THE OHIO STATE UNIVERSITY

# GRADUATE PROGRAMS IN MATHEMATICS

An Overview for Prospective Students

# Contents



# General Information

## Applications

The department will invites applications to all degree programs once a year for admission to the autumn semester. Application deadline for full consideration for all degrees is **December 15th**. Later application will be considered on a stand-by vases. Detailed information about the application procedure and expected preparations can be found at

https://math.osu.edu/grad/future/apply

## Contacts

All inquiries from prospective students and communication about our program and applications procedures should be directed to

grad-info@math.osu.edu

The email account will also be used to extend offers of admission and support, or inform students about their wait list status.

# Faculty & Research

## Graduate Faculty

The Ohio State mathematics department comprises currently **66** graduate faculty on the main Columbus campus. Additional there are 21 faculty on branch campuses who can and frequently do supervise main campus dissertations. There are thus about **87** professors that doctoral of master's student can ask to serve as their dissertation or thesis advisors.

Our faculty members are actively engaged in supporting a vigorous research environment through top-level research publications, an abundance of research seminars, numerous sources of grant support, a large visitor and post-doctoral program, frequently hosted conferences of national reach, and research collaborations all over the world. In addition, several joint faculty appointments support interdisciplinary research projects with other departments at Ohio State, such as several life science disciplines, computer science, and statistics. Other OSU units collaborating with our department include, for example, the medical center, physics, engineering, and education.

An increasing number of our faculty are involved in developing new graduate degree programs or improving existing ones, organizing working groups that integrate student, post-doc and faculty participation around a topic, as well as seeking funding for graduate student support from many sources. Graduate advising is also a major factor in the evaluation of faculty in our department.

## Opportunities in Breadth and Interaction

Thanks to the large size of our faculty nearly every area of mathematics is represented in our program. One immediate implication is that our program is able to offer on a regular basis a wide variety of courses that provide our students with a broad intellectual formation and solid skill sets in many disciplines of mathematics.

At a more advanced level the breadth in mathematical research in our program offers unique opportunities for students who would like to explore directions before committing to a research area as well as students who would like to combine or work at the interface of several fields of mathematics.

Most research represented in our program is also characterized by the combining methods and perspectives of several overlapping areas of mathematics. This positions our graduates well in a scientific environment that demands more and more versatility of professional mathematicians in order to be successful in academic careers. Research in our program also, very often, connects to deeper mathematics questions arising in other disciplines leading to collaborations with other departments around campus in both traditional and innovative combinations of interests. This opens additional career paths to students working in such interdisciplinary fields.

## New Hires and Innovative Directions

New faculty hires over the last few years have additionally invigorated our research program by strengthening core areas and adding original new research directions. Several recent additions have emphasized research that combines computational methods with topics in pure mathematics, often with novel cross-disciplinary components.

This year we are adding at least six new graduate faculty, emphasizing expertise that combines harmonic analysis, probability theory, and applied themes (such as signal processing) but also expanding into new aspects of algebraic geometry, representation theory, and applied topology.

As a result of prior hiring, our program now also boasts one of the premier center in the world in *Topological and Geometric Data Analysis*, a young area that draws both from sophisticated methods in algebraic and geometric topology as well as cutting edge research in computer science. Other examples of hires at the interface of computation, statistics, and pure mathematics are in computational number theory, statistical graph theory, and probabilistic topology.

Additionally, several faculty with very active research programs have joined our program in the last couple of years, strengthening research directions that are already represented in our program by well established and renown research groups. These areas of expansion include algebraic geometry, combinatorics, ergodic theory, dynamical systems, complex analysis, mathematical biology, and topology.

## Traditional Strengths

Among the better known traditional strengths of our program is number theory, as our department houses the premier research journal in the area and has hosted numerous special programs and conferences in recent years. Several activities focus especially on deep and exciting connections with ergodic theory, another strongly represented area in our program with equally many students and renown faculty. Moreover, our topology group has a traditionally strong presence with many students, faculty, and post-docs, particularly in the specialties geometric group theory, low-dimensional topology, and various other directions in algebraic and differential topology.

The *Mathematical Biosciences Institute* (MBI, see http://mbi.osu.edu/) at Ohio State – one of the seven major NSF-funded mathematical sciences institutes in the United States – is the focal point of our large research group in mathematical biology. It includes about ten mathematics professors in addition to numerous interdisciplinary appointments and affiliated faculty from other departments. Much of the mathematics involved in this area ties into our prolific research groups in PDE, dynamical systems, and applied mathematics, but also benefits from collaboration with life science departments, medical units across campus, as well as large number of post-docs visiting the MBI each year. Similarly, other faculty working in applied mathematics and numerical analysis maintain lively collaborations with Ohio State's large engineering and computer science departments.

In addition, several smaller, but nonetheless very active, research groups complement the wide spectrum of mathematics represented in our program. These encompass, for example, logic and foundations, real and complex analysis, differential geometry and geometric analysis, non-commutative geometry and operator algebra, representation and Lie theory, ring and group theory, as well as mathematical physics and financial mathematics.

## Exploring our Faculty

The attached list of current and incoming graduate faculty at our department contains keyword descriptions of their research as well as their contact information. Interested students should feel free to contact faculty directly with questions about their research. (The organization by subject areas in the list may at times be arbitrary since research areas have become more and more cross-

disciplinary).

In addition, our program runs the *Invitations to Mathematics*, a weekly student colloquium with lectures delivered mostly by our graduate faculty and targeting beginning doctoral students who are looking for research areas and advisors. Browsing the lecture announcements and abstracts may serve as an additional source of topics that are researched at our department.

## Miscellaneous Highlights

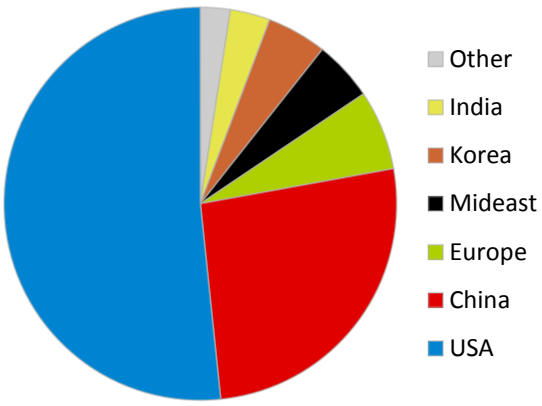
Here a few more facts that underline the high level and significant impact of the research conducted at our department:

- Over the past seven years **five** of our incoming faculty were awarded the prestigious *Sloan Fellowships*, see for example this article . Moreover, **four** of our younger faculty have recently won prestigious *NSF-CAREER* awards.
- The *Mathematics Research Institute* (MRI, see http://www.mri.osu.edu) combines department and college resources as well as external grants to fund a variety of conferences, special years on selected topics, visitor programs, seminars, and travel support.
- In the last three years **four** *Field Medalists* have visited our department for special lectures, namely, *Edward Witten*, *Elon Lindenstrauss*, *Alain Connes*, and *Terence Tao*.
- **Thirteen** of our faculty members are *Fellows of the American Mathematical Society*.
- Moreover **four** faculty in our program are *AAAS Fellows*, one of whom is serving as chair-elect of the mathematics section of AAAS. Also **one** of our faculty is a member of the *National Academy of Science,* and several more members of our program have had prestigious invitations as speakers to the *International Congress of Mathematicians* in recent years.

# Graduate Student Life

## Demographics

There are typically between 125 and 130 students in our graduate program of which about 100 are pursuing a doctoral degree and over 25 are in the MMS program. Nearly a quarter of our graduate students are female. The nationalities represented in our department are illustrated in the chart on the right. Students enter the program coming from wide range of institutions from small liberal arts colleges to large research universities with similarly diverse educational backgrounds including both Bachelors and Masters degrees. Our program has thus ample experience and resources to accommodate students widely varying academic and personal backgrounds.




## Academic and Social Life

The community of graduate students in our department is not only characterized by its diversity but also by a pronounced cooperative and supportive atmosphere among peers. Shared offices provide the environment in which groups form that work together on course assignments, exams preparations, or grading in the beginning years. Graduate students show support by helping each other through courses and examinations, peer-mentoring incoming students, and nominating each

other for teaching awards.

Recently, our graduate students founded a local student chapter of the *Association for Women in Mathematics* (AWM) which is maintaining an active program and which is advised by Prof. Keyfitz, a former president of the AWM. In addition, students established the *Mathematics Graduate Student Association* (MGSA) as a registered stdudents organization which is conducting student-only lectures on a broad range of subjects as well as social events.

There are many further settings for more research oriented interactions as well. Particularly, in recent years students by themselves or students together with faculty and post-docs have been organizing informal working seminars around numerous special topics, for example, in number theory, algebraic geometry, several in topology, ergodic theory, probability theory, or applied mathematics. Students often collaborate with faculty from Ohio State but also other institutions as well as other students in our program on research projects and articles.

Further more informal and social interactions occur in the lounge rooms and daily tea area, during our annual departmental picnics and special events, as well as outside the department for a wide range of extracurricular activities.

# Doctoral (Ph.D.) Program

The Doctor of Philosophy degree enables its recipients to conduct independent research, produce original scholarly work, and serve in faculty position at colleges and universities. Nothing is therefore more important in the formation of a Ph.D. student than the guidance and training by researchers and faculty advisors. We believe that the Mathematics Graduate Program at the Ohio State University provides a tremendously broad and exciting range of high caliber research opportunities and a faculty that is uniquely dedicated to graduate advising.

## Academic Progression & Curriculum

The path to the Ph.D.-degree is roughly divided into two parts separated by the candidacy exam. During the first part students are expected to pass the two qualifying requirements and fulfill a few basic course requirements. As doctoral candidates students focus in the second part entirely on research and writing their dissertation. The details of the various pre-candidacy requirements can be found at

http://math.osu.edu/grad/current/phd

In the past two years the department has substantially revised its pre-candidacy requirements in our doctoral program with the aim of leading students more quickly to research and reducing average times to graduation, while still guaranteeing a thorough training in core mathematical subjects.

In outline, our real analysis and abstract algebra qualifying requirements may be fulfilled by passing the year-long course sequences in analysis and algebra with sufficient grades. As an alternate option the course work can be replaced (or remedied) by passing annually offered exams as well, and the graduate committee may count additional course work in borderline situations. The candidacy examination will focus entirely on the proposed research area, and aims to provide the

students with a headstart into the subsequent dissertation topic.

As a result of these adjustments we expect all students to complete their degree in under six years. Faculty committees are also currently considering curricular options that are more closely tailored to students with interests in applied mathematics. The effort reflects our commitment to existing and newly emerging interdisciplinary areas in mathematics – both at the level of faculty hiring and graduate education.

The doctoral completion rate (from entry to degree) has steadily improved over recent years and we currently estimate this ratio to be around or exceeding 70% – which is significantly above the national average of about 50%. The majority of those leaving before degree do so for reasons not directly related to academic requirements but more often due to personal reasons or because they develop career interests outside of doctoral studies in mathematics.

## Financial Support

All graduate students in good academic standing are supported either as graduate teaching associates (GTAs), graduate research associates (GRAs), or as University Fellows during the regular academic year. In all cases support includes a full tuition waiver. Students who have been supported in the nine months of the preceding academic year also have an automatic summer tuition waiver regardless of summer support. Additionally GA and fellowship support includes a generous (85%) subsidy of health insurance premiums as detailed in http://hr.osu.edu/hrpubs/index.aspx#student. Beyond first year fellowships for selected students fulfilling university criteria, there are additional fellowship and support opportunities for more advanced students:

Every year the department offers around 20 SGA/RGF Fellowships that support students for one semester without teaching duties at regular stipend levels in order to allow them to focus on their research, complete thesis or other academic projects, or travel to workshops and conferences.

Many faculty in our department also hold research grants that can support students on GRAs, especially during the summer months. In addition a limited number of teaching and research positions are available for summer support each year. Typically over 90% of all students who remain enrolled over the summer and apply receive financial support from one of these sources.

Students in their dissertation years can also compete for the highly prestigious Presidential Fellowships which our graduate school awards to the very best students in the entire university. Our program the top six or seven program on campus that win most of these awards every year.

Finally, the department makes travel funds available that allow students to visit conferences, workshops, and collaborators. Many students take advantage of this opportunity to connect to the larger scientific community, collaborate outside of the program, present their work, and thus improve their chances in securing academic jobs.

## Graduations and Job Placements

Over the past four years our doctoral program has awarded on average about twenty Ph.D.-degrees per year. An ever increasing number of our graduating students have articles published or in submission as well as active outside collaborations by the time of their graduation.

In recent years about half of our Ph.D.-graduates placed in post-doctoral positions in major research oriented programs both in the US and other countries. Among the institutions where our students found research positions over the last five to six years are *Princeton University (2), IAS Princeton, University of Chicago, Yale University (2), MSRI, University of Michigan, Cal-Tech (3), University of Minnesota (2), Rutgers University (2), University of Utah, University of Bristol, Duke University, Vanderbilt University (2), York University, UC Irvine, Purdue University (2), Texas A&M University, University of Illinois at Chicago, University of Iowa, University of Connecticut, University of Nottingham, University of British Columbia, University of Southampton, Northeastern University, SUNY Binghampton*, as well as numerous other prestigious international institutions. Among these recent graduate some have already gone on to tenure track professorships at major research schools such as *SUNY Stony Brook* and *Texas A&M*.

Other graduates continue academic careers as professors in smaller more teaching oriented colleges and universities. Each year a few of our students also enter private industry careers such as in software development, finance, and R&D, and occasionally some enter government agencies such as NSA. Still others pursue additional doctoral degrees, for example, in physics or financial mathematics.

The department typically accommodates its recent graduates who are still looking for academic jobs with lecturer positions for at least a year until they found employments that align with their career goals.

# Master of Mathematical Sciences

Since 2009 the Ohio State mathematics department offers a Master of Mathematical Sciences (MMS) degree. The MMS is a professionally oriented, interdisciplinary two-year master's programs that includes practical experiences and thesis research in collaboration with several partnering units on the Ohio State campus. The MMS currently encompasses the following three specialization tracks:

- Mathematical Biosciences (since 2009)
- Mathematics for Educators (since 2010)
- Computational Sciences (since 2012)

More detailed information about the degree and these tracks can be found at

http://math.osu.edu/grad/current/mms

The curriculum of each degree track consists of both core courses that provide targeted mathematical background as well as a palette of elective courses in partnering disciplines to which the acquired mathematical skills are applied. Furthermore, MMS students in all tracks will be involved in individual projects or practical experiences during the summer between their first and second year. Projects are supervised by both a mathematics advisors and, typically, a faculty member from partnering department. Results from these experiences are incorporated in a thesis that is written and defended in the second year of study.

The training provided by this degree program and the tangible outcomes of its hands-on experiences have helped graduates find placements in research & development-oriented positions in

industry as well as challenging opportunities in the public sector and education. A large portion of graduated have also gain admission to competitive interdisciplinary PhD programs.

The interdisciplinary nature of the program is supported both by the vast opportunities for collaboration at OSU as well as an emphasis on flexibility in the choices of applications. Students are encouraged and to make their own connections with units on campus and often succeed to expand the scope of the program with new creative collaborations fitting their particular specialization track.

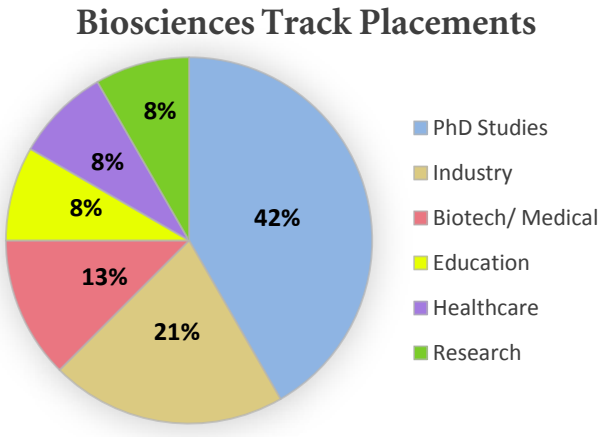
Students progressing in the MMS program receive financial support as teaching associates and may compete for the same university and departmental fellowships that are available to doctoral students (see previous section). The following paragraphs provide more specific information for each track:

## Mathematical Biosciences:

The Biosciences track, the first specialization introduced to the MMS degree, builds on a strong representation of our faculty in mathematical biology as well as the nationally renown Mathematical Biosciences Institute (MBI). Research conducted at the MBI has led to many collaborations of our program with numerous life science departments on campus, the several research divisions of the OSU Wexner Medical Center, as well as off-campus facilities such as the Nationwide Children's Hospital or Stone Laboratory on Lake Erie.

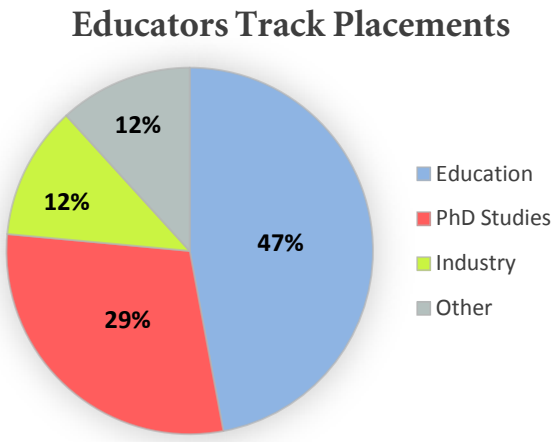
These connections provide a vast range of projects and mentors that students can choose from and the great majority of projects and MMS theses result in publications in mainstream scientific journals. Students in this track will also participate in MBI activities such as summer research programs and colloquia. The training in this specialization aims to equip students with the skills to model problems in the life sciences in mathematical terms and solve these with analytical and numerical methods in order to explain, predict, or optimize underlying biological situations. The current emphasis is on continuous modeling, differential equations, and numerical analysis.

Prospective careers are in bio-medical research and industry, employment in the public sector such as with Health & Human Services (HHS) or Centers for Disease Control (CDC) or in education. The plurality of our graduates enter PhD programs in applied and interdisciplinary mathematically oriented fields. A more detailed break-down of placements is depicted in the chart on the right.




## Mathematics for Educators:

The Educators track of the MMS degree program serves current and prospective mathematics educators and collaborative users of core mathematics in both educational and industrial settings. The goal is to raise the mathematical formation of students and to enhance their ability to communicate mathematics at a level sought by public and private sector employers and advanced




academic programs.

The program draws on the expertise of the Teaching & Learning department of the OSU College of Education and Human Ecology (EHE/T&L), the Mathematical Sciences Learning Center (MSLC), the department's eLearning group that involved in the development of Massive Open Online Courses (MOOCs), as well as various other departments on campus such as computer science, linguistics, economics, or communication. Many creative and innovative projects and theses have emerged from these activities and have provided insight into learning and cognition driven by quantitative analysis.

Emphasis in the course curriculum is placed on mathematical training with additional opportunities to participate in seminars offered by EHE/T&L. Although teacher licensure is not an objective of this degree program (as it may be for M.Ed. and MAT degrees) pathways to becoming licensed can be found in collaboration with EHE/T&L.

Career opportunities for graduates include doctoral programs in mathematics education and related fields, leadership positions of school districts, teaching faculty positions in community colleges, as well as employment in the private sector in jobs that require the communication of modern mathematics. A basic breakdown of job and academic placements of graduates from this track is illustrated in the chart above.

## Computational Science:

The youngest specialization in the MMS degree program takes advantage of the wide range of departments and units on campus that provide opportunities to collaborate in computational projects. Most prominently, the College of Engineering comprises eleven highly ranked departments (including computer science) with nearly 300 faculty. The mathematics department collaborations with the College of Engineering that include, especially, the areas of computational topology, topological data analysis, and fluid dynamics. Other partnering units, which may serve sa sources of computational projects, include the MBI, physical and mathematics sciences departments, as well as other related disciplines such as computer science and economics. Students can gain also access to the resources of the Ohio Supercomputer Center.

The curriculum of the this track provides students with the mathematical tools in numerical analysis, finite element methods, and applied differential equations to tackle computational challenges in a broad range of applications. Electives for this track currently consist of a substantial list of mathematically oriented courses offered by the college of engineering as well as mathematics courses on computational methods. The former include subjects such as computational electromagnetics, mechanics, fluid and aerodynamics, as well as algorithms and graphics.

The track is currently under further development by a group of six computationally oriented faculty at our department with the aim to significantly broaden the scope of electives and projects. New directions may include topological data analysis, computational geometry, computational number theory, signal processing, compressed sensing, or statistical mechanics. Students are encouraged to propose electives and research directions themselves.

The computational science track connects its students to a plethora of career paths in industries as

well as government agencies with heavy computational and data analytic needs. Further, the combination of computational expertise and rigorous mathematical formation puts graduates in a strong position to enter competitive doctoral programs in applied mathematics and related fields.

## Master of Actuarial and Quantitative Risk Management

The Master of Actuarial and Quantitative Risk Management (MAQRM) is a new graduate degree program which has been officially approved in March of 2016. This master degree is based on a tremendously successful undergraduate degree program in actuarial sciences that our department has been offering for over 35 years.

The MAQRM provides a curriculum that combines training in modern mathematical finance and in actuarial risk management - two areas that have becomes increasingly intertwined creating a demand in graduates that have acquired expertise in both. The curriculum includes newly developed courses in risk management, and financial stochastic calculus. In addition students will be exposed to courses in actuarial sciences, financial economics, statistics, and numerical analysis.

The program utilizes well established connections to the statewide insurance industry and well as other businesses involved in risk management in order to create practical experiences and additional mentoring during the two years of study in the MAQRM. These connections will also be instrumental in job placements of graduates.

As opposed to the PhD and MMS programs, however, students in the MAQRM will generally not be supported by graduate associateships.

# Graduate Faculty List

Find below the current list of graduate faculty available for dissertation and thesis advising for all degrees. The list includes basic research interests as well as contact information. Prospective students should feel free to contact any faculty member about their research. Since most of our faculty are not directly involved in the admission process any questions about applications should be directed by email to grad-info@math.osu.edu.

## Number Theory

**Cogdell,** James — PhD: Yale University (1981)
COLUMBUS | cogdell.1@osu.edu | 614-292-8678
***Research:*** *Number Theory, Analytic Number theory, L-functions - Converese Theorems.*

**Hiary,** Ghaith — PhD: University of Minnesota (2008)
COLUMBUS | hiary.1@osu.edu | 614-292-4013
***Research:*** *Computational number theory, analytic number theory, random matrix models for L-functions, asymptotic analysis & interests in probability and numerical analysis.*

**Holowinsky,** Roman — PhD: Rutgers University (2006)
COLUMBUS | holowinsky.1@osu.edu | 614-292-3941
***Research:*** *Number Theory: Analytic Methods, Automorphic forms, L-functions, Sieve Methods, Quantum Unique Ergodicity*

**Luo,** Wenzhi — PhD: Rutgers University (1993)
COLUMBUS | luo.43@osu.edu | 614-292-5751
***Research:*** *Number Theory, Analytic and Arithmetic Theory of Automorphic Forms and Automorphic L-Functions*

**Manderscheid,** David — PhD: Yale University (1981)
ARTS & SCIENCES | manderscheid.1@osu.edu | 614-292-3236
***Research:*** *Number Theory, Supercuspidal Representations, Automorphic Forms, Theta-correspondences.*

**Friesen,** Christian — PhD: Brown University (1989)
MARION | friesen.4@osu.edu | 614-292-9133
***Research:*** *Algebraic & Computational Number Theory: continued fractions. class groups in quadratic function fields.*

## Algebraic Geometry

**Anderson,** David — PhD: University of Michigan (2009)
COLUMBUS | anderson.2804@osu.edu | 614-292-5754
***Research:*** *Algebraic geometry, Combinatorics, Representation theory, Schubert varieties and toric varieties, Equivariant cohomology and its applications*

**Ban,** Chunsheng — PhD: Purdue University (1990)
COLUMBUS | ban.1@osu.edu | 614-292-5331
***Research:*** *Algebraic Geometry - Singularity Theory - Mathematical Finance.*

**Cueto,** Maria — PhD: Univ. of California at Berkeley (2010)
COLUMBUS | cueto.5@osu.edu | 614-688-5773
***Research:*** *Algebraic Geometry, Combinatorics, Non-Archimedean Geometry, Tropical Geometry*

**Clemens,** Herb — PhD: Univ. of California at Berkeley (1966)
COLUMBUS | clemens.43@osu.edu | 614-292-2789
***Research:*** *Algebraic Geometry, Geometry and deformation theory of complex projective varieties, Hodge theory, Algebraic Cycles*

**Joshua,** Roy — PhD: Northwestern University (1983)
COLUMBUS | joshua.1@osu.edu | 614-292-4014
***Research:*** *Algebraic and Arithmetic Geometry, K-Theory, Singular Varieties, Computational aspects of geometry, Quantum computation*

**Katz,** Eric — PhD: Stanford University (2004)
COLUMBUS | eekatz@math.uwaterloo.ca
***Research:*** *Tropical Geometry, Combinatorial Algebraic Geometry, Arithmetic & Enumerative Geometry,*

**Tseng,** Hsian-Hua — PhD: Univ. of California at Berkeley (2005)
COLUMBUS — tseng.109@osu.edu — 614-292-5581
***Research:*** *Algebraic Geometry, Symplectic Topology & Geometry, Mirror Symmetry, Gromov-Witten Theory*

**Caibar,** Mirel — PhD: University of Warwick (1999)
MANSFIELD — caibar.1@osu.edu — 614-688-3177
***Research:*** *Algebraic Geometry, Singularity Theory, Hodge Theory*

**Kennedy,** Gary — PhD: Columbia University (1981)
MANSFIELD — kennedy.28@osu.edu — 419-755-4291
***Research:*** *Algebraic Geometry, Enumerative geometry, Intersection theory*

**McEwan,** Lee — PhD: Columbia University (1985)
MANSFIELD — mcewan.1@osu.edu — 419-755-4257
***Research:*** *Algebraic Geometry, Topology of Algebraic Singularities*

## *Ring & Module Theory*

**Herzog,** Ivo — PhD: University of Notre Dame (1989)
LIMA — herzog.23@osu.edu — 419-995-8293
***Research:*** *Ring Theory, Module and Representation Theory, Category Theory*

**Rizvi,** Syed Tariq — PhD: McMaster University (1981)
LIMA — rizvi.1@osu.edu — 419-995-8211
***Research:*** *Theory of Rings and Modules, Injective/Projective Modules, Baer Modules and Rings, Rickart Modules, Ring and Module Hulls and their applications.*

**Roman,** Cosmin — PhD: The Ohio State University (2004)
LIMA — roman.37@osu.edu — 419-995-8644
***Research:*** *Ring Theory, Module Theory, Injectivity-Like Properties , Relations Between Modules and Their Endomorphisms Ring, Theory of Rings and Modules*

**Yousif,** Mohamed — PhD: University of Calgary (1986)
LIMA — yousif.1@osu.edu — 419-995-8368
***Research:*** *Rings and Modules, Injective and Continuous Rings and Modules, Pseudo and Quasi-Frobenius Rings*

**Loper,** Kenneth — PhD: University of Wisconsin (1985)
NEWARK — loper.4@osu.edu — 740-366-3321
***Research:*** *Commutative Rings, Nagata & Kronecker Function Rings, Prüfer-like and almost Dedekind domains*

## *Pure & Applied Topology & Computational Geometry*

**Broaddus,** Nathan — PhD: Columbia University (2003)
COLUMBUS — broaddus.9@osu.edu — 614-292-0605
***Research:*** *Geometric Group Theory, Topology, Low-dim Topology*

**Davis,** Michael — PhD: Princeton University (1975)
COLUMBUS — davis.12@osu.edu — 614-292-4886
***Research:*** *Topology, Geometric Group Theory, Aspherical Manifolds & Spaces, Non-positive Curvature*

**Dey,** Tamal — PhD: Purdue University – Computer Science
COLUMBUS — dey.8@osu.edu — 614-292-3563
***Research:*** *Computational geometry, computational topology, geometric modeling, computer graphics, mesh generation*

**Fiedorowicz,** Zbigniew — PhD: University of Chicago (1975)
COLUMBUS — fiedorowicz.1@osu.edu — 614-292-0724
***Research:*** *Algebraic Topology, Algebraic K-theory, Homotopy theory, Quantum Groups, Category Theory*

**Fowler,** James — PhD: University of Chicago (2009)
COLUMBUS — fowler.291@osu.edu — 614-292-4019
***Research:*** *Topology, Geometric Topology of Manifolds, Geometric Group Theory, Surgery Theory, K-Theory, MOOCs*

**Kerler,** Thomas — PhD: ETH-Zurich - Theor. Physics (1992)
COLUMBUS — kerler.2@osu.edu — 614-292-5252
***Research:*** *Topology, 3-dim Manifolds and Knots Invariants, Topological Quantum Field Theories, Mapping Class Groups, Quantum Algebra*

**Krishnan,** Sanjeevi — PhD: University of Chicago (2006)
COLUMBUS — krishnan.118@osu.edu — 614-292-8434
***Research:*** *Algebraic Topology and Applications to Optimization, Data Analysis, and dynamics.*

**Lafont,** Jean-Francois — PhD: University of Michigan (2002)
COLUMBUS — lafont.1@osu.edu — 614-292-5814
***Research:*** *Topology - Differential Geometry, Geometric Group Theory - K-Theory*

**Mémoli,** Facundo — PhD: University of Minnesota (2005)
COLUMBUS — memoli.2@osu.edu — 614-292-5585
***Research:*** *Shape comparison & Matching, Computational Topology, Topological data analysis, Machine learning, clustering.*

**Ogle,** Crichton — PhD: Brandeis University (1984)
COLUMBUS — ogle.1@osu.edu — 614-292-0836
***Research:*** *Topology - K-Theory*

**Sidiropoulos,** Anastasios — PhD: MIT – Computer Sci. (2008)
COLUMBUS — sidiropoulos.1@osu.edu — 614-292-0248
***Research:*** *Computational Geometry, High-dimensional, and metric geometry, Algorithms and on planar graphs, and surfaces, Computation of Low-dimensional Metric Embeddings.*

**Chmutov,** Sergei — PhD: Moscow State University (1985)
MANSFIELD — chmutov.1@osu.edu — 419-755-4287
***Research:*** *Algebraic Geometry and Topology, Knot & Graph Theory*

**Harper,** John — PhD: University of Notre Dame (2008)
NEWARK — harper.903@osu.edu — 740-755-7854
***Research:*** *Topology, Homotopy Theory, Modules over Operads, K-Theory & TQ-Homology.*

**Johnson,** Niles — PhD: University of Chicago (2009)
NEWARK — johnson.5320@osu.edu — 740-755-7856
***Research:*** *Topology, Categorical and Computational Aspects of Algebraic Topology, Picard/Brauer theory .*

**Rao,** Vidhyanath — PhD: Case Western Reserve (1981)
NEWARK — rao.3@osu.edu — 740-366-9341
***Research:*** *Topology - Homotopy Theory - K-Theory*

**Yau,** Donald — PhD: Massachusetts Institute of Technology
NEWARK — yau.22@osu.edu — 740-366-9197
***Research:*** *Topology, Algebra, Hom-Lie algebras, Deformations*

## *Differential Geometry*

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**Guan,** Bo — PhD: University of Massachusetts (1992)
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***Research:*** *Partial Differential Equations - Geometric Analysis*

**Zheng,** Fangyang — PhD: Harvard University (1989)
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## *Combinatorics, Probability & Graph Theory*

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***Research:*** *Combinatorics - Probability Theory - Random Matrices - Number Theory*

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## Real Analysis

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## Complex Analysis

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## Partial Differential Equations

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***Research:*** *Partial Differential Equations, Zero Dispersion & Semi-Classical Limits, Whitham Equations, Modulation of Dispersive Oscillations, Free Boundary Problems*

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***Research:*** *Partial Differential Equations, Mathematical Physics, Dynamical Systems, Wave Equations & Fluid Dynamics*

## *Mathematical Biology & Numerical Analysis*

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***Research:*** *Computational & Mathematical Biology, Systems Biology of Cell Polarity, Numerical Algorithms for Hyperbolic Problems, Conservation Schemes & Laws*

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***Research:*** *Behavioral Ecology, Coerced Cooperation, Evolution of Cooperative Behavior, Mathematical Modeling*

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***Research:*** *Partial Differential Equations, Mathematical Biology, Evolutionary Game Theory, Free-boundary Problems.*

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***Research:*** *Partial Differential Equations, Applications in Population Biology, Nonlinear Elliptic and Parabolic Systems*

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## *Other Applied Mathematics*
### *Mathematical Physics*

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***Research:*** *Applied Mathematics*

## Ergodic Theory

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## Representation Theory, Operator Theory, Harmonic Analysis

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***Research:*** *Representation Theory of Infinite-Dimensional Quantum Groups, Classical and Quantum Integrable Systems*

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***Research:*** *Operator algebra, von-Neuman Subfactors, Fusion and Tensor Categories, Mathematical Physics, Non-commutative Geometry.*

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## Logic

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