), Monk, Peter (Newark), Morin, Pedro (GLN Santa Fe), Nataraj, Neela (Powai, Mumbai), Neff, Patrizio (Essen), Oden, J. Tinsley (Austin), Park, Eun-Jae (Seoul), Peterseim, Daniel (Augsburg), Puttkammer, Sophie (Berlin), Sauter, Stefan A. (Zürich), Schedensack, Mira (Münster), Schöberl, Joachim (Wien), Schröder, Jörg (Essen), Starke, Gerhard (Essen), Stevenson, Rob P. (Amsterdam), Sung, Li-yeng (Baton Rouge), Torres, Céline (Zürich), Uebing, Sonja (Essen), Viebahn, Nils (Essen), Wohlmuth, Barbara (Garching bei München), Zahedi, Sara (Stockholm), Zhang, Zhimin (Detroit)

28.10. – 03.11.2018

Emergence of Structures in Particle Systems: Mechanics, Analysis and Computation

Organizers:
Andrea Braides, Rome
Bernd Schmidt, Ausgburg
Ulisse Stefanelli, Vienna
Florian Theil, Warwick

Abstract
The meeting focused on the last advances in particle systems. The talks covered a broad range of topics, ranging from questions in crystallization and atomistic systems to mesoscopic models of defects to machine learning approaches and computational aspects. Over 50 participants with broad geographic representation and a variety of research fields intervened, each revealing different methodology, interests, and level of abstraction.

Participants
Adams, Stefan (Coventry), Alicandro, Roberto (Cassino), Baake, Michael (Bielefeld), Bach, Annika (Garching bei München), Bétermin, Laurent (København), Braides, Andrea (Roma), Braun, Julian (Coventry), Caroccia, Marco (Pittsburgh), Cermelli, Paolo (Torino), Cicalese, Marco (Garching bei München), Davoli, Elisa (Wien), De Luca, Lucia (Trieste), Dondl, Patrick W. (Freiburg i. Br.), Dovetta, Simone (Torino), Friedrich, Manuel (Münster), Gelli, Maria Stella (Pisa), Grabner, Peter J. (Graz), Heydenreich, Markus (München), Jesenko, Martin (Freiburg i. Br.), Kapfer, Sebastian (Erlangen), Kreutz, Leonard (Münster), Luckhaus, Stephan (Leipzig), Luskin, Mitchell B. (Minneapolis), Mainini, Edoardo (Genova), Melching, David (Wien), Merino-Aceituno, Sara (Wien), Merkl, Franz (München), Mora, Maria Giovanna (Pavia), Ortiz, Michael (Pasadena), Peletier, Mark A. (Eindhoven), Piovano, Paolo (Wien), Ponsiglione, Marcello (Roma), Radin, Charles (Austin), Runa, Eris (Leipzig), Scardia, Lucia (Edinburgh), Schill, William (Pasadena), Schlömerkemper, Anja (Würzburg), Schmidt, Bernd (Augsburg), Schoenlieb, Carola-Bibiane (Cambridge), Shapeev, Alexander V. (Moscow), Slepcev, Dejan (Pittsburgh), Solci, Margherita (Alghero), Stefanelli, Ulisse (Wien), Steinbach, Martin (Augsburg), Theil, Florian (Coventry), Thorpe, Matthew (Cambridge), Tribuzio, Antonio (Roma), Wolfram, Marie-Therese (Coventry), Zeppieri, Caterina (Münster), Zwicknagl, Barbara (Berlin)

04.11. – 10.11.2018 **Combinatorial Optimization**

Organizers: Jesús De Loera, Davis
Satoru Iwata, Tokyo
Martin Skutella, Berlin

Abstract

Combinatorial Optimization is an active research area that developed from the rich interaction among many mathematical areas, including combinatorics, graph theory, geometry, optimization, probability, theoretical computer science, and many others. It combines algorithmic and complexity analysis with a mature mathematical foundation and it yields both basic research and applications in manifold areas such as, for example, communications, economics, traffic, network design, VLSI, scheduling, production, computational biology, to name just a few. Through strong inner ties to other mathematical fields it has been contributing to and benefiting from areas such as, for example, discrete and convex geometry, convex and nonlinear optimization, algebraic and topological methods, geometry of numbers, matroids and combinatorics, and mathematical programming. Moreover, with respect to applications and algorithmic complexity, Combinatorial Optimization is an essential link between mathematics, computer science and modern applications in data science, economics, and industry.

Participants

Aardal, Karen I. (Delft), Basu, Amitabh (Baltimore), Chekuri, Chandra (Urbana), Conforti, Michele (Padova), Cook, William J. (Waterloo), Cornuéjols, Gérard P. (Pittsburgh), Dadush, Daniel (Amsterdam), De Loera, Jesús A. (Davis), Dey, Santanu S. (Atlanta), Di Summa, Marco (Padova), Eberle, Franziska (Bremen), Eisenbrand, Friedrich (Lausanne), Fiorini, Samuel (Bruxelles), Goemans, Michel X. (Cambridge), Guenin, Bertrand (Waterloo), Gupta, Anupam (Pittsburgh), Hirai, Hiroshi (Tokyo), Iwata, Satoru (Tokyo), Jordan, Tibor (Budapest), Kaibel, Volker (Magdeburg), Kobayashi, Yusuke (Kyoto), Laurent, Monique (Amsterdam), Lee, Jon (Ann Arbor), Louveaux, Quentin (Liège), Martin, Alexander (Erlangen), Megow, Nicole (Bremen), Meunier, Frédéric (Marne-la-Vallée), Morell, Sarah (Berlin), Olver, Neil K. (Amsterdam), Onn, Shmuel (Haifa), Pap, Gyula (Budapest), Peis, Britta (Aachen), Pokutta, Sebastian (Atlanta), Rothvoss, Thomas (Seattle), Schlöter, Miriam (Zürich), Schrijver, Alexander (Amsterdam), Sebö, Andras (Grenoble), Shepherd, Bruce (Vancouver), Singh, Mohit (Atlanta), Skutella, Martin (Berlin), Svensson, Ola Nils A. (Lausanne), Tanigawa, Shin-ichi (Tokyo), Traub, Vera (Bonn), Vegh, Laszlo A. (London), Vygen, Jens (Bonn), Weismantel, Robert (Zürich), Woeginger, Gerhard (Aachen), Yokoi, Yu (Tokyo), Zenklusen, Rico (Zürich)

11.11. – 17.11.2018 **Complexity Theory**

Organizers: Peter Bürgisser, Berlin
Irit Dinur, Rehovot
Oded Goldreich, 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 arithmetic complexity, Boolean complexity, communication complexity, cryptography, probabilistic proof systems, pseudorandomness, and quantum computation. Many of the developments are related to diverse mathematical fields such as algebraic geometry, combinatorial number theory, probability theory, representation theory, and the theory of error-correcting codes.

Participants

Barak, Boaz (Cambridge), Bläser, Markus (Saarbrücken), Brakerski, Zvika (Rehovot), Bürgisser, Peter (Berlin), Dinur, Irit (Rehovot), Dvir, Zeev (Princeton), Garg, Ankit (Bengaluru), Goldreich, Oded (Rehovot), Goldwasser, Shafi (Cambridge), Goos, Mika (Princeton), Gurjar, Rohit (Powai, Mumbai), Guruswami, Venkatesan (Pittsburgh), Ikenmeyer, Christian (Saarbrücken), Kalai, Yael (Cambridge), Kaufman-Halman, Tali (Ramat-Gan), Kayal, Neeraj (Bengaluru), Koiran, Pascal (Lyon), Kopparty, Swastik (New Brunswick), Kothari, Pravesh K. (Princeton), Landsberg, Joseph M. (College Station), Lin, Hui-jia (Rachel) (Santa Barbara), Livni Navon, Inbal (Rehovot), Meir, Or (Haifa), Meka, Raghu R. (Los Angeles), Minzer, Dor (Princeton), Murray, Cody (Cambridge), O'Donnell, Ryan (Pittsburgh), Regev, Oded (New York), Reingold, Omer (Stanford), Rothblum, Guy (Rehovot), Rothblum, Ron (Cambridge), Rubinstein, Aviad (Stanford), Safra, Shmuel (Ramat Aviv, Tel Aviv), Saks, Michael (Piscataway), Saraf, Shubhangi (New Brunswick), Schramm, Tselil (Cambridge), Servedio, Rocco A. (New York), Shpilka, Amir (Tel Aviv), Srivastava, Nikhil (Berkeley), Steurer, David (Zürich), Sudan, Madhu (Cambridge), Ta-Shma, Amnon (Tel Aviv), Tell, Roei (Rehovot), Trevisan, Luca (Berkeley), Umans, Chris (Pasadena), Vadhan, Salil (Cambridge), Vassilevska Williams, Virginia (Cambridge), Vidick, Thomas (Pasadena), Wigderson, Avi (Princeton), Williams, Ryan (Cambridge), Zuckerman, David (Austin), Zuiddam, Jeroen (Princeton)

25.11. – 01.12.2018 **Enveloping Algebras and Geometric Representation Theory**

Organizers: Iain Gordon, Edinburgh
Bernard Leclerc, Caen
Wolfgang Soergel, Freiburg

Abstract
The workshop brought together experts investigating algebraic Lie theory from the geometric and categorical viewpoints. A particular highlight was the announcement by Geordie Williamson (joint with Simon Riche) of a new formula for calculating characters of simple G-modules in terms of periodic p-polynomials. Very remarkable was also a conjectural description presented by Olivier Dudas (joint with Raphael Rouquier) of decomposition matrices of finite general unitary groups in non describing characteristics in terms of Macdonald theory and the geometry of Hilbert schemes. Many lecturers presented work that involved affine Grassmannians and Satake categories. A big theme was also cohomology, e.g. cohomology of affine Springer fibres, or multiplicative quiver varieties.

Participants
Achar, Pramod N. (Baton Rouge), Andersen, Henning Haahr (Yichang), Braverman, Alexander (Waterloo), Brochier, Adrien (Hamburg), Chari, Vyjayanthi (Riverside), Cupit-Foutou, Stephanie (Bochum), Dudas, Olivier (Paris), Eicher, Claude (Cambridge), Finkelberg, Mikhail (Moscow), Ganev, Iordan (Klosterneuburg), Gautam, Sachin (Columbus), Geiss, Christof (México), Ginzburg, Victor (Chicago), Goodwin, Simon (Birmingham), Gordon, Iain (Edinburgh), Gorelik, Maria (Rehovot), Greenstein, Jacob (Riverside), Gunningham, Sam (Edinburgh), Heidersdorf, Thorsten (Bonn), Henderson, Anthony (Sydney), Hernandez, David (Paris), Jantzen, Jens Carsten (Aarhus), Jensen, Thorge (Aubière), Jordan, David (Edinburgh), Juteau, Daniel (Paris), Kumar, Shrawan (Chapel Hill), Lanini, Martina (Roma), Leclerc, Bernard (Caen), Loseu, Ivan (Toronto), Mautner, Carl (Riverside), McGerty, Kevin R. (Oxford), McNamara, Peter J. (Parkville), Moreau, Anne (Villeneuve-d'Ascq), Norton, Emily (Bonn), Patimo, Leonardo (Freiburg i. Br.), Przezdziecki, Tomasz (Glasgow), Qin, Fan (Shanghai Shi), Reineke, Markus (Bochum), Schröer, Jan (Bonn), Schumann, Beatrix (Köln), Serganova, Vera V. (Berkeley), Shan, Peng (Beijing), Soergel, Wolfgang (Freiburg i. Br.), Stroppel, Catharina (Bonn), Tingley, Peter (Chicago), Toledano Laredo, Valerio (Boston), Torres, Jacinta (Karlsruhe), Varagnolo, Michela (Cergy-Pontoise), Vasserot, Eric (Paris), Webster, Ben (Waterloo), Williams, Harold (Austin), Williamson, Geordie (Sydney), Yakimova, Oksana (Jena)

02.12. – 08.12.2018 **Free Probability Theory**

Organizers: Alice Guionnet, Lyon
Roland Speicher, Saarbrücken
Dan Voiculescu, Berkeley

Abstract

Free probability theory is a line of research which parallels aspects of classical probability, in a non-commutative context where tensor products are replaced by free products, and independent random variables are replaced by free random variables. It grew out from attempts to solve some longstanding problems about von Neumann algebras of free groups. In the almost 35 years since its creation, it has become a subject in its own right, with connections to several other parts of mathematics: operator algebras, the theory of random matrices, classical probability, the theory of large deviations, and algebraic combinatorics. Free probability also has connections with some mathematical models in theoretical physics and quantum information theory, as well as applications in statistics and wireless communications. The workhop brought together leading experts, as well as promising young researchers, in areas related to recent developments. Particular emphasis was on the relation of free probability with random matrix theory.

Participants

Akemann, Gernot (Bielefeld), Alfano, Giuseppa (Torino), Arizmendi, Octavio (Guanajuato), Augeri, Fanny (Rehovot), Banica, Teodor (Cergy-Pontoise), Banna, Marwa (Saarbrücken), Belinschi, Serban (Toulouse), Bercovici, Hari (Bloomington), Biane, Philippe (Marne-la-Vallée), Bordenave, Charles (Toulouse), Borot, Gaetan (Bonn), Bufetov, Alexey (Bonn), Capitaine, Mireille (Toulouse), Cébron, Guillaume (Toulouse), Collins, Benoit (Kyoto), Cook, Nicholas (Los Angeles), Donati-Martin, Catherine (Versailles), Dykema, Ken (College Station), Ebrahimi-Fard, Kurusch (Trondheim), Friedrich, Roland (Saarbrücken), Garcia-Failde, Elba (Gif-sur-Yvette), Garza Vargas, Jorge (Berkeley), Gorin, Vadim (Cambridge), Götze, Friedrich (Bielefeld), Guionnet, Alice (Lyon), Hasebe, Takahiro (Sapporo), Huang, Jiaoyang (Cambridge), Husson, Jonathan (Lyon), Jekel, David (Los Angeles), Knowles, Antti (Genève), Lehner, Franz (Graz), Leid, Felix (Saarbrücken), Levy, Thierry (Paris), Mai, Tobias (Saarbrücken), Maida, Mylène (Villeneuve-d'Ascq), Male, Camille (Talence), Maurel-Segala, Edouard (Orsay), Mingo, James A. (Kingston), Nechita, Ion (Toulouse), Nelson, Brent (Nashville), Nica, Alexandru (Waterloo), Nowak, Maciej A. (Kraków), Patras, Frédéric (Nice), Pluma Rodriguez, Miguel Angel (Saarbrücken), Shlyakhtenko, Dimitri (Los Angeles), Skoufranis, Paul D. (Toronto), Speicher, Roland (Saarbrücken), Srivastava, Nikhil (Berkeley), Tarnowski, Wojciech (Kraków), Voiculescu, Dan (Berkeley), Weber, Moritz (Saarbrücken), Yin, Sheng (Saarbrücken)

09.12. – 15.12.2018 **Convex Geometry and its Applications**

Organizers: Franck Barthe, Toulouse
Martin Henk, Berlin
Monika Ludwig, Wien

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 PDE, linear programming and, increasingly, in the study of algorithms in computer science. The purpose of this meeting was to bring together researchers from the analytic, geometric and probabilistic groups who have contributed to these developments.

Participants

Abardia, Judit (Frankfurt am Main), Alonso-Gutiérrez, David (Zaragoza), Artstein-Avidan, Shiri (Ramat Aviv, Tel Aviv), Aubrun, Guillaume (Villeurbanne), Barany, Imre (Budapest), Barthe, Franck (Toulouse), Bernig, Andreas (Frankfurt am Main), Besau, Florian (Wien), Bianchi, Gabriele (Firenze), Böröczky, Jr., Karoly (Budapest), Brazitikos, Silouanos (Athens), Calka, Pierre (Saint-Etienne-du-Rouvray), Colesanti, Andrea (Firenze), Cordero-Erausquin, Dario (Paris), Faifman, Dmitry (Toronto), Fradelizi, Matthieu (Marne-la-Vallée), Giannopoulos, Apostolos A. (Athens), Guédon, Olivier (Marne-la-Vallée), Henk, Martin (Berlin), Hernandez Cifre, Maria A. (Espinardo, Murcia), Hug, Daniel (Karlsruhe), Huiberts, Sophie (Amsterdam), Klartag, Bo'az (Rehovot), Koldobsky, Alexander (Columbia), Litvak, Alexander (Edmonton), Livshyts, Galyna (Atlanta), Lombardi, Nico (Firenze), Ludwig, Monika (Wien), Milman, Emanuel (Haifa), Milman, Vitali D. (Ramat Aviv, Tel Aviv), Mußnig, Fabian (Wien), Paouris, Grigoris (College Station), Reitzner, Matthias (Osnabrück), Rotem, Liran (Minneapolis), Rudelson, Mark (Ann Arbor), Ryabogin, Dmitry (Kent), Saorín Gómez, Eugenia (Magdeburg), Saroglou, Christos (Ioannina), Schneider, Rolf (Freiburg i. Br.), Schuster, Franz (Wien), Shenfeld, Yair (Princeton), Slomka, Boaz (Rehovot), Stancu, Alina (Montreal), Tatarko, Kateryna (Edmonton), Valettas, Petros (Columbia), Vedel Jensen, Eva B. (Aarhus), Wannerer, Thomas (Jena), Werner, Elisabeth (Cleveland), Wyczesany, Katarzyna (Cambridge), Xi, Dongmeng (Shanghai Shi), Yaskin, Vladyslav (Edmonton), Yepes Nicolás, Jesús (Espinardo, Murcia), Zvavitch, Artem (Kent)

2.4. Miniworkshops

Miniworkshop 1810a

04.03. – 10.03.2018

Chromatic Phenomena and Duality in Homotopy Theory and Representation Theory

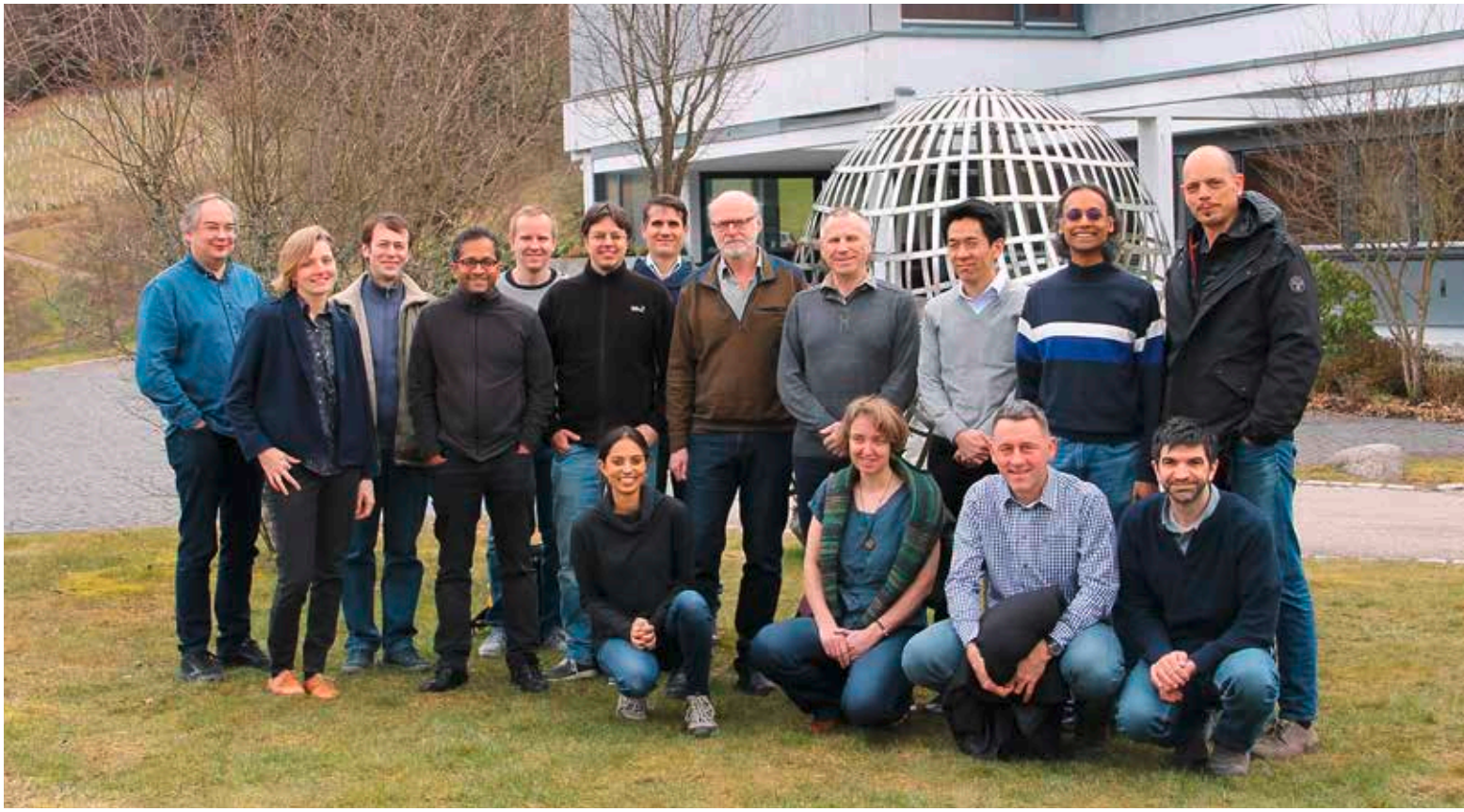
Organizers: Tobias Barthel, Copenhagen
Henning Krause, Bielefeld
Vesna Stojanoska, Urbana

Abstract

This Mini-Workshop focused on chromatic phenomena and duality as unifying themes in algebra, geometry, and topology. The overarching goal was to establish a fruitful exchange of ideas between experts from various areas, fostering the study of the local and global structure of the fundamental categories appearing in algebraic geometry, homotopy theory, and representation theory. The workshop started with introductory talks to bring researches from different backgrounds to the same page, and later highlighted recent progress in these areas with an emphasis on the interdisciplinary nature of the results and structures found. Moreover, new directions were explored in focused group work throughout the week, as well as in an evening discussion identifying promising long-term goals in the subject. Topics included support theories and their applications to the classification of localizing ideals in triangulated categories, equivariant and homotopical enhancements of important structural results, descent and Galois theory, numerous notions of duality, Picard and Brauer groups, as well as computational techniques.

Participants

Balmer, Paul (Los Angeles), Barthel, Tobias (København), Beaudry, Agnès (Boulder), Castellana Vila, Natàlia (Bellaterra), Dell'Ambrogio, Ivo (Villeneuve-d'Ascq), Greenlees, John (Coventry), Grodal, Jesper (København), Heard, Drew K. (Haifa), Krause, Henning (Bielefeld), Neeman, Amnon (Canberra), Noel, Justin (Regensburg), Pevtsova, Julia (Seattle), Ricka, Nicolas (Strasbourg), Sanders, Beren (Lausanne), Schlank, Tomer (Jerusalem), Stojanoska, Vesna (Urbana)



04.03. – 10.03.2018 **Entropy, Information and Control**

Organizers:
Fritz Colonius, Augsburg
Tomasz Downarowicz, Wroclaw
Christoph Kawan, Passau
Girish Nair, Melbourne

Abstract

This Mini-Workshop was motivated by the emerging field of networked control, which combines concepts from the disciplines of control theory, information theory and dynamical systems. Many current approaches to networked control simplify one or more of these three aspects, for instance by assuming no dynamical disturbances, or noiseless communication channels, or linear dynamics. The aim of this meeting was to approach a common understanding of the relevant results and techniques from each discipline in order to study the major, multi-disciplinary problems in networked control.

Participants

Colonius, Fritz (Augsburg), Downarowicz, Tomasz (Wrocław), Franceschetti, Massimo (La Jolla), Gelfert, Katrin (Rio de Janeiro), Ishii, Hideaki (Yokohama), Kawan, Christoph (Passau), Kostina, Victoria (Pasadena), Liberzon, Daniel M. (Urbana), Linsenmayer, Steffen (Stuttgart), Nair, Girish (Melbourne), Pogromsky, Alexander Y. (Eindhoven), Ranade, Gireeja (Redmond), Sahai, Anant (Berkeley), Santana, Alexandre J. (Maringá), Serafin, Jacek (Wrocław), Yüksel, Serdar (Kingston)

04.03. – 10.03.2018
Organizers:

Deep Learning and Inverse Problems
Simon Arridge, London
Maarten de Hoop, Houston
Peter Maaß, Bremen
Carola Schönlieb, Cambridge UK

Abstract
Machine learning and in particular deep learning offer several data-driven methods to amend the typical shortcomings of purely analytical approaches. The mathematical research on these combined models is presently exploding on the experimental side but still lacking on the theoretical point of view. This workshop addresses the challenge of developing a solid mathematical theory for analyzing deep neural networks for inverse problems.

Participants
Arridge, Simon R. (London), Benning, Martin (Cambridge), de Hoop, Maarten V. (Houston), Fernsel, Pascal (Bremen), Haber, Eldad (Vancouver), Hauptmann, Andreas (London), Kutyniok, Gitta (Berlin), Maaß, Peter (Bremen), Öktem, Ozan (Stockholm), Pock, Thomas G. (Graz), Rosasco, Lorenzo (Cambridge), Ruthotto, Lars (Atlanta), Scherzer, Otmar (Wien), Schoenlieb, Carola-Bibiane (Cambridge), Unser, Michael (Lausanne)

15.04. – 21.04.2018 **Arithmetic Geometry and Symmetries around Galois and Fundamental Groups**

Organizers: Benjamin Collas, Bayreuth
Pierre Dèbes, Villeneuve d'Ascq
Michael D. Fried, Billings

Abstract
The geometric study of the absolute Galois group of the rational numbers has been a highly active research topic since the first milestones: Hilbert's Irreducibility Theorem, Noether's program, Riemann's Existence Theorem. It gained special interest in the last decades with Grothendieck's "Esquisse d'un programme", his "Letter to Faltings" and Fried's introduction of Hurwitz spaces. It grew on and thrived on a wide range of areas, e.g. formal algebraic geometry, Diophantine geometry, group theory. The recent years have seen the development and integration in algebraic geometry and Galois theory of new advanced techniques from algebraic stacks, ℓ-adic representations and homotopy theories. It was the goal of this Mini-Workshop, to bring together an international panel of young and senior experts to draw bridges towards these fields of research and to incorporate new methods, techniques and structures in the development of geometric Galois theory.

Participants
Borne, Niels (Villeneuve-d'Ascq), Cadoret, Anna (Paris), Collas, Benjamin (Bayreuth), Dèbes, Pierre (Villeneuve-d'Ascq), Dettweiler, Michael (Bayreuth), Fried, Michael David (Irvine), Harari, David (Orsay), Koenig, Joachim (Würzburg), Legrand, Francois (Dresden), Litt, Daniel (New York), Nakamura, Hiroaki (Osaka), Neftin, Danny (Haifa), Quick, Gereon (Trondheim), Schlank, Tomer (Jerusalem), Schmidt, Alexander (Heidelberg), Stix, Jakob (Frankfurt am Main), Wickelgren, Kirsten G. (Atlanta), Wittenberg, Olivier (Paris)

15.04. – 21.04.2018
Organizers:

Gibbs Measures for Nonlinear Dispersive Equations
Giuseppe Genovese, Zürich
Benjamin Schlein, Zürich
Vedran Sohinger, Coventry

Abstract
In this Mini-Workshop we brought together leading experts working on the application of Gibbs measures to the study of nonlinear PDEs. This framework is a powerful tool in the probabilistic study of solutions to nonlinear dispersive PDEs, in many ways alternative or complementary to deterministic methods. Among the special topics discussed were the construction of the measures, applications to dynamics, as well as the microscopic derivation of Gibbs measures from many-body quantum mechanics.

Participants
Cacciafesta, Federico (Padova), Cruzeiro, Ana Bela (Lisboa), Genovese, Giuseppe (Zürich), Gunaratnam, Trishen (Coventry), Knowles, Antti (Genève), Lucà, Renato (Basel), Lukkarinen, Jani (Helsinki), Nahmod, Andrea R. (Amherst), Phan Thanh, Nam (München), Rougerie, Nicolas (Grenoble), Schlein, Benjamin (Zürich), Sohinger, Vedran (Coventry), Thomann, Laurent (Vandoeuvre-lès-Nancy), Tolomeo, Leonardo (Edinburgh), Visciglia, Nicola (Pisa), Weber, Hendrik (Coventry)

15.04. – 21.04.2018 **Superexpanders and Their Coarse Geometry**

Organizers: Anastasia Khukhro, Neuchatel
Tim de Laat, Münster
Mikael de la Salle, Lyon

Abstract

It is a deep open problem whether all expanders are superexpanders. In fact, it was already a major challenge to prove the mere existence of superexpanders. However, by now, some classes of examples are known: Lafforgue's expanders constructed as sequences of finite quotients of groups with strong Banach property (T), the examples coming from zigzag products due to Mendel and Naor, and the recent examples coming from group actions on compact manifolds. The methods which are used to construct superexpanders are typically functional analytic in nature, but also rely on arguments from geometry and combinatorics. Another important aspect of the study of superexpanders is their (coarse) geometry, in particular in order to distinguish them from each other. The aim of this workshop was to bring together researchers working on superexpanders and their coarse geometry from different perspectives, with the aim of sharing expertise and stimulating new research.

Participants

Arzhantseva, Goulnara N. (Wien), Baudier, Florent (College Station), de Laat, Tim (Münster), Delabie, Thiebout (Neuchâtel), de la Salle, Mikael (Lyon), Drutu Badea, Cornelia (Oxford), Dymarz, Tullia (Madison), Gomez Aparicio, Maria Paula (Orsay), Khukhro, Ana (Neuchâtel), Mendel, Manor (Raanana), Mimura, Masato (Lausanne), Naor, Assaf (Princeton), Nguyen, Thang (New York), Nowak, Piotr (Warszawa), Sawicki, Damian (Warszawa), Valette, Alain (Neuchâtel), Vigolo, Federico (Oxford)

30.09. – 06.10.2018
Organizers:

Positional Games
Dan Hefetz, Ariel
Michael Krivelevich, Tel Aviv
Milos Stojakovic, Novi Sad
Tibor Szabo, Berlin

Abstract
Positional Games Theory is a branch of Combinatorics whose main aim is to systematically develop an extensive mathematical basis for a variety of two-player games of perfect information and without chance moves, usually played on discrete objects. These include popular recreational games such as Tic-Tac-Toe and Hex as well as purely abstract games played on graphs and hypergraphs. Though a close relative of the classical Game Theory of von Neumann and of Nim-like games, popularized by Conway and others, Positional Games are quite different and are more of a combinatorial nature. The subject is strongly related to several other branches of Combinatorics like Ramsey Theory, Extremal Graph and Set Theory, and the Probabilistic Method. It has also proven to be instrumental in deriving central results in Theoretical Computer Science, in particular in derandomization and algorithmization of important probabilistic tools. Despite being a relatively young topic, there are already three textbooks dedicated to Positional Games as well as one invited talk at the International Congress of Mathematicians. During this Mini-Workshop, several new exciting developments in the field were presented and discussed. We have also made some progress towards solving various open problems in Positional Games Theory and related areas.

Participants
Antoniuk, Sylwia (Poznań), Balogh, Jozsef (Urbana), Bednarska-Bzdega, Malgorzata (Poznań), Clemens, Dennis (Hamburg), Ferber, Asaf (Cambridge), Hefetz, Dan (Ariel), Krivelevich, Michael (Tel Aviv), Kronenberg, Gal (Tel Aviv), Lamaison, Ander (Berlin), Luczak, Tomasz (Poznań), Mond, Adva (Ramat Aviv, Tel Aviv), Müller, Tobias (Groningen), Nenadov, Rajko (Zürich), Pokrovskiy, Alexey (London), Stojakovic, Milos (Novi Sad), Szabó, Tibor (Berlin), Tiba, Marius (Cambridge)

30.09. – 06.10.2018
Organizers:

Asymptotic Invariants of Homogeneous Ideals
Thomas Bauer, Marburg
Susan Cooper, Manitoba
Brian Harbourne, Lincoln
Justyna Szpond, Krakow

Abstract
Recent decades have witnessed a shift in interest from isolated objects to families of objects and their limit behavior, both in algebraic geometry and in commutative algebra. A series of various invariants have been introduced in order to measure and capture asymptotic properties of various algebraic objects motivated by geometrical ideas. The major goals of this workshop were to refine these asymptotic ideas, to articulate unifying themes, and to identify the most promising new directions for study in the near future. We expect the ideas discussed and originated during this workshop to be poised to have a broad impact beyond the areas of algebraic geometry and commutative algebra.

Participants
Bauer, Thomas (Marburg), Bocci, Cristiano (Siena), Cooper, Susan M. (Winnipeg), Farnik, Lucja (Warszawa), Grifo, Eloisa (Ann Arbor), Guardo, Elena (Catania), Hanumanthu, Krishna (Kelambakkam), Harbourne, Brian (Lincoln), Huizenga, Jack (University Park), Juhnke-Kubitzke, Martina (Osnabrück), Schmitz, David (Bayreuth), Seceleanu, Alexandra (Lincoln), Szemberg, Tomasz (Kraków), Szpond, Justyna (Kraków), Tohaneanu, Stefan (Moscow), Tutaj-Gasinska, Halszka (Kraków), Xie, Yu (Chester)

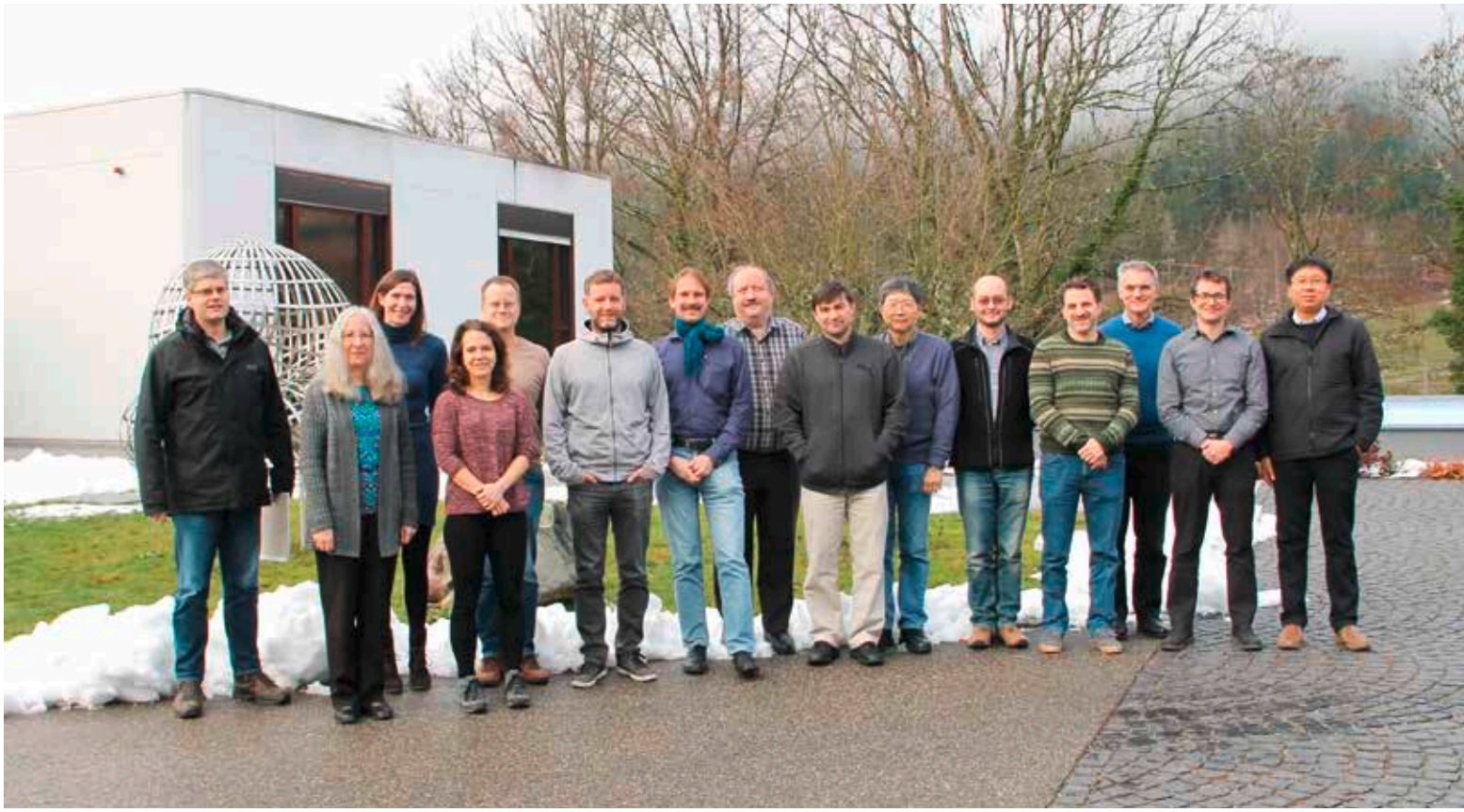
30.09. – 06.10.2018

Algebraic, Geometric, and Combinatorial Methods in Frame Theory

Organizers: Emily J. King, Bremen
Christopher Manon, Lexington
Dustin G. Mixon, Columbus
Cynthia Vinzant, Raleigh

Abstract
Frames are collections of vectors in a Hilbert space which have reconstruction properties similar to orthonormal bases and applications in areas such as signal and image processing, quantum information theory, quantization, compressed sensing, and phase retrieval. Further desirable properties of frames for robustness in these applications coincide with structures that have appeared independently in other areas of mathematics, such as special matroids, Gel'Fand-Zetlin polytopes, and combinatorial designs. Within the past few years, the desire to understand these structures has led to many new fruitful interactions between frame theory and fields in pure mathematics, such as algebraic and symplectic geometry, discrete geometry, algebraic combinatorics, combinatorial design theory, and algebraic number theory. These connections have led to the solutions of several open problems and are ripe for further exploration. The central goal of our Mini-Workshop was to attack open problems that were amenable to an interdisciplinary approach combining certain subfields of frame theory, geometry, and combinatorics.

Participants
Bodmann, Bernhard G. (Houston), Burgdorf, Sabine (Konstanz), Edidin, Dan (Columbia), Ehler, Martin (Wien), Fink, Alex (London), Grassl, Markus (Erlangen), Greaves, Gary R.W. (Singapore), Hering, Milena (Edinburgh), Iverson, Joey (Ames), Jasper, John (Brookings), King, Emily J. (Bremen), Manon, Christopher (Lexington), Mixon, Dustin G. (Columbus), Needham, Tom (Columbus), Shonkwiler, Clayton (Fort Collins), Vinzant, Cynthia (Raleigh), Waldron, Shayne (Auckland)



16.12. – 22.12.2018 **Numerical Analysis for Non-Smooth PDE-Constrained Optimal Control Problems**

Organizers: Susanne C. Brenner, Baton Rouge
Dmitriy Leykekhman, Storrs
Boris Vexler, Garching

Abstract
Modern real-life applications, such as optimal control of mechanical systems and identification of parameters in environmental processes, lead to optimization problems governed by systems of partial differential equations (PDEs). Finite element methods are by far the most popular choices for approximating such problems numerically. The theory of error analysis and convergence is fairly mature for smooth elliptic and parabolic problems. However, the theory of non-smooth PDE-constrained optimal control problems is far from complete. This Mini-Workshop brought together leading experts working on various aspects of numerical analysis for optimal control problems with nonsmoothness. Topics discussed included problems with nonsmooth/nonlinear/novel constraints, problems with nonsmooth objective functions, problems with nonsmooth solutions, novel discretizations, and fast solvers.

Participants
Apel, Thomas (Neubiberg), Brenner, Susanne C. (Baton Rouge), Chrysafinos, Konstantinos (Athens), Draganescu, Andrei (Baltimore), Gedicke, Joscha (Wien), Gong, Wei (Beijing), Leykekhman, Dmitriy (Groton), May, Sandra (Dortmund), Meyer, Christian (Dortmund), Neitzel, Ira (Bonn), Pfefferer, Johannes (Garching bei München), Pieper, Konstantin (Tallahassee), Rösch, Arnd (Essen), Sung, Li-yeng (Baton Rouge), Wachsmuth, Daniel (Würzburg), Wollner, Winnifried (Darmstadt)

16.12. – 22.12.2018

Innovative Trends in the Numerical Analysis and Simulation of Kinetic Equations

Organizers:
José A. Carrillo, London
Martin Frank, Karlsruhe
Jingwei Hu, West Lafayette
Lorenzo Pareschi, Ferrara

Abstract
In multiscale modeling hierarchy, kinetic theory plays a vital role in connecting microscopic Newtonian mechanics and macroscopic continuum mechanics. As computing power grows, numerical simulation of kinetic equations has become possible and undergone rapid development over the past decade. Yet the unique challenges arising in these equations, such as highdimensionality, multiple scales, random inputs, positivity, entropy dissipation, etc., call for new advances of numerical methods. This Mini-Workshop brought together both senior and junior researchers working on various fastpaced growing numerical aspects of kinetic equations. The topics include, but were not limited to, uncertainty quantification, structure-preserving methods, phase transitions, asymptotic-preserving schemes, and fast methods for kinetic equations.

Participants
Carrillo de la Plata, José Antonio (London), Cerfon, Antoine (New York), Chacon, Luis (Los Alamos), Dimarco, Giacomo (Ferrara), Filbet, Francis (Toulouse), Frank, Martin (Eggenstein-Leopoldshafen), Hiptmair, Ralf (Zürich), Hu, Jingwei (West Lafayette), Jin, Shi (Shanghai Shi), Klar, Axel (Kaiserslautern), Li, Qin (Madison), Ma, Zheng (West Lafayette), Pareschi, Lorenzo (Ferrara), Rey, Thomas (Villeneuve-d'Ascq), Russo, Giovanni (Catania), Wang, Li (Buffalo), Zanella, Mattia (Torino)

16.12. – 22.12.2018

Mathematical and Numerical Analysis of Maxwell's Equations

Organizers:
Monique Dauge, Rennes
Ulrich Langer, Linz
Peter Monk, Newark
Dirk Pauly, Essen

Abstract

In this Mini-Workshop 17 leading mathematicians from Europe and United States met at the MFO to discuss and present new developments in the mathematical and numerical analysis of Maxwell's equations and related systems of partial differential equations. Maxwell's equations of electrodynamics are of huge importance in mathematical physics, engineering, and especially in mathematics, leading since their discovery to interesting mathematical problems and even to new fields of mathematical research, particularly in the analysis and numerics of partial differential equations and applied functional analysis. The deep understanding of Maxwell's equations and the possibility of their numerical solution in complex geometries and different settings have led to very efficient and robust simulation methods in Computational Electromagnetics. Moreover, efficient simulation methods pave the way for optimizing electromagnetic devices and processes. Digital communication and e-mobility are two fields where simulation and optimization techniques that are based on Maxwell's equations play a deciding role.

Participants

Alonso Rodriguez, Ana (Povo), Bonnet-Ben Dhia, Anne-Sophie (Palaiseau), Costabel, Martin (Rennes), Dauge, Monique (Rennes), Gopalakrishnan, Jay (Portland), Imbert-Gérard, Lise-Marie (College Park), Langer, Ulrich (Linz), Monk, Peter (Newark), Nicaise, Serge (Valenciennes), Osterbrink, Frank (Essen), Pauly, Dirk (Essen), Perugia, Ilaria (Wien), Picard, Rainer (Dresden), Schöberl, Joachim (Wien), Valli, Alberto (Povo), Waurick, Marcus (Glasgow), Winther, Ragnar (Oslo)

2.5. Simons Visiting Professors

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

Veronica Becher, Buenos Aires
Workshop 1802: Computability Theory
Host: Delia Kesner, Paris

Andre O. Nies, Auckland
Workshop 1802: Computability Theory
Host: Katrin Tent, Münster

Daniel C. Cohen, Baton Rouge
Workshop 1803: Topology of Arrangements and Representation Stability
Host: Eva-Maria Feichtner, Bremen

Ruriko Yoshida, Monterey
Workshop 1804: Statistics for Data with Geometric Structure
Host: Stephan Huckemann, Göttingen

Mick G. Roberts, Auckland
Workshop 1808: Design and Analysis of Infectious Disease Studies
Host: Hans Heesterbeek, Utrecht

Thomas Hillen, Edmonton
Workshop 1809: The Mathematics of Mechanobiology and Cell Signaling
Host 1: Mark Chaplain, St. Andrews
Host 2: Kevin Painter, Edinburgh

Paul Balmer, Los Angeles
Miniworkshop 1810a: Chromatic Phenomena and Duality in Homotopy Theory and Representation Theory
Host: Tobias Barthel, Kobenhavn

Yihong Wu, New Haven
Workshop 1811: Statistical Inference for Structured High-dimensional Models
Host: Alexandre B. Tsybakov, Malakoff

Raman Parimala, Atlanta
Workshop 1818: Quadratic Forms and Related Structures over Fields
Host: Anne Quéguiner-Mathieu, Villetaneuse

Ae Ja Yee, University Park
Workshop 1820: Enumerative Combinatorics
Host: Christian Krattenthaler, Wien

Colin Ingalls, Ottawa
Workshop 1822: Interactions between Algebraic Geometry and Noncommutative Algebra
Host: Eleonore Faber, Leeds

James Zhang, Seattle
Workshop 1822: Interactions between Algebraic Geometry and Noncommutative Algebra
Host 1: Toby Stafford, Manchester
Host 2: Ken A. Brown, Glasgow

Ailana M. Fraser, Vancouver
Workshop 1824: Geometrie
Host: Elvira Mascolo, Firenze

Samit Dasgupta, Santa Cruz
Workshop 1826: Algebraische Zahlentheorie
Host: Guido Kings, Regensburg

2.5. Simons Visiting Professors

The following researchers combined their stay in Oberwolfach with a research visit to a European University, supported by the Simons Foundation.

Joseph Harris, Cambridge
Workshop 1829: Classical Algebraic Geometry
Host: Gavril Farkas, Berlin

Gregory Galloway, Coral Gables
Workshop 1832: Mathematical General Relativity
Host: Carla Cederbaum, Tübingen

Feng Rong, Shanghai
Workshop 1833: Geometric Methods of Complex Analysis
Host: John Erik Fornaess, Trondheim

Ivan Yotov, Pittsburgh
Workshop 1835: Reactive Flows in Deformable, Complex Media
Host 1: Florin Adrian Radu, Bergen
Host 2: Iuliu Sorin Pop, Diepenbeek

Shinpei Baba, Osaka
Workshop 1836: New Trends in Teichmüller Theory and Mapping Class Groups
Host: Anna Katharina Wienhard, Heidelberg

Subhojoy Gupta, Bengaluru
Workshop 1836: New Trends in Teichmüller Theory and Mapping Class Groups
Host: Anna Katharina Wienhard, Heidelberg

Weixu Su, Shanghai
Workshop 1836: New Trends in Teichmüller Theory and Mapping Class Groups
Host: Athanase Papadopoulos, Strasbourg

Hubert Lacoin, Rio de Janeiro
Workshop 1837: Scaling Limits in Models of Statistical Mechanics
Host: Cyril Labbe, Ceremade

Jayadev S. Athreya, Seattle
Workshop 1838: Flat Surfaces and Algebraic Curves
Host: Francois Labourie, Nice

Shigeru Kondo, Osaka
Workshop 1839: Differential Equations arising from Organising Principles in Biology
Host: Jenny Wiklund, Djursholm

Krisha Hanumanthu, Kelambakkam
Miniworkshop 1840b: Asymptotic Invariants of Homogeneous Ideals
Host: Justyna Szpond, Krakow

Shayne Waldron, Auckland
Miniworkshop 1840c: Algebraic, Geometric, and Combinatorial Methods in Frame Theory
Host: Leonard Peter Bos, Verona

Pedro Morin, GLN Santa Fe
Workshop 1843: Computational Engineering
Host: Eberhard Bänsch, Erlangen

Thirupathi Gudi, Bengaluru
Workshop 1843: Computational Engineering
Host 1: Gerhard Starke, Duisburg-Essen
Host 2: Carsten Carstensen, Berlin
Host 3: Dietmar Gallistl, Enschede

Joseph M. Landsberg, College Station
Workshop 1846: Complexity Theory
Host: Jaroslav Buczynski, Warzsawa

Luca Trevisan, Berkeley
Workshop 1846: Complexity Theory
Host: Albert Atserias, Barcelona

Christof Geiss, Mexico
Workshop 1848: Enveloping Algebras and Geometric Representation Theory
Host: Bernard Leclerc, Caen

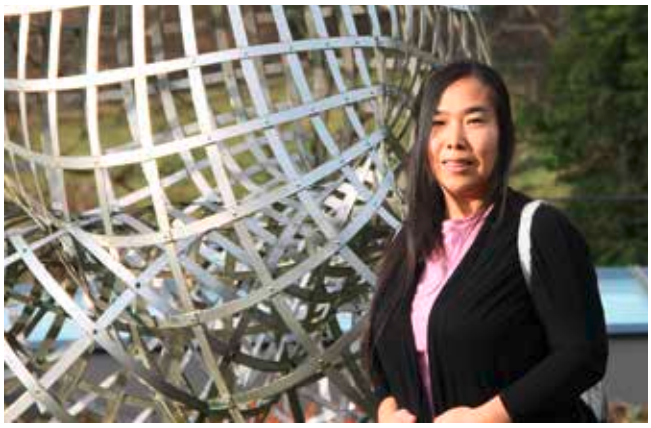
Octavio Arizmendi, Guanajuato
Workshop 1849: Free Probability Theory
Host: Roland Speicher, Saarbrücken

James A. Mingo, Kingston
Workshop 1849: Free Probability Theory
Host: Roland Speicher, Saarbrücken

Elisabeth Werner, Cleveland
Workshop 1850: Convex Geometry and its Applications
Host: Monika Ludwig, Wien

Andrei Draganescu, Baltimore
Miniworkshop 1851a: Mathematical and Numerical Analysis of Maxwell's Equations
Host: Liviu Marin, Bucharest

D. C. Cohen



R. Yoshida

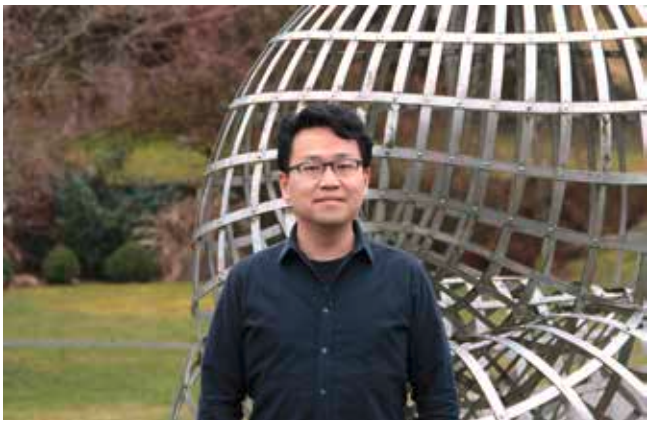
V. Becher

M. G. Roberts

A. O. Nies

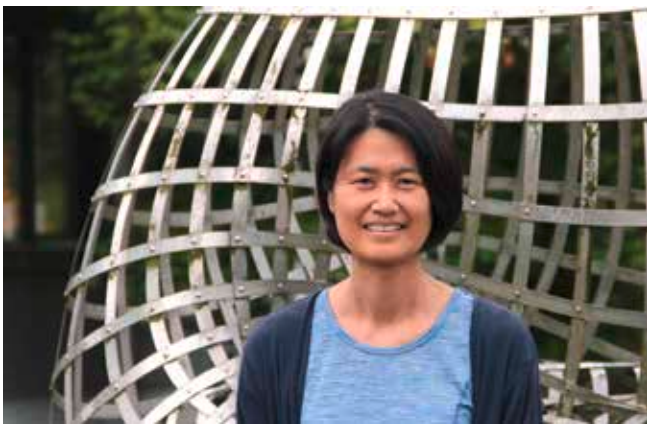
T. Hillen

P. Balmer



Y. Wu

R. Parimala



A. J. Yee

C. Ingalls

J. Zhang

A. M. Fraser

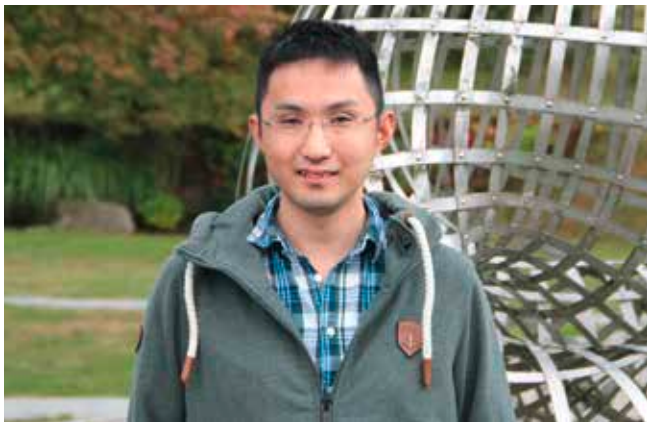
S. Dasgupta

J. Harris

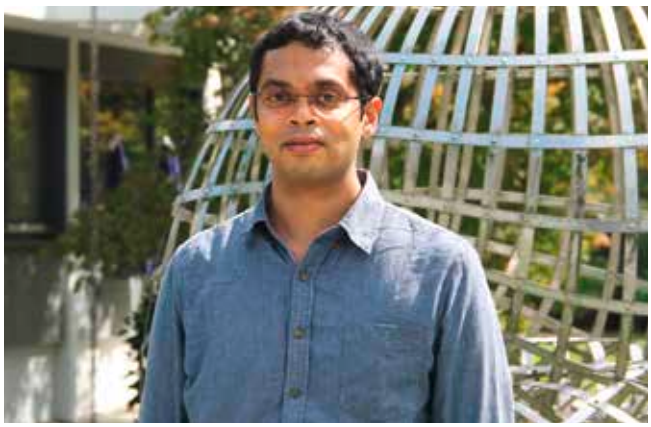
G. Galloway

F. Rong

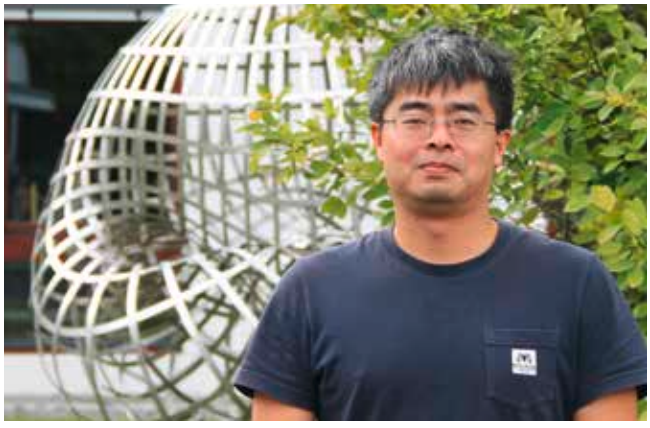
I. Yotov



S. Baba

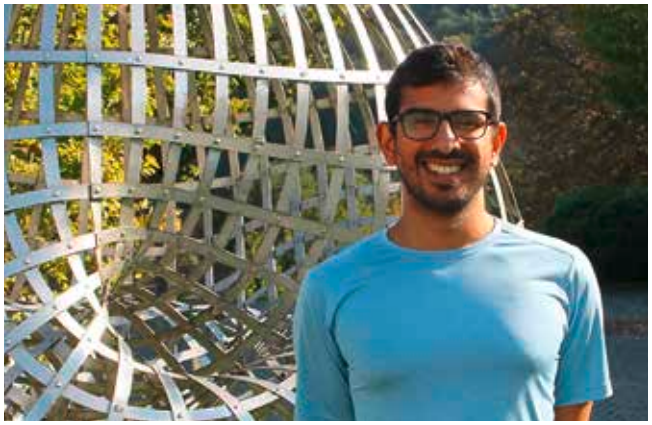


S. Gupta



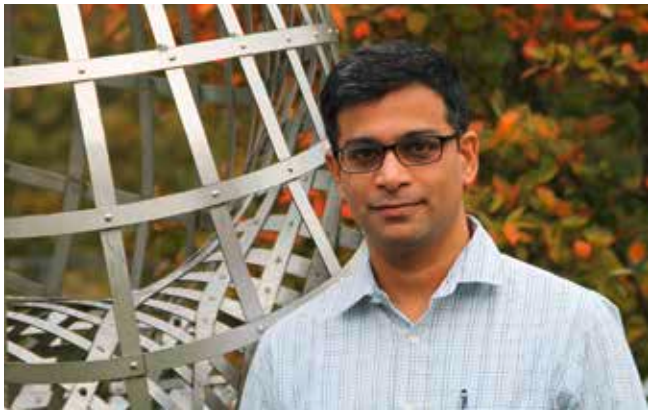
W. Su

H. Lacoin



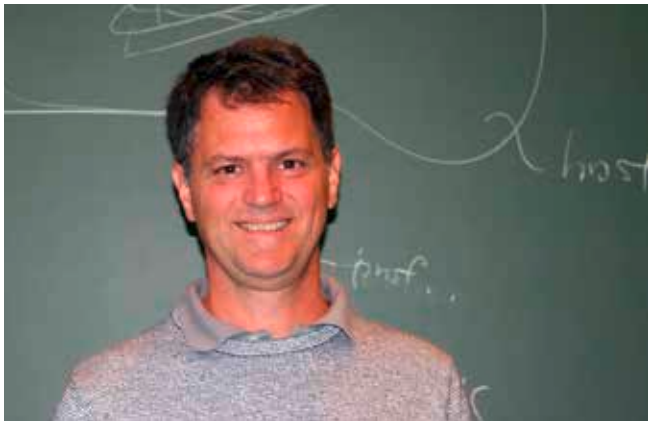
J. S. Athreya

S. Kondo

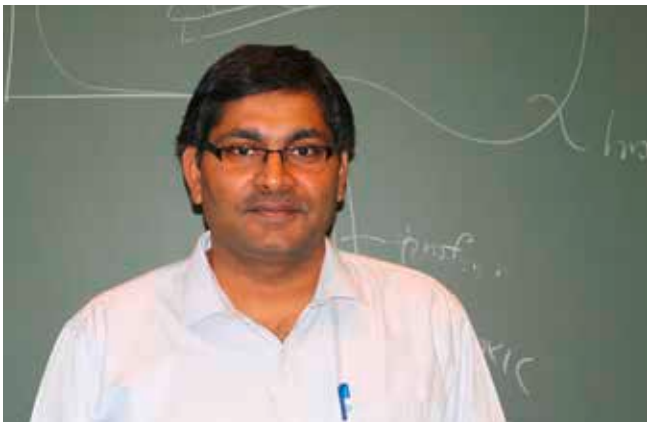


K. Hanumanthu

S. Waldron

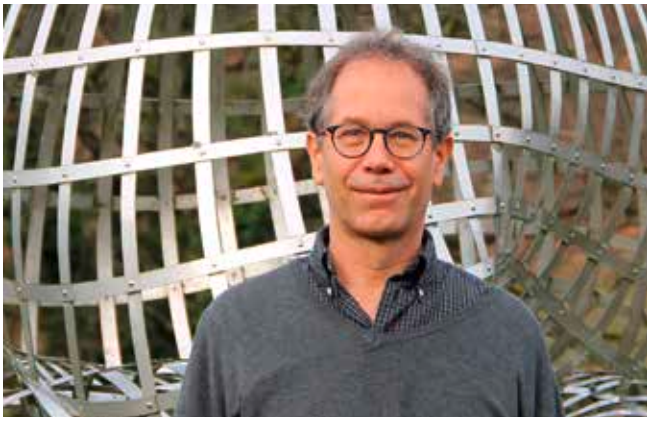


P. Morin



T. Gudi

L. Trevisan



C. Geiss

O. Arizmendi

J. A. Mingo

E. Werner

A. Draganescu

2.6. Arbeitsgemeinschaften

Arbeitsgemeinschaft 1814

01.04. – 07.04.2018 **Topological Cyclic Homology**
Organizers: Lars Hesselholt, Copenhagen
Peter Scholze, Bonn

Abstract
Introduced by Bökstedt-Hsiang-Madsen in the nineties, topological cyclic homology is a manifestation of the dual visions of Connes-Tsygan and Waldhausen to extend de Rham cohomology to a noncommutative setting and to replace algebra by higher algebra. The cohomology theory that ensues receives a denominator-free Chern character from algebraic K-theory, used by Hesselholt-Madsen to evaluate the p-adic K-theory of p-adic fields. More recently, Bhatt-Morrow-Scholze have defined a "motivic" filtration of topological cyclic homology and its variants, the filtration quotients of which give rise to their denominator-free p-adic Hodge theory $A\Omega$.

Participants
Achinger, Piotr (Warszawa), Angeltveit, Vigleik (Canberra), Anschütz, Johannes (Bonn), Ariotta, Stefano (Bonn), Barthel, Tobias (København), Bohmann, Anna Marie (Nashville), Cesnavicius, Kestutis (Orsay), Darrell, Micah (Chicago), Deninger, Christopher (Münster), Dotto, Emanuele (Bonn), Dundas, Björn Ian (Bergen), Elmanto, Elden (Evanston), Fjeldgren Rischel, Eigil (København), Gao, Hui (Helsinki), Geisser, Thomas H. (Tokyo), Gepner, David J. (West Lafayette), Gill, Montek S. (Ann Arbor), Gurney, Lance (Amsterdam), Hamann, David (Bonn), Hebestreit, Fabian (Bonn), Hedenlund, Alice (Oslo), Hesselholt, Lars (Nagoya), Höning, Eva (Bonn), Hsiang, Wu-Chung (Palo Alto), Konovalov, Andrei (Moscow), Krause, Achim (Bonn), Land, Markus (Regensburg), Le Bras, Arthur-César (Paris), Leip, Malte (København), Li, Shizhang (New York), Lindenstrauss, Ayelet (Bloomington), Liu, Ruochuan (Beijing), McCandless, Jonas (København), Min, Yu (Paris), Miyazaki, Hiroyasu (Paris), Nekrasov, Ilia (St. Petersburg), Nikolaus, Thomas (Münster), Niziol, Wieslawa (Lyon), Patchkoria, Irakli (Bonn), Patrikis, Stefan (Salt Lake City), Petrov, Aleksandr (Cambridge), Ponto, Kathleen (Lexington), Porta, Mauro (Strasbourg), Quigley, James D. (Notre Dame), Raskin, Sam (Chicago), Rognes, John (Oslo), Rülling, Kay (Berlin), Scholze, Peter (Bonn), Speirs, Martin Patrick (København), Stahl, Joseph M. (Berkeley), Steinebrunner, Jan (Oxford), Sulyma, Yuri (Austin), Tabuada, Goncalo (Cambridge), Vologodsky, Vadim (Eugene), Wang, Guozhen (Shanghai Shi), Yuan, Allen (Cambridge), Zakharevich, Inna (Ithaca), Zhu, Yifei (Shenzhen)

07.10. – 12.10.2018 **Rigidity of Stationary Measure**

Organizers: Yves Benoist, Paris
Jean-Francois Quint, Bordeaux

Abstract

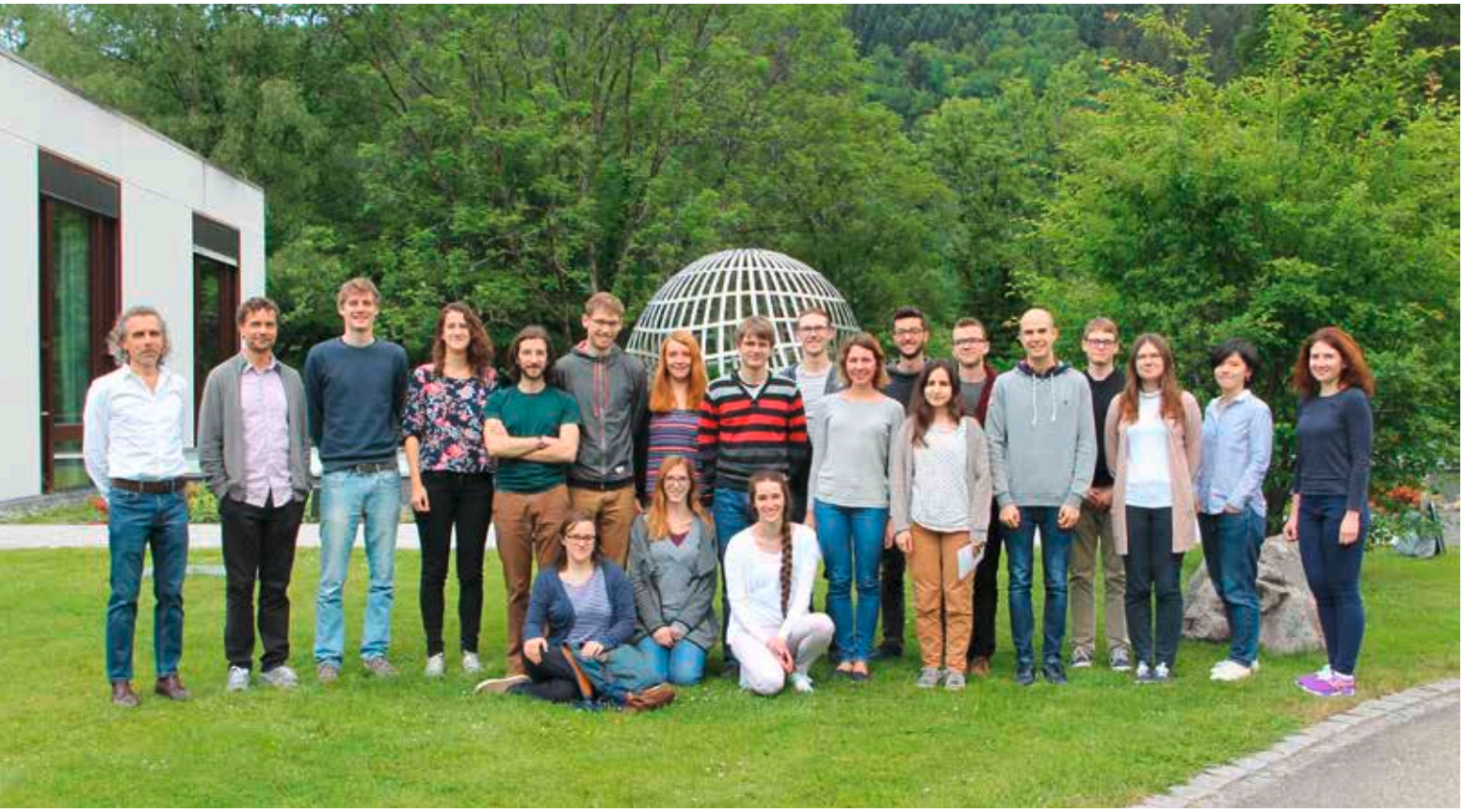
The aim of this Arbeitsgemeinschaft was to understand the classification of stationary measures for semisimple random walks on a finite volume homogeneous space and its applications. The meeting was attended by 56 participants. Most of them were working on a topic related to the conference: Ergodic Theory, Dynamical Systems, Fractals, Random walks, Group Theory or Number Theory. The Arbeitsgemeinschaft comprised 21 lectures and two evening discussion sessions where participants could ask and answer basic questions.

Participants

Alam, Mahbub (Mumbai), Bajpai, Jitendra (Göttingen), Bandi, Prasuna (Mumbai), Batsis, Alexandros (Manchester), Bénard, Timothée (Paris), Benoist, Yves (Orsay), Bersudsky, Michael (Haifa), Blayac, Pierre-Louis (Paris), Boyer, Adrien (Rehovot), Bruce, Catherine (Manchester), Calderon, Irving (Orsay), Chung, Nhan-Phu (Suwon), Chung, Ping Ngai (Chicago), Datta, Shreyasi (Mumbai), Dayan, Yiftach (Ramat Aviv, Tel Aviv), de Saxcé, Nicolas (Villetaneuse), DeWitt, Jonathan Alexander (Chicago), Dodds, Samuel (Chicago), Dufloux, Laurent (Oulu), Faltings, Gerd (Bonn), Finkelshtein, Filya (Göttingen), Fisher, Nate (Medford), Fraczyk, Mikolaj (Budapest), González Robert, Gerardo (Aarhus), He, Weikun (Jerusalem), Howroyd, Douglas Charles (St. Andrews), Katz, Asaf (Chicago), Kempton, Tom M. W. (Manchester), Khayutin, Ilya (Princeton), Kirsebom, Maxim Solund (Hamburg), Kozma, Robert Thijs (Chicago), Kuessner, Thilo (Augsburg), Lakrec, Tsviqa (Jerusalem), Lee, Homin (Bloomington), Lee, Seul Bee (Seoul), Li, Jialun (Talence), Lifschitz, Lucy (Norman), Lim, Seonhee (Seoul), Mallahi-Karai, Keivan (Bremen), Masbaum, Gregor (Paris), Petri, Bram (Bonn), Pham, Lam (New Haven), Quint, Jean-Francois (Talence), Ramirez, Felipe A. (Middletown), Rühr, Rene (Ramat Aviv, Tel Aviv), Sanchez, Anthony (Seattle), Sargent, Oliver (Rehovot), Sert, Cagri (Zürich), Shchetka, Ekaterina (St. Petersburg), Shi, Ruxi (Amiens), Takahashi, Yuki (Ramat-Gan), Tal, Matan (Jerusalem), Yu, Han (St. Andrews)

2.7. Oberwolfach Seminare

Oberwolfach Seminar 1821a



20.05. – 26.05.2018 **Statistical Inference for Complex Data: Random Matrices, Random Functions and Geometry and Topology**

Organizers: Alexander Aue, Davis
Wolfgang Polonik, Davis

Abstract
The seminar provided an introduction to statistical inference for modern complex data structures with a special focus on: (1) Random matrix theory applications in statistics, in particular the asymptotic characterization of the eigenvalues of sample covariance matrices in the highdimensional regime and their practical use; (2) functional data analytic methods, in particular the use of Hilbert space and linear operator theory and their application to functional time series prediction and estimation; (3) topological data analysis, in particular how feature extraction can be performed with the persistent homology and how topological features can be used to build methods for statistical inference, (4) emphasizing the connection between topological data analysis and geometric approaches to statistical analysis, using Morse theory.

Participants
Aue, Alexander (Davis), Cvetkovic, Nada (Berlin), Ebli, Stefania (Genève), Egas Santander, Daniela (Lausanne), Elsener, Andreas (Zürich), Finocchio, Gianluca (Leiden), Gusakova, Anna (Bielefeld), Lebid, Viktoriia (Kyiv), London, András (Szeged), Mösching, Alexandre (Bern), Müller, Marilena (Heidelberg), Olkhovskaya, Julia (Barcelona, Catalonia), Ortelli, Francesco (Zürich), Polonik, Wolfgang (Davis), Rademacher, Daniel Constantin (Braunschweig), Schluttenhofer, Sandra (Heidelberg), Schötz, Christof (Heidelberg), Strähl, Christof (Bern), Turin, Riccardo (Milano), Velona, Vasiliki (Barcelona, Catalonia), Yu, Yi (Bristol)

20.05. – 26.05.2018 **Spectral Estimates on Noncompact Manifolds and Applications to Geometry**

Organizers: Nadine Große, Freiburg
Luciano Mari, Pisa
Ben Sharp, Leeds

Abstract
The seminar focused on the following topics: (1) Basics: Laplace, Schrödinger and Dirac operators with special focus on noncompact manifolds, geometry of submanifolds and immersions, introduction to the spectral theory of compact minimal hypersurfaces. (2) Techniques to study the spectrum on noncompact manifolds: Rayleigh-Ritz and minmax, Radialization, Heat kernels and Green functions, decay estimates for embedded eigenvalues, conditions for discreteness of spectra/ half lines in the essential spectra/ existence of spectral gaps. (3) Applications: Geometric implications to immersions/ submanifold theory: index estimates and harmonic forms, spectral stability and topology of manifolds, weak compactness of closed minimal hypersurfaces under spectral bounds, (non-) existence results for geometric semilinear PDEs, e.g. Yamabe-type equations.

Participants
Aino, Masayuki (Nagoya), Amann, Marius (Freiburg i. Br.), Antonelli, Gioacchino (Pisa), Assimos Martins, Renan (Leipzig), Castro Infantes, Jesús (Granada), de Freitas Pessoa, Leandro (Teresina), Driscoll, Joe (Leeds), Fornasin, Nelvis (Freiburg i. Br.), Franz, Giada (Pisa), Große, Nadine (Freiburg i. Br.), Jeßberger, Julius (Freiburg i. Br.), Lye, Jorgen Olsen (Freiburg i. Br.), Mari, Luciano (Pisa), Marque, Nicolas (Paris), Murro, Simone (Freiburg i. Br.), Ramos Olivé, Xavier (Riverside), Schulz, Mario B. (Zürich), Sharp, Ben G. (Leeds), Wu, Ruijun (Leipzig), Zergaenge, Norman (Coventry)

14.10. – 20.10.2018 **Optimal Transport Theory and Hydrodynamics (from Euler to Monge and vice versa)**

Organizers: Yann Brenier, Paris
Mikaela Iacobelli, Durham
Filippo Santambrogio, Orsay

Abstract
Optimal transport theory is a very successful field of mathematics connecting calculus of variations, probability theory, differential geometry, partial differential equations, functional analysis, statistics and computer sciences. Going back to Monge around 1780, this theory has deep connections with the earlier work of Euler on Hydrodynamics around 1750. This connection has recently known a strong revival on many different sides, leading to various non trivial generalizations of the concept of optimal transport. Three examples were covered in the seminar: (1) Continuous multimarginal optimal transport problems (Euler equations, models of congestion, sprays...) and their close relationship with the mean-field game theory introduced by Lasry and Lions about 10 years ago; (2) Entropic regularization of the mass transport problem (started by Schrödinger in the late 30s) and its recent generalization to Hydrodynamics; (3) Kinetic formulation of the Euler equations as a model of optimal incompressible transport. During the week, tutorials on optimal transport, Euler equations and fluid dynamics were held, starting from a crash course on the very first day.

Participants
Baradat, Aymeric (Palaiseau), Brenier, Yann (Paris), Cavagnari, Giulia (Pavia), Ceci, Stefano (Münster), Daus, Esther (Wien), Doemeland, Marco (Aachen), Domazakis, Georgios (Athens), Feydy, Jean (Cachan), Iacobelli, Mikaela (Durham), Kamtue, Supanat (Durham), Kroshnin, Aleksei (Moscow), Lavenant, Hugo (Orsay), Lehmann, Tobias (Leipzig), Lisai, Stefania (Edinburgh), Natale, Andrea (Paris), O'Neill, Tom (Guildford), Ozanski, Wojciech (Coventry), Portinale, Lorenzo (Klosterneuburg), Rigoni, Chiara (Bonn), Rott, Eva-Maria (Garching bei München), Santambrogio, Filippo (Villeurbanne), Sarrazin, Clement (Ivry-sur-Seine), Sattig, Gabriel (Leipzig), Schmidtchen, Markus (London), Xia, Mingchen (Göteborg)

14.10. – 20.10.2018 **Mathematics of Deep Learning**

Organizers: Gitta Kutyniok, Berlin
Philipp Grohs, Wien

Abstract

Despite the outstanding success of deep learning in real-world applications, most of the related research is empirically driven and a mathematical foundation is almost completely missing. At the same time, those methods have already shown their impressive potential in mathematical research areas such as imaging sciences, inverse problems, or numerical analysis of partial differential equations. Recently, theoretical research aiming to derive a fundamental understanding of different aspects of deep learning such as expressibility, generalization, identifiability, and learning as well as improving current methodologies has been intensified. Summarizing, deep learning is a rich research area, touching various areas of mathematics and posing an exciting challenge to mathematicians. This seminar was intended to provide an introduction to the current state-of-the-art in the mathematical analysis of deep learning algorithms.

Participants

Alfke, Dominik (Chemnitz), Baines, Weston (College Station), Blechschmidt, Jan (Chemnitz), del Razo Sarmina, Mauricio J. (Berlin), Drory, Amnon (Tel Aviv), Elbrächter, Dennis (Wien), Farchmin, Nando (Berlin), Gambara, Matteo (Zürich), Glas, Silke (Ulm), Grohs, Philipp (Wien), Hinz, Peter (Zürich), Kivaranovic, Danijel (Wien), Kümmerle, Christian (Garching bei München), Lunz, Sebastian (Cambridge), Macdonald, Jan (Berlin), Malthaner, Ryan (College Station), Naisat, Gregory (Chicago), Neufeld, Ariel (Zürich), Petersen, Philipp Christian (Oxford), Reisenhofer, Rafael (Bremen), Sheng, Jun-Da (Davis), Thesing, Laura (Cambridge), Trunschke, Philipp (Berlin), von Lindheim, Johannes (Berlin), Weber, David (Davis), Weber, Melanie (Princeton)

18.11. – 24.11.2018 **Syntomic Cohomology and p-adic Hodge Theory**

Organizers: Wieslawa Niziol, Lyon
Bruno Chiarellotto, Padua
Pierre Colmez, Paris

Abstract

The seminar provided an introduction to syntomic cohomology and its applications with a special focus on: (1) Syntomic cohomology of good and semistable reduction varieties, syntomic cohomology over a field, definitions, and basic properties; (2) regulators, syntomic realizations of motives, comparison theorems for motives; (3) syntomic cohomology and p-adic nearby cycles, construction of the period morphism, proof of the semistable comparison isomorphism; (4) computation of (pro)-étale cohomology of rigid analytic spaces via syntomic cohomology, analytic curves, general Stein spaces; (5) étale cohomology of coverings of Drinfeld half-plane and its relation to p-adic local Langlands correspondence; (6) étale cohomology of Drinfeld half-spaces of arbitrary dimension.

Participants

Anschütz, Johannes (Bonn), Antolini, Dario (Roma), Chiarellotto, Bruno (Padova), Colmez, Pierre (Paris), Dospinescu, Gabriel (Lyon), Ertl, Veronika (Regensburg), Gilles, Sally (Lyon), Junger, Damien (Lyon), Kufner, Han-Ung (Regensburg), Le Bras, Arthur-César (Bonn), Min, Yu (Paris), Nakada, Yukihide (Padova), Niziol, Wieslawa (Lyon), Recktenwald, René (Freiburg i. Br.), Rodrigues Jacinto, Joaquin (London), Sprang, Johannes (Regensburg), Vanhaecke, Arnaud (Paris), Vetere, Elmiro (Freiburg i. Br.), Wang, Shanwen (Shanghai Shi), Wang, Yupeng (Beijing), Yan, Qijun (Beijing), Yao, Zijian (Cambridge), Zhou, Yiwen (Chicago)

18.11. – 24.11.2018
Organizers:

Character Formulas for Reductive Algebraic Groups
Pramod Achar, Baton Rouge
Simon Riche, Aubière
Laura Rider, Athens

Abstract
This Oberwolfach Seminar was an introduction to modern representation theory of reductive algebraic groups over fields of positive characteristic, mainly from the geometric point of view. In particular, we introduced the *p*-canonical basis of Hecke algebras (after Williamson) and emphasized its use in the study of character formulas for simple representations and indecomposable tilting modules.

Participants
Achar, Pramod N. (Baton Rouge), Bannuscher, Falk (Bochum), Bonala, Narasimha Chary (Bonn), Chatterjee, Tamanna (Baton Rouge), Fabroni, Claudio (Roma), Fintzen, Jessica (Cambridge), Gao, Yang (Shanghai Shi), Gouttard, Valentin (Aubière), Gruchot, Maike (Bochum), Hardesty, William D. (Baton Rouge), Jensen, Thorge (Aubière), Ko, Hankyung (Bonn), Kowalenko, Ethan (Riverside), Litterick, Alastair James (Bochum), Maltoni, Leonardo (Paris), McDonnell, Benjamin (Freiburg i. Br.), Riche, Simon (Aubière), Rider, Laura (Athens), Samokhin, Alexander (Bures-sur-Yvette), Sanmarco, Guillermo (Córdoba), Scheinmann, Nathan (Lausanne), Shu, Cheng (Paris), Tolmachov, Kostiantyn (Toronto), Topley, Lewis (Canterbury), Zaccanelli, Giovanni (Freiburg i. Br.)

2.8. Fortbildungsveranstaltungen/Training weeks

Trainings- und Abschluss-Seminar für die Internationale Mathematik-Olympiade 1820a

13.05. – 19.05.2018 **Trainings- und Abschluss-Seminar für die Internationale Mathematik-Olympiade**

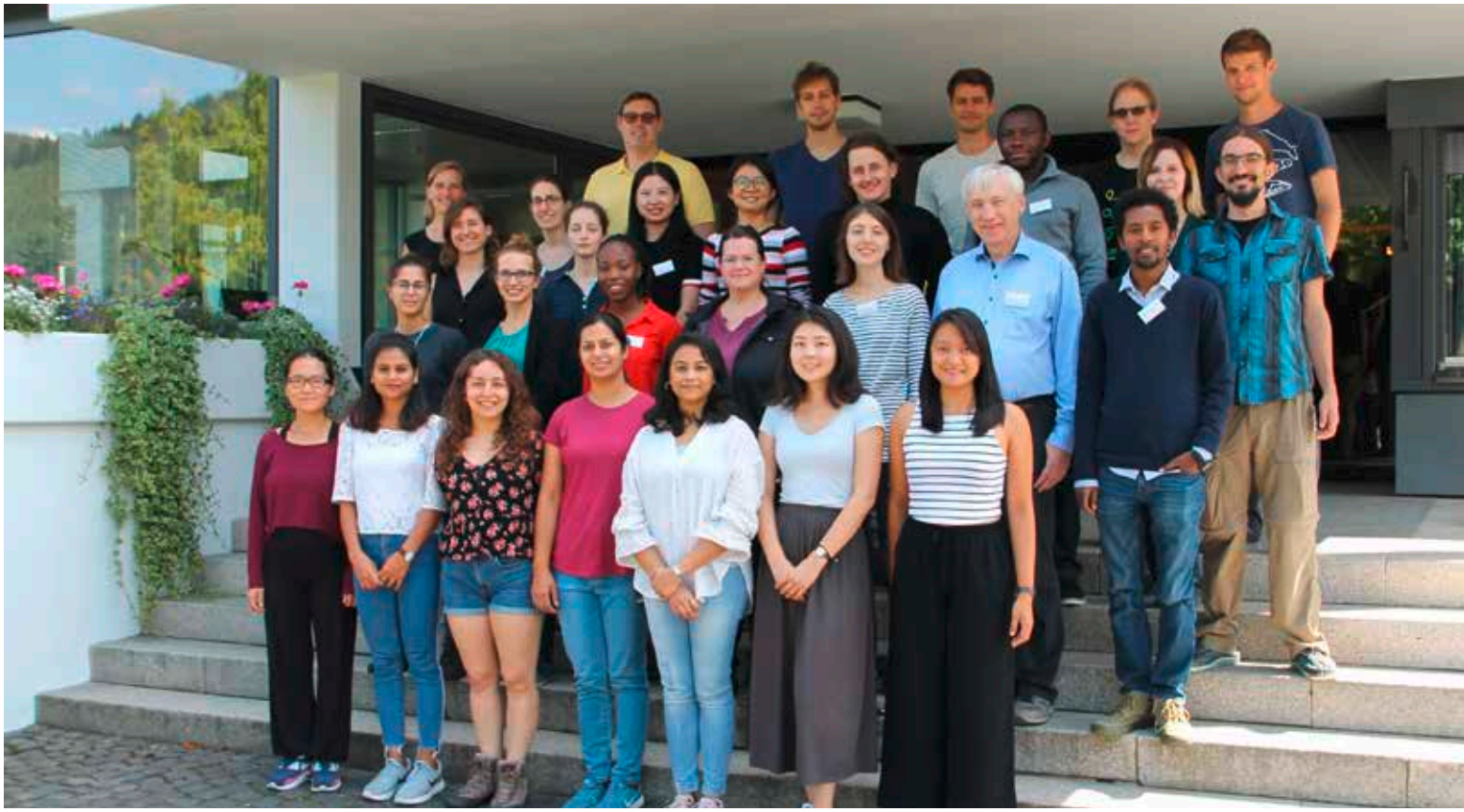
Organizer: Jürgen Prestin, Lübeck

Abstract

The Institute hosted again the annual final training week for especially gifted German pupils to prepare for the International Mathematical Olympiad.

Participants

Armbruster, Alexander (Unterhaching), Becker, Lars (Rüsselsheim), Bielser, Kerrin (Hamburg), Börger, Christoph (Hamburg), Chen, Raymond (Geisenheim), Fröhlich, Benedikt (Nabburg), Fronhöfer, Christoph (Landshut), Göbel, Maximilian (Geisenheim), Groß, Lukas Finn (Essen), Heinemann, Elias (Neufahrn), Hesse, Male (Stolzenau), Holstermann, Jan (Warendorf), Keßler, Maximilian (Espluges de Llobregat), Lange, Christian (Erlangen), Müller, Paul (Grevenbroich), Walter, Jonas (Rostock)



03.09. – 07.09.2018 **Statistical Modeling and Data Analysis**

Organizers:
Clara Happ, München
Jörg Polzehl, Berlin
Heidi Seibold, München
Almond Stöcker, München
Alexandra Suvorikova, Potsdam

Abstract

Experimental or observational data of high or infinite dimensionality are getting common in institutes of all sections of the Leibniz Association. This creates an increasing demand for adequate modern data analysis techniques. At the same time reproducibility of experiments and their statistical analyses lead to new requirements for good scientific practice and requests for open source and open science. Both topics have been addressed in a way that provides knowledge transfer from mathematical and applied statistics into the various scientific communities and helps to develop skills in R programming, statistical modeling and reproducible data analysis. Conceptually, the Summer School was problem-oriented and the program included both lectures, as well as programming training session in the afternoons.

Participants

Abobi, Seth Mensah (Bremen), Alas, Honey Down (Leipzig), Beier, Felicitas (Potsdam), Breitwieser, Jasmin (Frankfurt a. M.), Cao, Xueqi (Jena), Cheng, Lan (Bremen), Czarnecki, Jerry (Kühlungsborn), Gamov, Ivan (Berlin), Hajizadeh, Aida (Magdeburg), Happ, Clara (München), Huang, Jing (Jena), Huber, Nicolas (Jena), Kebede, Mihiretu (Bremen), Keshri, Nandita (Potsdam), Murray-Watters, Alexander (Mannheim), Ntsoane, Makgafele Lucia (Potsdam), Pathak, Namrata (Potsdam), Petersen, Malte (Frankfurt a. M.), Polzehl, Jörg (Berlin), Saxena, Pankhuri (Göttingen), Schacke, Stephan (Jena), Seibold, Heidi (München), Senff, Paula (Bremen), Stöcker, Almond (München), Suvorikova, Alexandra (Potsdam), Urbicht, Marie (Berlin), Willenbücher, Katharina (Potsdam), Yurt, Pinar (Göttingen), Zhao, Jiangyue (Leipzig)

2.9. Research in Pairs

Die folgenden Forscherinnen und Forscher nahmen 2018 am Research in Pairs Programm teil:

Alexander D. Bendikov, Wroclaw Adrien Boyer, Rehovot Christophe Pittet, Marseille	07.01. – 20.01.2018
Peter Cholak, Notre Dame Damir D. Dzhafarov, Storrs Denis R. Hirschfeldt, Chicago Ludovic Patey, Villerbanne	14.01. – 20.01.2018
Siegfried Beckus, Haifa Jean V. Bellissard, Atlanta Giuseppe De Nittis, Santiago de Chile	14.01. – 03.02.2018
Robert Downey, Wellington NZ Alexander Melnikov, Auckland Keng Meng Ng, Singapore	14.01. – 20.01.2018
Eveliina Peltola, Geneva Hao Wu, Beijing	21.01. – 10.02.2018
Juhan Aru, Zürich Jean-Christophe Mourrat, Lyon	21.01. – 03.02.2018
Yoav Moriah, Haifa Jennifer Schultens, Davis	04.02. – 17.02.2018
Karl Heinrich Hofmann, Darmstadt Linus Kramer, Münster	04.02. – 24.02.2018
Robert Altmann, Augsburg Christoph Zimmer, Berlin	04.02. – 17.02.2018
Eusebio Gardella, Münster Martino Lupini, Pasadena	11.02. – 24.02.2018
Vincent Bruneau, Talence Georgi Dimitrov Raikov, Santiago de Chile	18.02. – 03.03.2018
André Schlichting, Bonn Martin Slowik, Berlin	18.02. – 24.02.2018
Mikhail Ignatyev, Samara Alexey Petukhov, Moscow	25.02. – 17.03.2018
Tommasa Ruggeri, Bologna Masaru Sugiyama, Nagoya	04.03. – 17.03.2018
Jürgen Herzog, Essen Raheleh Jafari, Teheran Abbas Nasrollah Nejad, Zanjan	11.03. – 07.04.2018
Jürgen Appell, Würzburg Daria Bugajewska, Poznan Piotr Kasprzak, Poznan Simon Marius Reinwand, Würzburg	18.03. – 31.03.2018
Nathan Broomhead, Plymouth David Pauksztello, Verona David Ploog, Berlin Jonathan Woolf, Liverpool	08.04. – 21.04.2018
Ernst P. Stephan, Hannover Thanh Tran, Sydney	08.04. – 21.04.2018
Claudia Klüppelberg, München Ercan Sönmez, Düsseldorf	08.04. – 21.04.2018

The following researchers attended the Research in Pairs program in 2018:

Goulwen Fichou, Rennes Adam Parusinski, Nice Yimu Yin, Santa Monica	22.04. – 05.05.2018
Andrei Moroianu, Orsay Uwe Semmelmann, Stuttgart	29.04. – 12.05.2018
Steffen Lauritzen, Copenhagen Caroline Uhler, Cambridge MA Piotr Zwiernik, Barcelona	06.05. – 19.05.2018
Kathrin Flaßkamp, Bremen Sina Ober-Blöbaum, Oxford Karl Worthmann, Ilmenau	13.05. – 26.05.2018
Joseph Chuang, London Andrey Lazarev, Lancaster	20.05. – 02.06.2018
Claudia Polini, Notre Dame Bernd Ulrich, West Lafayette	27.05. – 09.06.2018
Alla Detinko, St. Andrews Dane Flannery, Galway Alexander Hulpke, Fort Collins	03.06. – 23.06.2018
Eleonore Faber, Leeds Colin J. Ingalls, Ottawa	03.06. – 16.06.2018
Antoine Marnat, Heslington Nikolai Moshchevitin, Moscow	03.06. – 16.06.2018
Kenji Iohara, Villeurbanne Gustav I. Lehrer, Sydney Ruibin Zhang, Sydney	17.06. – 30.06.2018
Jeremy Blanc, Basel Ivan Cheltsov, Edinburgh Alexander Duncan, Columbia Yuri Prokhorov, Moscow	24.06. – 07.07.2018
Annie Millet, Paris Marta Sanz-Solé, Barcelona	24.06. – 07.07.2018
Goncalo dos Reis, Edinburgh Mario Maurelli, Berlin Julian Tugaut, Saint-Etiènne	24.06. – 07.07.2018
Arkadyi Berenstein, Eugen Vladimir Rethak, Piscataway	08.07. – 28.07.2018
Toshiyuki Kobayashi, Tokyo Birgit Speh, Ithaca	29.07. – 11.08.2018
Rajendra v. Gurjar, Mumbai Kayo Masuda, Sanda Masayoshi Miyanishi, Sanda	05.08. – 01.09.2018
Marc Masdeu, Barcelona Bharathwaj Palvannan, Philadelphia Chris Williams, London	12.08. – 25.08.2018
Thomas Mikosch, Copenhagen Olivier Wintenberger, Paris	19.08. – 01.09.2018
Jacek Bochnak, Romainmotier Wojciech Kucharz, Krakow	02.09. – 22.09.2018
George C. Hsiao, Newark Wolfgang Wendland, Stuttgart	09.09. – 06.10.2018

Urtzi Buijs, Malaga
Yves Félix, Louvain-la-Neuve
Daniel Tanré, Villeneuve d'Ascq 16.09. – 29.09.2018

J. Matthew Douglass, Alexandria
Götz Pfeiffer, Galway
Gerhard Röhrle, Bochum 23.09. – 06.10.2018

Tobias Hurth, Lausanne
Konstantin Khanin, Toronto
Beatriz Navarro Lameda, Toronto 23.09. – 06.10.2018

Alberto Grünbaum, Berkeley
Ignacio Zurrian, Cordoba 07.10. – 20.10.2018

Alex Bartel, Glasgow
Aurel Page, Bordeaux 14.10. – 03.11.2018

Christian Stump, Berlin
Hugh R. Thomas, Montreal
Nathan Williams, Dallas 14.10. – 27.10.2018

Karin Erdmann, Oxford
Andrzej Skowronski, Torun 14.10. – 27.10.2018

Michel Balazard, Marseille
Bruno Martin, Calais 21.10. – 03.11.2018

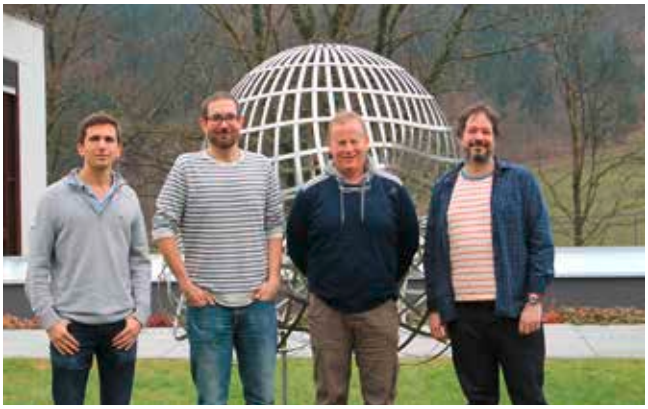
Aryampilly J. Parameswaran, Mumbai
Mihai Tibar, Villeneuve d'Ascq 04.11. – 17.11.2018

Edward L. Green, Blacksburg
Oyvind Solberg, Trondheim
Sibylle Schroll, Leicester
Dan Zacharia, Syracuse 04.11. – 17.11.2018

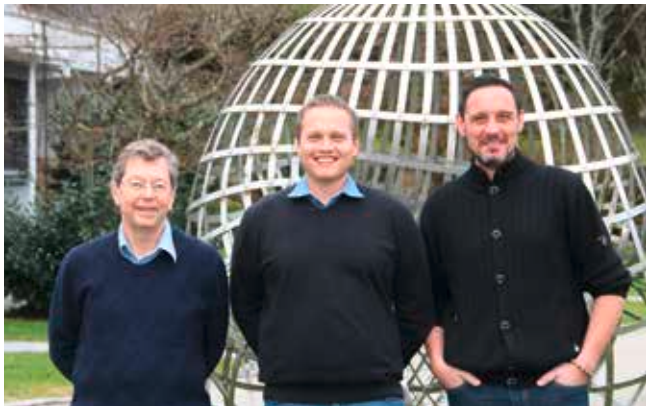
Javier Falcó, Valencia
Paul Gauthier, Montréal
Myrto Manolaki, Dublin
Vassili Nestoridis, Athens 18.11. – 08.12.2018

Heiko Dietrich, Clayton
Primoz Moravec, Ljubljana 02.12. – 15.12.2018

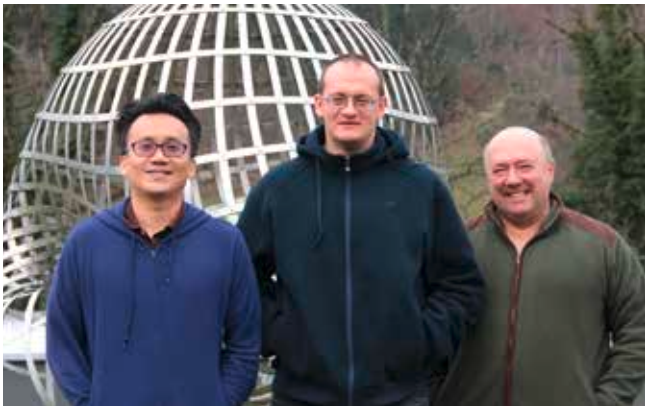
A. Boyer, C. Pittet, A. D. Bendikov



L. Patey, D. D. Dzhafarov, P. Cholak, D. R. Hirschfeldt



J. V. Bellissard, S. Beckus, G. De Nittis

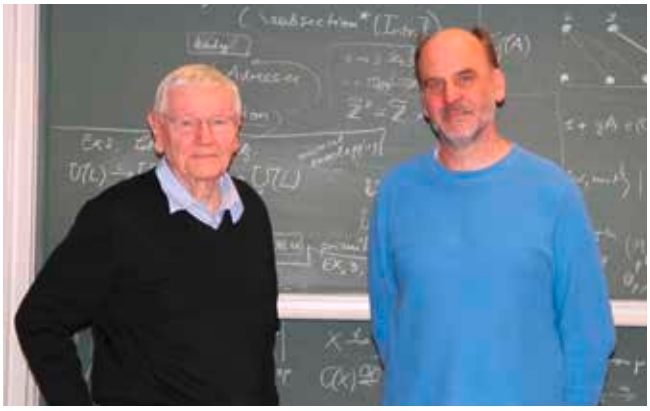


K. M. Ng, A. G. Melnikov, R. Downey

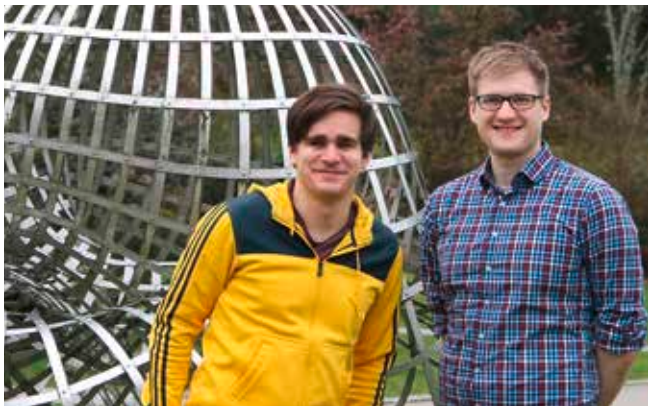
E. Peltola, H. Wu

J.-C. Mourrat, J. Aru

J. Schultens, Y. Moriah

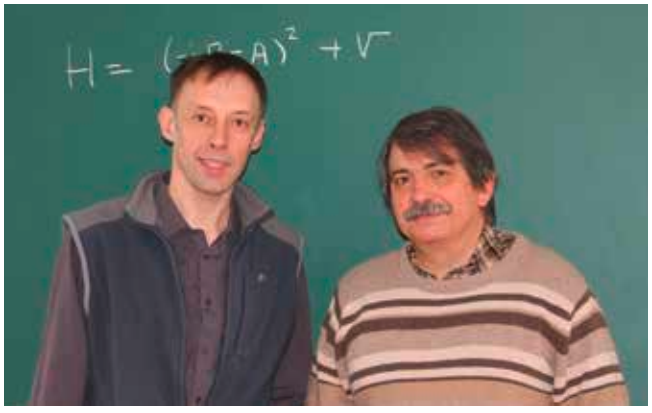


K. H. Hofmann, L. Kramer

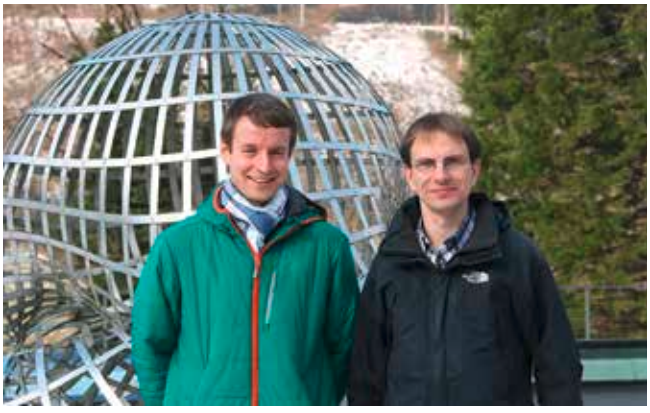


C. Zimmer, R. Altmann

E. Gardella, M. Lupini



V. Bruneau, G. D. Raikov



A. Schlichting, M. Slowik

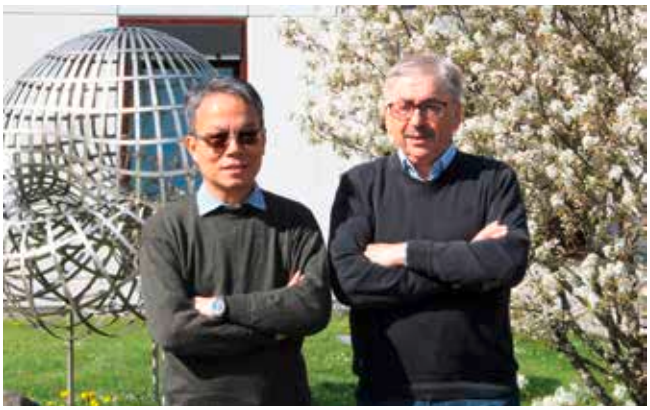
A. Petukhov, M. Ignatyev

M. Sugiyama, T. Ruggeri

A. Nasrollah Nejad, R. Jafari, J. Herzog

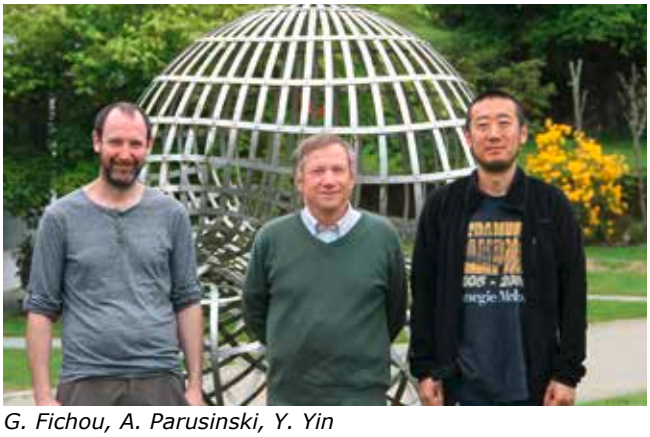
S. M. Reinwand, D. Bugajewska, P. Kasprzak, J. Appell

N. Broomhead, D. Pauksztello, J. Woolf, D. Ploog



T. Tran, E. P. Stephan

C. Klüppelberg, E. Sönmez

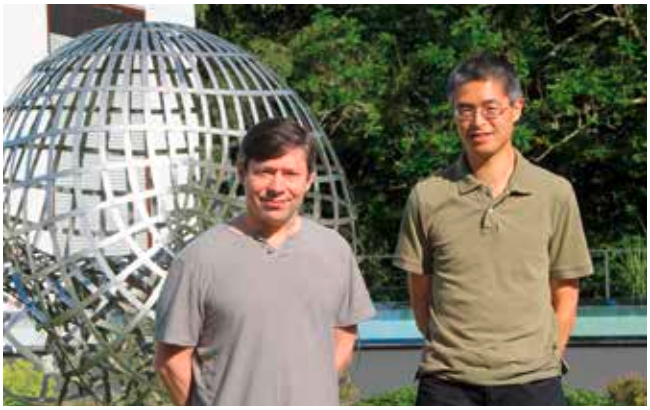


G. Fichou, A. Parusinski, Y. Yin

A. Moroianu, U. Semmelmann

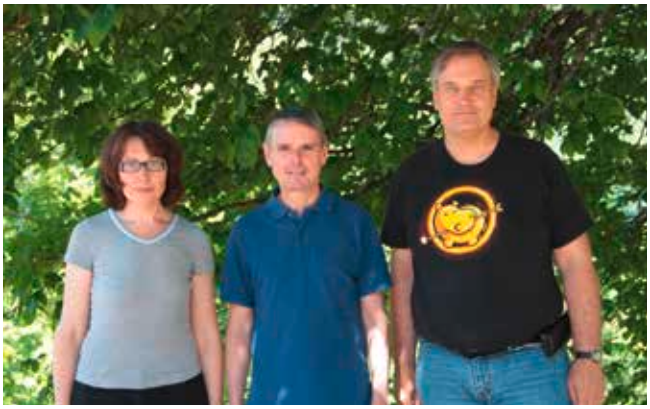
P. Zwiernik, S. Lauritzen, C. Uhler

S. Ober-Blöbaum, K. Flaßkamp, K. Worthmann



A. Lazarev, J. Chuang

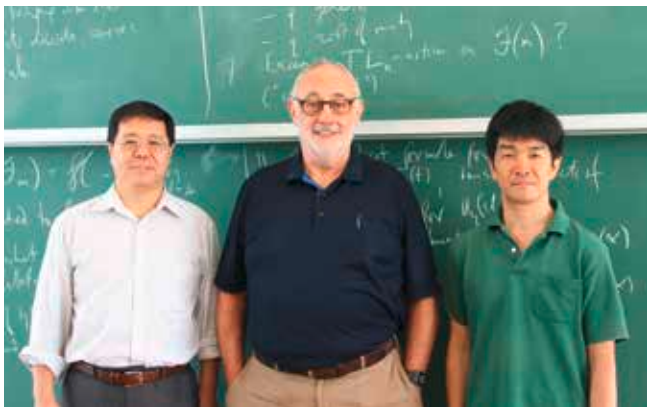
C. Polini, B. Ulrich



A. Detinko, D. Flannery, A. Hulpke

E. Faber, C. Ingalls

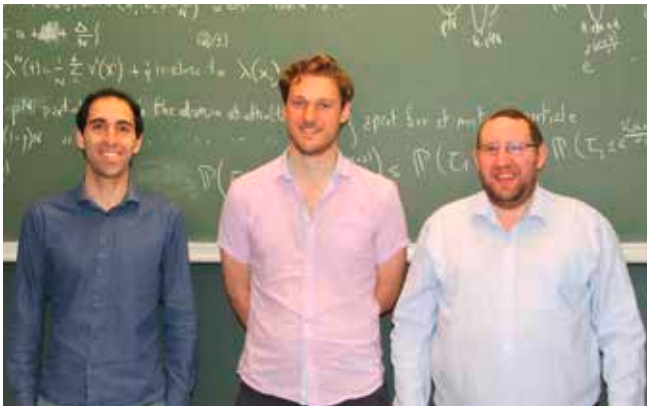
A. Marnat, N. Moshchevitin



R. Zhang, G. I. Lehrer, K. Iohara

A. R. Duncan, J. Blanc, I. Cheltsov, Y. Prokhorov

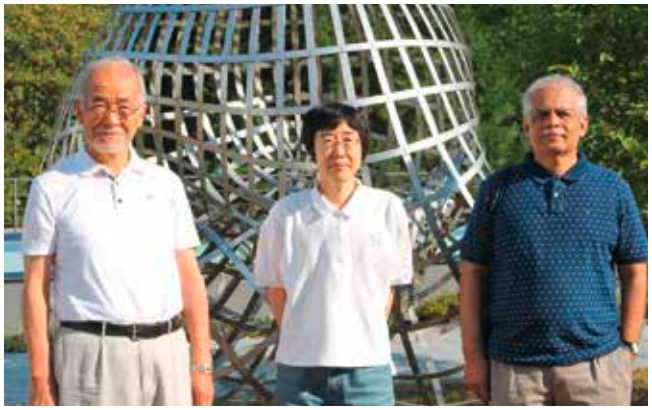
A. Millet, M. Sanz-Solé



M. Maurelli, G. dos Reis, J. Tugaut

A. Berenstein, V. Retakh

T. Kobayashi, B. Speh



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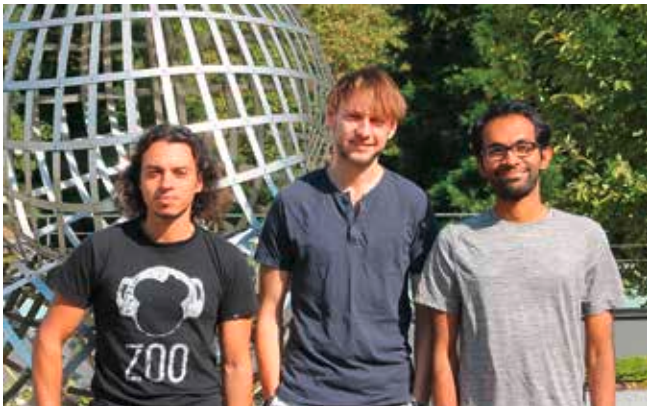
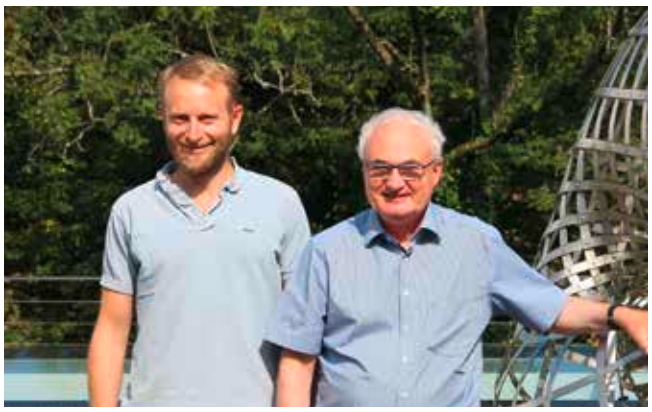


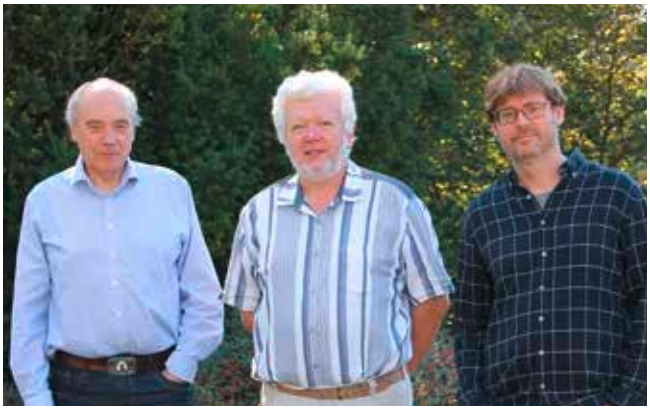
M. Masdeu, C. Williams, B. Palvannan



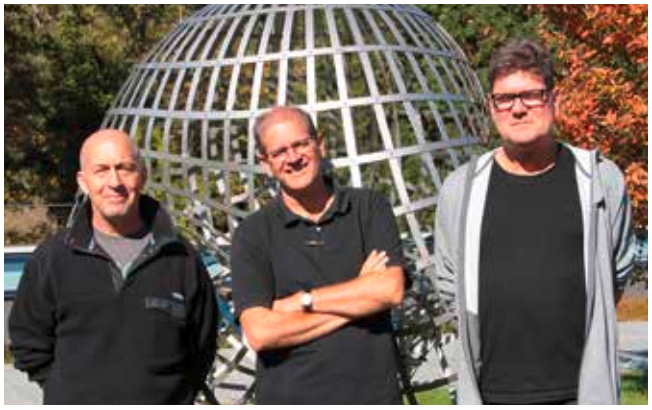
O. Wintenberger, T. Mikosch

W. Kucharz, J. Bochnak

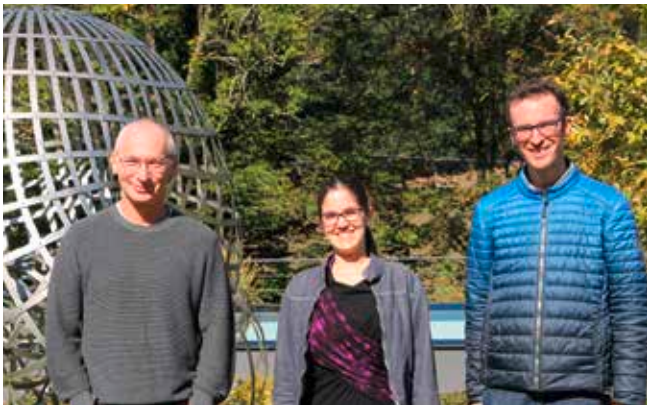
G. C. Hsiao, W. Wendland



D. Tanré, Y. Félix, U. Buijs

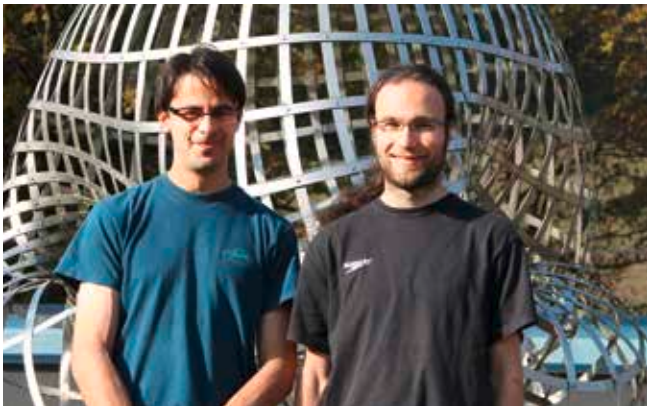


J. M. Douglass, G. Röhrle, G. Pfeiffer



K. M. Khanin, B. Navarro Lameda, T. Hurth

A. Grünbaum, I. Zurrian



A. Bartel, A. Page

C. Stump, H. R. Thomas, N. F. Williams

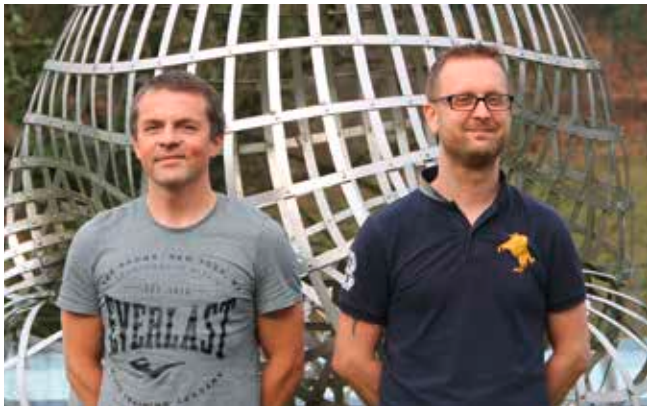
K. Erdmann, A. Skowronski

B. Martin, M. Balazard

M. Tibar, A. J. Parameswaran

D. Zacharia, S. Schroll, E. L. Green, O. Solberg

V. Nestoridis, M. Manolaki, P. Gauthier, J. Falcó



P. Moravec, H. Dietrich

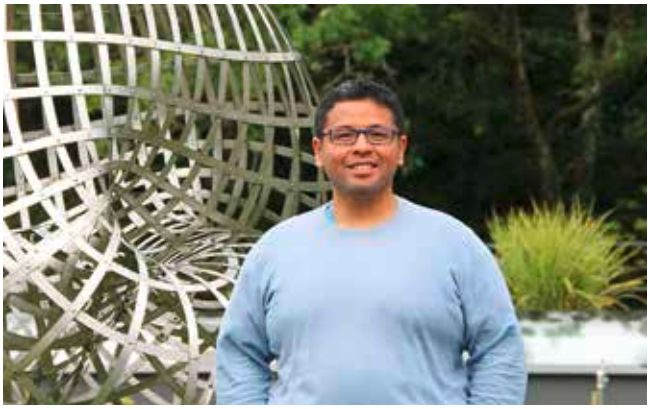
2.10. Oberwolfach Leibniz Fellows

Im Rahmen des Nachwuchsförderprogramms Oberwolfach Leibniz Fellows verbrachten die folgenden Personen im Jahr 2018 einen Forschungsaufenthalt in Oberwolfach:

Hery Randriamaro (Antananarivo)	06.01. – 17.03.2018
Carina Geldhauser (St. Petersburg)	07.01. – 07.04.2018
external guest researchers:	
Artem Pulemotov (Brisbane)	20.01. – 23.01.2018
Marco Romito (Pisa)	04.02. – 10.02.2018
Susanna Dann (Wien)	21.01. – 17.02.2018
external guest researcher:	
Andreas Bernig (Frankfurt)	12.02. – 14.02.2018
Yi-Sheng Wang (Freiburg)	21.01. – 21.04.2018
Lleonard Rubio y Degrassi (London)	25.02. – 28.04.2018
Ariyan Javanpeykar (Mainz)	29.04. – 26.05.2018
external guest researchers:	
Philipp Licht (Mainz)	13.05. – 18.05.2018
Matthias Nickel (Frankfurt)	13.05. – 19.05.2018
Jaqueline Godoy Mesquita (Brasilia)	29.04. – 26.05.2018
Valentijn Karemaker (Philadelphia)	10.06. – 30.06.2018
Jonathan Montano (Lawrence)	24.06. – 28.07.2018
external guest researchers:	
Carles Bivià-Ausina (Valencia)	24.06. – 30.06.2018
Claudia Polini (Notre Dame)	01.07. – 07.07.2018
Hailong Dao (Lawrence)	09.07. – 14.07.2018
Jack Jeffries (Ann Arbor)	21.07. – 28.07.2018
Valentijn Karemaker (Philadelphia)	15.07. – 21.07.2018
Valentijn Karemaker (Philadelphia)	29.07. – 04.08.2018
external guest researcher:	
Irene Bouw (Ulm)	29.07. – 30.07.2018
Jaqueline Godoy Mesquita (Brasilia)	02.09. – 29.09.2018

Within the program for junior researchers, Oberwolfach Leibniz Fellows, the following persons spent a research stay in Oberwolfach in the year 2018:

Lleonard Rubio y Degrassi (London)	09.09. – 06.10.2018
Rafael López Soriano (Granada)	25.09. – 15.12.2018
external guest researchers:	
Luca Battaglia (Roma)	13.10. – 20.10.2018
Aleks Jevnikar (Pisa)	05.11. – 10.11.2018
David Ruiz (Granada)	15.11. – 19.11.2018
Andrey O. Krutov (Moscow)	30.09. – 21.12.2018
external guest researchers:	
Dimitry Leites (Stockholm)	25.11. – 02.12.2018
Réamonn O'Buachalla (Bruxelles)	03.12. – 15.12.2018
Karen Strung (Nijmegen)	12.12. – 15.12.2018
Valentijn Karemaker (Philadelphia)	09.12. – 21.12.2018
external guest researcher:	
Francesca Balestrieri (Bonn)	08.12. – 15.12.2018

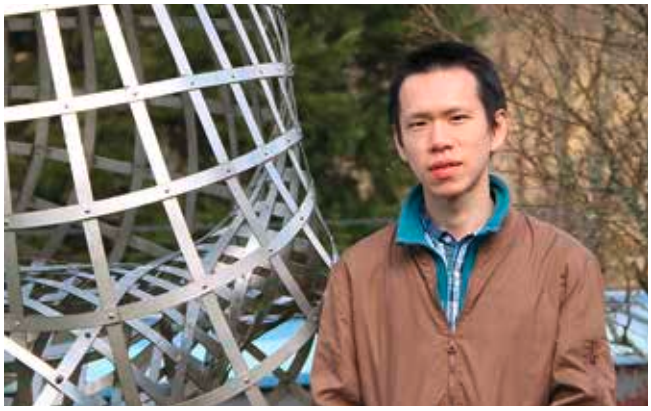


H. Randriamaro

C. Geldhauser, A. Pulemotov

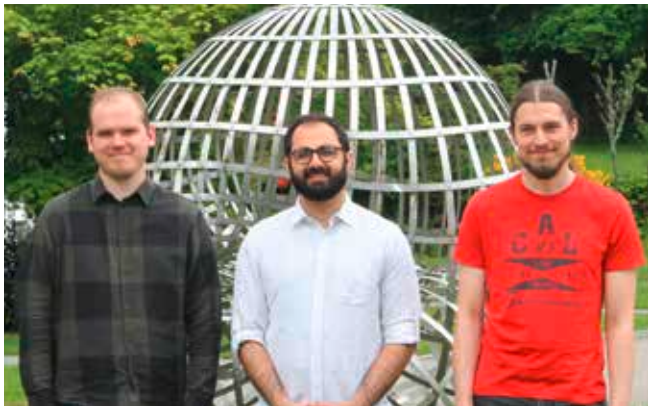
M. Romito, C. Geldhauser

S. Dann



Y.-S. Wang

L. Rubio y Degrassi



M. Nickel, A. Javanpeykar, P. Licht

J. Godoy Mesquita

I. Bouw, V. Karemaker

F. Balestrieri, V. Karemaker

H. Dao, J. Montano

J. Jeffries, J. Montano

J. Montano, C. Bivià-Ausina

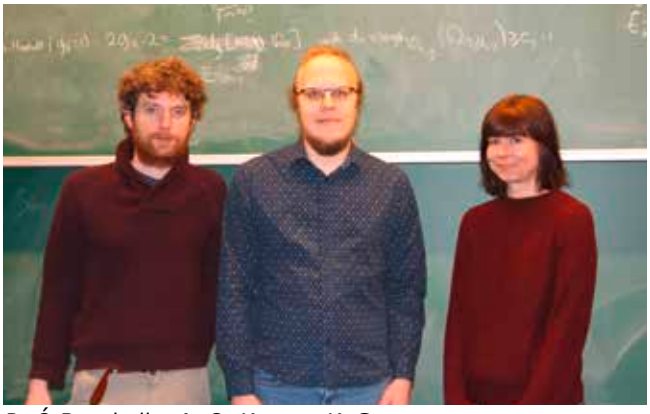
C. Polini, J. Montano

R. López Soriano, L. Battaglia

R. López Soriano, A. Jevnikar

R. López Soriano, D. Ruiz

A. O. Krutov, D. Leites



R. Ó Buachalla, A. O. Krutov, K. Strung

2.11. Publikationen 2018

Das MFO unterstützt die Idee von Open Access. Daher sind alle Publikationen auf der Webseite www.mfo.de elektronisch frei verfügbar (mit Ausnahme der Buchreihe Oberwolfach Seminars bei Springer Nature).

Oberwolfach Reports (OWR)

OWR wird in Zusammenarbeit mit dem Publishing House der EMS veröffentlicht und enthält die Ergebnisse der Workshops, Miniworkshops und Arbeitsgemeinschaften in Form von erweiterten Abstracts der Vorträge. 2018 sind die Bände OWR 15.1 bis 15.4 mit mehr als 3.600 Seiten erschienen.

Oberwolfach Preprints (OWP)

In OWP werden Resultate von längerfristigen Forschungsaufenthalten (RiP und OWLF) publiziert, aber auch von mathematischen Vorträgen am MFO im Rahmen von besonderen Veranstaltungen, z.B. der Oberwolfach Vorlesung. 2018 sind die folgenden Preprints erschienen:

2.11. Publications 2018

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

Oberwolfach Reports (OWR)

OWR is published in cooperation with the EMS publishing house and contains extended abstracts of the talks in the Workshops, Mini-Workshops, and Arbeitsgemeinschaften. In 2018, the issues OWR 15.1 to 15.4 were published with more than 3,600 pages in total.

Oberwolfach Preprints (OWP)

OWP mainly contains research results related to a longer stay in Oberwolfach (RiP and OWLF), but this can also include an Oberwolfach Lecture, for example. The following Preprints were published in 2018:

- Herbrand's Theorem as Higher Order Recursion (OWP-2018-01)
  Afshari, Bahareh; Hetzl, Stefan; Leigh, Graham E.
- Deformation Classification of Real Non-Singular Cubic Threefolds with a Marked Line (OWP-2018-02)
  Finashin, Sergey; Kharlamov, Viatcheslav
- The Martin Boundary of Relatively Hyperbolic Groups with Virtually Abelian Parabolic Subgroups (OWP-2018-03)
  Dussaule, Matthieu; Gekhtman, Ilya; Gerasimov, Victor; Potyagailo, Leonid
- Exceptional Legendrian Torus Knots (OWP-2018-04)
  Geiges, Hansjörg; Onaran, Sinem
- The Sylow Structure of Scalar Automorphism Groups (OWP-2018-05)
  Herfort, Wolfgang; Hofmann, Karl Heinrich; Kramer, Linus; Russo, Francesco G.
- Homogenization of a nonlinear monotone problem with nonlinear Signorini boundary conditions in a domain with highly rough boundary (OWP-2018-06)
  Gaudiello, Antonio; Mel'nyk, Taras A.

- On the Gauss Algebra of Toric Algebras (OWP-2018-07)
  Herzog, Jürgen; Jafari, Raheleh; Nasrollah Nejad, Abbas
- Categorical Linearly Ordered Structures (OWP-2018-08)
  Downey, Rod; Melnikov, Alexander; Ng, Keng Meng
- Max-Linear Models on Infinite Graphs Generated by Bernoulli Bond Percolation (OWP-2018-09)
  Klüppelberg, Claudia; Sönmez, Ercan
- A Well-Posedness Result for Viscous Compressible Fluids with Only Bounded Density (OWP-2018-10)
  Danchin, Raphaël; Fanelli, Francesco; Paicu, Marius
- A Deformed Quon Algebra (OWP-2018-11)
  Randriamaro, Hery
- MOSES: A Streaming Algorithm for Linear Dimensionality Reduction (OWP-2018-12)
  Eftekhari, Armin; Hauser, Raphael A.; Grammenos, Andreas
- The Magic Square of Reflections and Rotations (OWP-2018-13)
  Buchweitz, Ragnar-Olaf; Faber, Eleonore; Ingalls, Colin
- A McKay Correspondence for Reflection Groups (OWP-2018-14)
  Buchweitz, Ragnar-Olaf; Faber, Eleonore; Ingalls, Colin
- An Optimal Bound for the Ratio Between Ordinary and Uniform Exponents of Diophantine Approximation (OWP-2018-15)
  Marnat, Antoine; Moshchevitin, Nikolay
- Metric Connections with Parallel Skew-Symmetric Torsion (OWP-2018-16)
  Cleyton, Richard; Moroianu, Andrei; Semmelmann, Uwe
- Generalized Vector Cross Products and Killing Forms on Negatively Curved Manifolds (OWP-2018-17)
  Barberis, María Laura; Moroianu, Andrei; Semmelmann, Uwe
- Some Results Related to Schiffer's Problem (OWP-2018-18)
  Kawohl, Bernd; Lucia, Marcello
- Affine Space Fibrations (OWP-2018-19)
  Gurjar, Rajendra V.; Masuda, Kayo; Miyanishi, Masayoshi
- Demailly’s Notion of Algebraic Hyperbolicity: Geometricity, Boundedness, Moduli of Maps (OWP-2018-20)
  Javanpeykar, Ariyan; Kamenova, Ljudmila
- On the Invariants of the Cohomology of Complements of Coxeter Arrangements (OWP-2018-21)
  Douglass, J. Matthew; Pfeiffer, Götz; Röhrle, Gerhard
- Computing Congruence Quotients of Zariski Dense Subgroups (OWP-2018-22)
  Detinko, Alla; Flannery, Dane; Hulpke, Alexander
- Real Analyticity is Concentrated in Dimension 2 (OWP-2018-23)
  Bochnak, Jacek; Kucharz, Wojciech
- Global Variants of Hartogs' Theorem (OWP-2018-24)
  Bochnak, Jacek; Kucharz, Wojciech
- Criteria for Algebraicity of Analytic Functions (OWP-2018-25)
  Bochnak, Jacek; Gwoździewicz, Janusz; Kucharz, Wojciech
- Sur le Minimum de la Fonction de Brjuno (OWP-2018-26)
  Balazard, Michel; Martin, Bruno

- Spectral Continuity for Aperiodic Quantum Systems II. Periodic Approximations in 1D (OWP-2018-27)
  Beckus, Siegfried; Bellissard, Jean; De Nittis, Giuseppe
- The Tutte Polynomial of Ideal Arrangements (OWP-2018-28)
  Randriamaro, Hery

Oberwolfach Seminars (OWS)

OWS ist eine Buchreihe in Zusammenarbeit mit Springer Nature, die den Inhalt der Oberwolfach Seminare für den wissenschaftlichen Nachwuchs und interessierte Forscherinnen und Forscher zugänglich macht. 2018 wurde ein Titel publiziert:

Oberwolfach Seminars (OWS)

In order to make the Oberwolfach Seminars available to an even larger audience, the MFO supports the publication within the book series OWS, published in cooperation with Springer Nature. In 2018, one book was published:

- Oberwolfach Seminars Vol. 48: Mathematical Theory of Evolutionary Fluid-Flow Structure Interactions. Kaltenbacher, Barbara; Kukavica, Igor; Lasiecka, Irena; Triggiani, Roberto; Tuffaha, Amjad; Webster, Justin T. (2018)

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 2018 sind insgesamt 15 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. 15 snapshots from distinct mathematical areas have been published in 2018:

- The Algebraic Statistics of an Oberwolfach Workshop (No. 1/2018)
  Seigal, Anna
- Topological recursion (No. 2/2018)
  Sułkowski, Piotr
- Computing with symmetries (No. 3/2018)
  Roney-Dougal, Colva M.
- Prony's method: an old trick for new problems (No. 4/2018)
  Sauer, Tomas
- Topological Complexity, Robotics and Social Choice (No. 5/2018)
  Carrasquel, José; Lupton, Gregory; Oprea, John
- Fast Solvers for Highly Oscillatory Problems (No. 6/2018)
  Barnett, Alex
- Tropical geometry (No. 7/2018)
  Brugallé, Erwan; Itenberg, Ilia; Shaw, Kristin; Viro, Oleg
- The mathematics of aquatic locomotion (No. 8/2018)
  Tucsnak, Marius
- The codimension (No. 9/2018)
  Lerario, Antonio
- Geometry behind one of the Painlevé III differential equations (No. 10/2018)
  Hertling, Claus

- Data assimilation: mathematics for merging models and data (No. 11/2018)
  Morzfeld, Matthias; Reich, Sebastian
- Number theory in quantum computing (No. 12/2018)
  Schönnenbeck, Sebastian
- A short story on optimal transport and its many applications (No. 13/2018)
  Santambrogio, Filippo
- Mixed volumes and mixed integrals (No. 14/2018)
  Rotem, Liran
- Estimating the volume of a convex body (No. 15/2018)
  Baldin, Nicolai

3. Infrastruktur und Finanzen

3.1. 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 (elektronische Publikationen, Datenbanken und mathematische Software), als auch für die weltweite Kommunikation der Forschenden untereinander (Email, Internet und Informationsdienste).

Zur Planung, Durchführung und Begleitung der wissenschaftlichen Programme waren am Institut etwa 22 Stellen in den Bereichen der wissenschaftlichen Verwaltung, Bibliothek, IT-Abteilung, Verwaltungsleitung, 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.

3.2 Bibliothek

Die Bibliothek des MFO ist für die Forschungsgäste in Oberwolfach das wichtigste Arbeitsmittel. Sie wird intensiv von Teilnehmenden aller Programme genutzt. Viele Mathematiker 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

3. Facilities and Finances

3.1. 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 (electronic publications, database and mathematical software), and also to ensure worldwide communication among the scientific community (e-mail, internet, and information services).

For the planning and realization of the scientific program approximately 22 positions in various divisions, such as scientific and administration management, library, IT-service, 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.

3.2 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 Möllegaard-Foundation, the Volkswagen Foundation and the Carl Friedrich von Siemens Foundation. For example,

Stiftung und die VolkswagenStiftung zu gleichen 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 in 2018 ca. 63.400 gedruckte Bücher, davon 43.100 Monographien und mehr als 8.000 Kongressberichte. Die Zahl der E-Books konnte auf über 22.000 gesteigert werden. Vor allem durch DFG-Nationallizenzen und weitere Allianzlizenzen stehen

the Klaus Tschira Stiftung and the Volkswagen 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 complete 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 sytematically 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.

Inventory

In 2018, the stock of the library contained about 63,400 printed books, in particular 43,100 monographs and more than 8,000 conference proceedings. The number of e-books has increased to more than 22,000. Including the national and alliance licenses, the MFO can

am MFO fast 7.000 E-Journals zur Verfügung. Die Zahl der zusätzlich vom MFO abbonnierten Zeitschriften in 2018 betrug ca. 850, die meisten davon wurden nur noch als E-Journal bezogen. In den Kompaktregalen befanden sich weiterhin ca. 32.000 gedruckte Zeitschriftenbände, nicht alles davon ist digital erhältlich. In Zukunft werden mehr und mehr Zeitschriften auf einen rein elektronischen Bezug umgestellt, während bei den Büchern die gedruckte Version weiterhin eine große Rolle spielen wird.

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. 2018 gingen insgesamt 778 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
- De Gruyter GmbH & Co. KG
- Edition am Gutenbergplatz Leipzig EAG.LE
- European Mathematical Society Publishing House
- International Press of Boston, Inc.
- Iwanami Shoten Publishers
- Mathematical Society of Japan
- Oxford University Press
- Presses polytechniques et universitaires romandes / EFPL Press
- Société Mathématique de France (SMF)
- Society for Industrial and Applied Mathematics (SIAM)
- Springer Nature
- Springer Spektrum
- XYZ Press by AwesomeMath (distributed by AMS)

offer access to almost 7,000 e-journals, where the MFO has subscribed to about 850 additional journals in 2018, most of them in the e-only version. Additionally, the compact shelves of the library contain about 32,000 bound journal volumes, where not all of them are also electronically available. In the future, more and more journals will be subscribed electronically, whereas printed books will continue to play a major role.

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 2018 the library received a total of 778 books this way. We wish to thank the following publishers for taking part in our book exhibition program:

Oberwolfach Photo Collection

Zum Bibliotheksbestand gehört eine umfangreiche Sammlung an Mathematiker-Porträts, 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 zugrunde liegende Datenbank ist eine Eigenentwicklung des MFO. Die Sammlung wird laufend ergänzt durch institutseigene Aufnahmen sowie durch Beiträge von Mathematikern weltweit. 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 2018 waren ca. 20.700 Fotos in der Datenbank enthalten.

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 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 2018 the database contained approximately 20,700 photos.

3.3. 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.

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

Gästebereich

Die Gäste erhalten persönliche Nutzerkonten, drahtlosen und kabelgebundenen Internetzugang, SMTP-Server-Zugang sowie Scan- und Druckmöglichkeiten. Die Terminal-Server-Arbeitsplätze bieten neben den üblichen Office-Anwendungen Zugriff auf einen Compute-Server mit Maple, Mathematica, Magma sowie einer Vielzahl freier mathematischer Software. Wegen der relativ kurzen Aufenthalte der Gäste sind die IT-Angebote so intuitiv wie möglich gestaltet.

3.3. 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.

Administrative sector

The databased software "owconf", developed in-house, handles all tasks arising from scientific management, conference management and guesthouse administration. Commercial software is used for financial accounting and human resources, for the library catalog and the literature search portal.

Guests' working environments

Guest scientists are provided with personal accounts, wifi and cable-bound ethernet connection, SMTP server access as well as scan and print facilities. Terminal Server workplaces offer the usual office tools together with access to a compute server with Maple, Mathematica, Magma and a range of free mathematical software. Due to the relatively short stays of the guest scientists, the services are designed as easy to use as possible.

Alle Vortragsräume enthalten moderne Präsentationstechnik. Den Gästen steht außerdem ein Videokonferenzsystem zur Verfügung. Die IT-Abteilung unterstützt die Forscherinnen und Forscher in allen technischen Fragen.

The IT section maintains modern presentation equipment in all lecture rooms, a video conference system and offers technical support to guest researchers on all technical issues.

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. Die speziellen Webdienste Oberwolfach Photo Collection und Oberwolfach References on Mathematical Software sind Eigenentwicklungen des 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 services Oberwolfach Photo Collection and Oberwolfach References on Mathematical Software have been developed in-house.

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". Dieses wird von der Gemeinde Oberwolfach, dem Verein der Freunde von Mineralien und Bergbau Oberwolfach und dem MFO gemeinsam betrieben (s. Abschnitt 3.4.: Öffentlichkeitsarbeit).

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". It is run jointly by the local authority, the association of the Friends of Minerals and Mining and the MFO – all seated at Oberwolfach (see section 3.4.: Outreach and Media).

Sicherheit und Datenschutz

Informationssicherheit und Datenschutz sind wichtige Aufgaben der IT, die bei allen Arbeiten mit bedacht werden. Ein Schwerpunkt in diesem Jahr war die Unterstützung der betrieblichen Datenschutzbeauftragten bei der Umsetzung der europäischen Datenschutzgrundverordnung.

Security and data protection

Data security and data protection are important tasks, taken into account throughout. A focus of this year was to support the Institute's data security officer in implementing the new European General Data Protection Regulation.

3.4. 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. Außerdem sendet das Institut mehrmals im Jahr Poster und Flyer mit Informationen über Veranstaltungen und Programme an etwa 400 verschiedene Institutionen. Eine weitere wichtige Informationsquelle ist die Website des Instituts.

3.4. 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. In addition, several times a year, the MFO sends posters and flyers with information on events and programs to around 400 institutions around the world. A further important source of information is the website of the Institute.

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 Hauptziel bei diesen Zielgruppen ist es, das Verständnis für die Bedeutung der Mathematik und der modernen mathematischen Forschung 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.

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 – Museum für Mineralien und Mathematik. Das Museum zeigt eine einzigartige Sammlung an Mineralien aus dem gesamten Schwarzwald und erklärt ihre kristallinen 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. Sowohl Konzepte der angewandten als auch der reinen Mathematik werden in interaktiven Programmen, Hands-on-Exponaten und Bildern dargestellt. Ein deutlicher Schwerpunkt liegt auf den mathematischen Grundlagen der Kristallografie. Durch diese 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.

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 publication "snapshots of modern mathematics from Oberwolfach" and it is shareholder and cooperation partner of the IMAGINARY gGmbH.

Mathematics at the MiMa

Since 2010 the Mathematisches Forschungsinstitut Oberwolfach engages in the MiMa – Museum for Minerals and Mathematics, together with the association of the Friends of Minerals and Mining in Oberwolfach and the municipality Oberwolfach. The museum 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 phenomenons. Interactive programs, hands-on exhibits, and images depict concepts of both applied and pure mathematics. A clear focus is put on the mathematical foundations of crystallography. Through this 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.

Morenaments

Mathematik und Mineralien/Mathematics and Minerals

Im Jahr 2018 wurden zwei der interaktiven mathematischen Exponate aufwändig überarbeitet. Sowohl an der Station „Cinderella", die eine Vielzahl an mathematischen Experimenten aus dem Bereichen Geometrie und Kristallographie bietet, als auch an der bei Kindern beliebten Station „Morenaments" wurden die alten Smartboards durch neue hochauflösende Touchscreens ersetzt. Bei dieser Gelegenheit wurden außerdem Teile der Programme überarbeitet und mit weiteren Funktionen versehen.

In 2018 two of the interactive mathematical exhibits were extensively updated. The station "Cinderella", which offers a variety of experiments from the field of mathematics and crystallography, and the station "Morenaments", which is very popular for children, received a new high-resolution touchscreen. Parts of the programs were revised as well and provided with additional functions.

Jedes Jahr werden im Rahmen der Reihe „Kultur im MiMa" einige Sonderveranstaltungen mit verschiedenen Formaten und Themen organisiert. Dies können zum Beispiel Fachvorträge zu mineralogischen oder mathematischen Themen sein, aber auch Konzerte, Lesungen oder andere künstlerische Darbietungen. Im Jahr 2018 fand ein Konzert des Klarinettenquintetts „Mocatheca" statt, sowie ein Fachvortrag über das Mineral Baryt.

Every year a number of special events with different formats and topics are organized as part of the series "Kultur im MiMa". These events can be lectures on mineralogical or mathematical topics, but also concerts, readings or other artistic performances. In 2018 a concert of the clarinet quintet "Mocatheca" took place, as well as a lecture on the mineral baryte.

Im Jahr 2018 kamen erneut über 6000 Besucherinnen und Besucher ins MiMa.

In 2018 more than 6000 people visited the MiMa.

Schnappschüsse moderner Mathematik

Das Ziel der „Schnappschüsse moderner Mathematik aus Oberwolfach" ist es, mathematische Ideen und Probleme in verständlicher Art und Weise einem breiten 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 für ein breites Publikum. Das MFO veröffentlicht die Schnappschüsse frei verfügbar unter einer Creative Commons Lizenz.

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 broad 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 to a broad audience. The MFO publishes the snapshots for free download under a Creative Commons license.

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.

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.

Das Projekt wird von Prof. Dr. Carla Cederbaum koordiniert. Sie ist als Chefeditorin für das Editieren der Texte verantwortlich. 2018 haben Dr. David Edward Bruschi, Prof. Dr. Andrew Cooper, Dr. Moritz Firsching, Sophia Jahns, Martin Kalck, Daniel Kronberg, Dr. Sara Munday, Dr. Johannes Niediek, Dr. Anja Randecker, Lara Skuppin und Sabiha Tokus Schnappschüsse editiert. Im Laufe des Jahres wurden 15 Schnappschüsse publiziert (s. Abschnitt 2.11.: Publikationen).

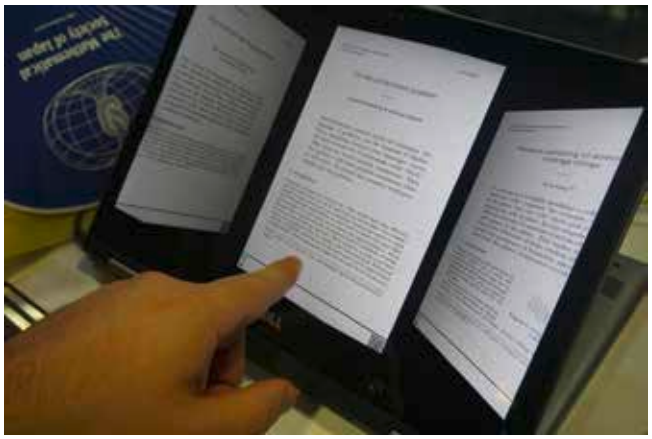
The project is coordinated by Prof. Dr. Carla Cederbaum. As senior editor she is responsible for the editing process of the snapshots. In 2018 Dr. David Edward Bruschi, Prof. Dr. Andrew Cooper, Dr. Moritz Firsching, Sophia Jahns, Martin Kalck, Daniel Kronberg, Dr. Sara Munday, Dr. Johannes Niediek, Dr. Anja Randecker, Lara Skuppin and Sabiha Tokus worked as junior editors. 15 snapshots were published in this year (see section 2.11.: Publications).

Zusammenarbeit mit IMAGINARY

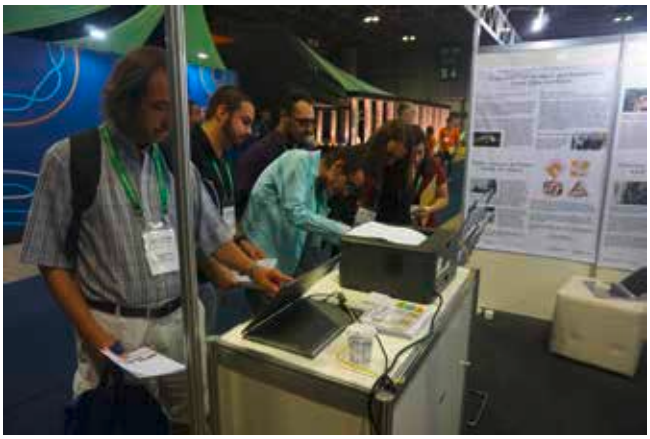
IMAGINARY startete am MFO anlässlich des Wissenschaftsjahres der Mathematik 2008 als interaktive Wanderausstellung und entwickelte sich über die Jahre zu einer Online-Plattform für interaktive Mathematik-Vermittlung. Seit September 2016 ist IMAGINARY eine selbständige gemeinnützige GmbH mit einem breiten Spektrum an Dienstleistungen in der Mathematikkommunikation. Das MFO ist Teilhaber der gGmbH 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, so zum Beispiel im Jahr 2018 bei der Überarbeitung zweier interaktiver Stationen. Die Schnappschüsse werden maßgeblich über die IMAGINARY-Plattform verbreitet sowie auf vielen IMAGINARY-Ausstellungen in der interaktiven Station „Snapshot-Slider" gezeigt und zum Ausdrucken oder Verschicken angeboten. 2018 war IMAGINARY unter anderem mit einem Informationsstand an der ICM in Rio vertreten und präsentierte dort auch die Schnappschüsse aus Oberwolfach. Der „Snapshot-Slider" wurde rege genutzt und viele Besucher nahmen vorausgedruckte Schnappschüsse mit oder druckten selbst weitere Schnappschüsse aus.

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 September 2016 IMAGINARY became an independent non-profit company 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 outreach and media – 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, for example in 2018 when two interactive stations were revised. The snapshots are largely distributed via the IMAGINARY platform. They are also presented at many IMAGINARY exhibitions in the interactive "Snapshot-Slider" and offered for printing or mailing. For example, in 2018 IMAGINARY had an information booth at the ICM in Rio and presented the snapshots from Oberwolfach there as well. The "Snapshot-Slider" was frequently used and many people took already printed snapshots or printed further snapshots themselves.



Snapshot-Slider



Besucher drucken Snapshots/Visitors printing snapshots

3.5. 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 Vortragsräume sowie Computerarbeitsplätze. 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 9,53 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 Forschungsgäste 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 acht größere Appartements sowie fünf Bungalows. Dadurch sind auch längere Aufenthalte im Rahmen des RiP-Programms und des Oberwolfach-Leibniz-Fellows-Programms möglich. Der Hauswirtschaftsbereich umfasst insgesamt 13 Stellen für Küche und Zimmerservice sowie für die Pflege von Gebäuden und Grundstück (davon waren 2018 11,89 Stellen besetzt).

3.5. 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 numerous computer stations 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 proofed 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 9.53 positions, covering scientific administration (planning and organization of the scientific program, public relations, third-party projects), library, IT-services and general administration (financial management, purchasing, personnel administration, contracts, renovation measures etc.) as well as guest liaison and support.

Since board and lodging is provided by the Institute, housekeeping is also an important part of the realization 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, eight apartments and five bungalows enable a longer stay at the MFO within the Research in Pairs program and the Oberwolfach Leibniz Fellows program. The housekeeping department comprises 13 positions for kitchen and room service as well as for the maintenance of the buildings and premises (11.89 positions staffed in 2018).

3.6. Finanzielle Übersicht

Erlöse 2018 (gerundet auf 1.000 €)		
Zuwendung Bund/Länder	Benefits from the federation/ federal states	3.213.000
Wettbewerbsmittel aus 2017	Competition benefits from 2017	36.000
Drittmittel	Third party funds	376.000
Spenden	Donations	106.000
Sonstige Einnahmen	Other income	94.000
Zweckgebundene Reste aus 2016	Earmarked surpluses	237.000
Summe Erlöse	**Total revenues:**	**4.062.000**

Aufwendungen 2018 (gerundet auf 1.000 €)		
Personalausgaben	Personnel department	1.599.000
Materialaufwand	Purchases	383.000
Aufwand für bezogene Leistungen	Expenses for drawn benefits	177.000
Abschreibungen	Consumption of fixed capital	142.000
Sonstige Aufwendungen (inklusive Sachausgaben Bibliothek)	Other Expenses (with material expenses for the library)	1.483.000
Rückstellungen für zweckgebundene Reste	Provisions for earmarked surpluses	207.000
Investitionen	Investments	71.000
Summe Aufwendungen	**Total expenses:**	**4.062.000**

Erläuterungen

Der Anteil von Drittmitteln, Spenden und sonstigen Einnahmen bezogen auf die Gesamtsumme der Erlöse liegt im Haushaltsjahr 2018 bei 15,2%. Die zweckgebundenen Reste aus 2017 sind dabei nicht berücksichtigt.

Öffentliche Mittel

Das MFO erhielt im Haushaltsjahr 2018 insgesamt 3,213 Mio. Euro Zuwendung von Bund und Ländern.

Drittmittel

Die projektbezogenen Drittmittel rekrutierten sich im Haushaltsjahr 2018 insbesondere aus Mitteln der National Science Foundation (NSF), der Simons Foundation, der Carl Friedrich von Siemens Stiftung und aus Mitteln des Wettbewerbsverfahrens der Leibniz-Gemeinschaft.

3.6. Financial overview

Revenues 2018 (rounded to 1,000 €)		
Zuwendung Bund/Länder	Benefits from the federation/ federal states	3.213.000
Wettbewerbsmittel aus 2017	Competition benefits from 2017	36.000
Drittmittel	Third party funds	376.000
Spenden	Donations	106.000
Sonstige Einnahmen	Other income	94.000
Zweckgebundene Reste aus 2016	Earmarked surpluses	237.000
Summe Erlöse	**Total revenues:**	**4.062.000**

Expenses 2018 (rounded to 1,000 €)		
Personalausgaben	Personnel department	1.599.000
Materialaufwand	Purchases	383.000
Aufwand für bezogene Leistungen	Expenses for drawn benefits	177.000
Abschreibungen	Consumption of fixed capital	142.000
Sonstige Aufwendungen (inklusive Sachausgaben Bibliothek)	Other Expenses (with material expenses for the library)	1.483.000
Rückstellungen für zweckgebundene Reste	Provisions for earmarked surpluses	207.000
Investitionen	Investments	71.000
Summe Aufwendungen	**Total expenses:**	**4.062.000**

Explanations

The proportion of private resources (own income, third-party-funds and donations) of the total sum of revenues is 15.2%. Funds carried forward from 2017 are disregarded here.

Public funding

In the fiscal year 2018 the MFO received 3.213 million Euro funding from the federation and the federal states.

Third-party funds

Earmarked third party funds in the fiscal year 2018 are mainly composed of the grants from the National Science Foundation (NSF), the Simons Foundation, the Carl Friedrich von Siemens Foundation, and from the Leibniz Association.

Förderverein und Oberwolfach Stiftung

Zweckgebundene Spenden erhielt das MFO auch im Haushaltsjahr 2018 vom Förderverein und der Oberwolfach Stiftung. Die Gelder wurden für Reisekostenzuschüsse in besonderen Fällen, für die Unterstützung von Kinderbetreuungskosten und als Zuschuss zu Baumaßnahmen verwendet.

3.7. 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), der Simons Foundation und der VolkswagenStiftung. Ein besonderes Dankeschön gilt natürlich auch dem Förderverein und der Oberwolfach Stiftung für die großzügige Unterstützung des MFO.

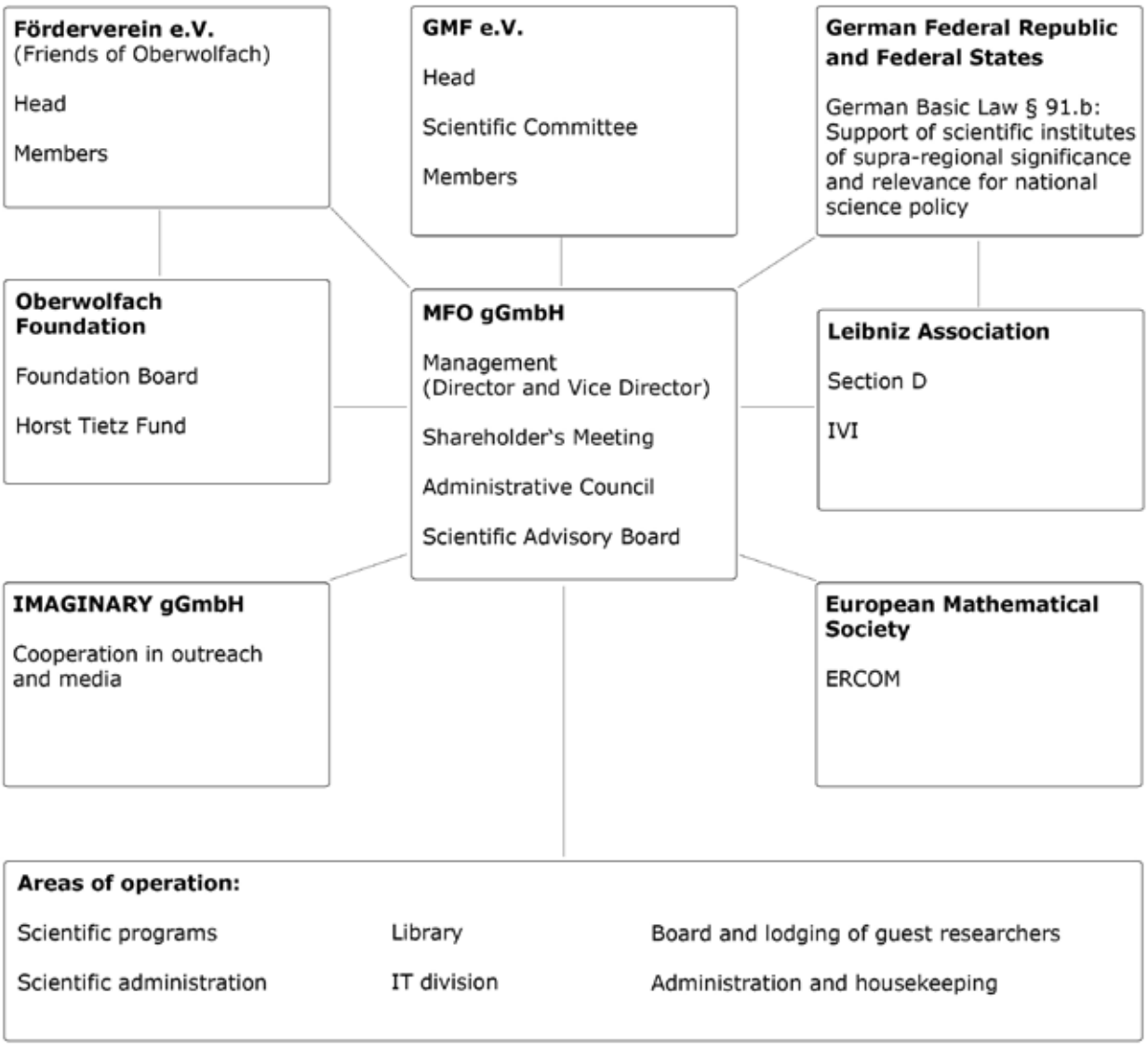
Förderverein and Oberwolfach Foundation

Earmarked donations have been received by the Förderverein and the Oberwolfach Foundation. These funds have been used to support travel costs for scientists in special cases, for child support, and as additional support for building measures.

3.7. 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), the Simons Foundation and the Volkswagen Foundation. Our special thank-you also goes to the Förderverein and the Oberwolfach Foundation for their important support of the MFO.

3.8. Organigramm



Erläuterungen

Das Mathematische Forschungsinstitut Oberwolfach (MFO) ist seit April 2005 eine gemeinnützige GmbH. Die Geschäftsführung des MFO besteht aus Direktor und stellvertretendem Direktor. Alleiniger Gesellschafter des MFO ist die Gesellschaft für Mathematische Forschung e.V. (GMF), die durch ihren Vorstand vertreten wird. Das MFO wird von der Bundesrepublik Deutschland und den Bundesländern im Rahmen der Forschungsförderung nach Artikel 91b des Grundgesetzes gemeinschaftlich finanziert, wobei das Sitzland Baden-Württemberg eine besondere Rolle einnimmt. Dabei ist die Mitgliedschaft des MFO in der Leibniz-Gemeinschaft Bestandteil der gemeinschaftlichen Finanzierung. Die Zuwendungsgeber sind im Verwaltungsrat des MFO vertreten, der als wichtigstes Aufsichtsgremium

Explanations

Since April 2005 the Mathematisches Forschungsinstitut Oberwolfach has been registered as a non-profit corporation (gemeinnützige GmbH). The MFO is headed by a Director supported by a Vice Director. The sole associate of the MFO is the Gesellschaft für Mathematische Forschung e.v. (GMF), represented by its board. Financing of the MFO is shared by the Federal Republic of Germany and the Federal States according to article 91b (research financing) of the Basic Law of the Federal Republic of Germany with emphasis on the local state of Baden-Württemberg. Being a member of the Leibniz Association is a prerequisite for the common financing. The financial partners are represented in the Administrative Council of the MFO, which in its function as most important supervisory panel decides on

über die mittel- und langfristige Finanz- und Budgetplanung entscheidet. Institut und Verwaltungsrat werden dabei vom wissenschaftlichen Beirat des MFO beraten, dem 6 bis 8 international angesehene Mathematiker angehören. Ferner ist das MFO Mitglied in ERCOM (European Research Centres on Mathematics), einem Komitee der European Mathematical Society.

Die Gesellschaft für Mathematische Forschung e.V. (GMF) hat ca. 80 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. Der Vorstand der GMF besteht aus dem Vorstandsvorsitzenden, dem Schatzmeister und dem Vorsitzenden der Wissenschaftlichen Kommission. Die Wissenschaftliche Kommission der GMF besteht aus ca. 20-25 international angesehenen Mathematikern und ist in Abstimmung mit der Geschäftsführung des MFO zuständig für die Forschungs- und Entwicklungsplanung sowie die aktuelle wissenschaftliche Arbeitsplanung des MFO.

Der Verein zur Förderung des Mathematischen Forschungsinstituts Oberwolfach e.V. (Förderverein) hat etwa 600 Mitglieder, die das MFO durch Mitgliedsbeiträge zusätzlich finanziell unterstützen. Die Oberwolfach Stiftung, die im Förderverein als nicht rechtsfähige Stiftung gegründet wurde, sammelt Stiftungskapital aus dem wirtschaftlichen und dem privaten Bereich. Dabei spielt der Horst Tietz Fund als Sondervermögen innerhalb der Oberwolfach Stiftung eine besondere Rolle.

Das Institut ist außerdem Gesellschafter der IMAGINARY gGmbH und kooperiert mit dieser im Bereich der Öffentlichkeitsarbeit. IMAGINARY begann als Projekt des MFO im Jahr 2008 und wurde 2016 als selbständiger Dienstleister im Bereich der Mathematik-Kommunikation ausgegründet.

the medium- and long-term finance- and budget planning. The Institute and the Administrative Council are supported by the Scientific Advisory Board which is composed of 6 to 8 internationally renowned mathematicians. Moreover, the MFO is a member of ERCOM (European Research Centres on Mathematics), a committee of the European Mathematical Society.

The Gesellschaft für Mathematische Forschung e.V. (GMF) consists of about 80 members, including four institutional members, namely 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. The head of the society is formed by the chairman, the treasurer, and the chairman of the Scientific Committee. 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 head of the MFO.

The Verein zur Förderung des Mathematischen Forschungsinstituts Oberwolfach e.V. (Förderverein) has about 600 members and provides additional financial support for the MFO by its membership fees. The Oberwolfach Foundation, a foundation of public utility within the Förderverein, provides further financial support by economic and private means. Within the Oberwolfach Foundation the Horst Tietz Fund plays an important role by providing special funds.

Furthermore the Institute is a shareholder of the IMAGINARY gGmbH and cooperates with the company in the field of public relations. IMAGINARY started in 2008 as a project of the MFO. Since 2016 it is an independent service provider in the field of mathematics communication.

Wissenschaftliche Verwaltung	**Scientific Administration**	
Direktor	Director	Prof. Dr. Gerhard Huisken
Stellvertretender Direktor	Vice Director	Prof. Dr. Dietmar Kröner
Wissenschaftlicher Administrator	Scientific Administrator	apl. Prof. Dr. Stephan Klaus
Wissenschaftliche Mitarbeiterin	Scientific Assistant	Dr. Tatjana Ruf
Sekretärinnen für Workshops, RiP und Seminare	Secretaries for Workshops, RiP and Seminars	Silke Okon, Andrea Schillinger
Verwaltung	**Administration**	
Verwaltungsleitung	Head of Administration	Susanne Riester
Sekretärinnen im Gästebüro	Secretaries in the guest services office	Annette Disch, Petra Lein, Katrin Schmid
Bibliothekarin	Librarian	Verena Franke
Fachangestellte für Medien- und Informationsdienste (FaMI)	Library Assistant	Jennifer Hinneburg
Auszubildender FaMi	Trainee in the library	Jannes Wörner
Systemverwalter	System Administrators	Helmut Kastenholz, Christoph Weber
Hauswirtschaft	**Housekeeping**	
Hauswirtschaftsleiterin	Housekeeping Manager	Charlotte Endres
Hausmeister	Caretaker	Helmut Breithaupt
Auszubildende Hauswirtschafterin	Housekeeping trainee	Rebecca Schmid
Weitere Beschäftigte	Further housekeeping staff	ca. 10 full time equivalent

Verwaltungsrat des MFO/Administrative Council of the MFO
(Mitglieder/Members 2018)

Tania Bolius	Ministerium für Wissenschaft, Forschung und Kunst, Stuttgart, (Vorsitzende/Chair)
Dr. Frank Wolf	Bundesministerium für Bildung und Forschung, Bonn, (stellvertretender Vorsitzender/Vice Chair)
Prof. Dr. Jean-Pierre Bourguignon	President of the European Research Council
Prof. Dr. Friedrich Götze	Fakultät für Mathematik, Universität Bielefeld
Dr. Henrike Hartmann	VolkswagenStiftung, Hannover
Prof. Dr. Wolfgang Lück	Director of HIM (Hausdorff Institute for Mathematics), Mathematisches Institut Universität Bonn
Christian Mees	Staatskanzlei des Saarlandes
Prof. Dr. Felix Otto	Direktor des Max-Plancks-Instituts für Mathematik in den Naturwissenschaften, Leipzig
Beate Spiegel	Geschäftsführerin der Klaus Tschira Stiftung gGmbH, Heidelberg

Wissenschaftlicher Beirat des MFO/Scientific Advisory Board of the MFO
(Mitglieder/Members 2018)

Prof. Dr. Wolfgang Lück, Bonn (Chair)
Prof. Dr. Ulrike Tillmann, Oxford (Vice Chair)
Prof. Dr. Maria Chudnovsky, Princeton
Prof. Dr. Johan Håstad, Stockholm
Prof. Dr. Barbara Niethammer, Bonn
Prof. Dr. Ragni Piene, Oslo
Prof. Dr. Bernd Sturmfels, Berkeley

Gesellschaft für Mathematische Forschung e.V. (GMF)

Vorstand der GMF/Head of the GMF
(Mitglieder/Members 2018)

Prof. Dr. Friedrich Götze, Bielefeld	Vorstandsvorsitzender der GMF/ Chair of the GMF
Prof. Dr. Felix Otto, Leipzig	Vorsitzender der Wissenschaftlichen Kommission/ Chair of the Scientific Committee
Prof. Dr. Joachim Schwermer, Wien	Schatzmeister/Treasurer

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