



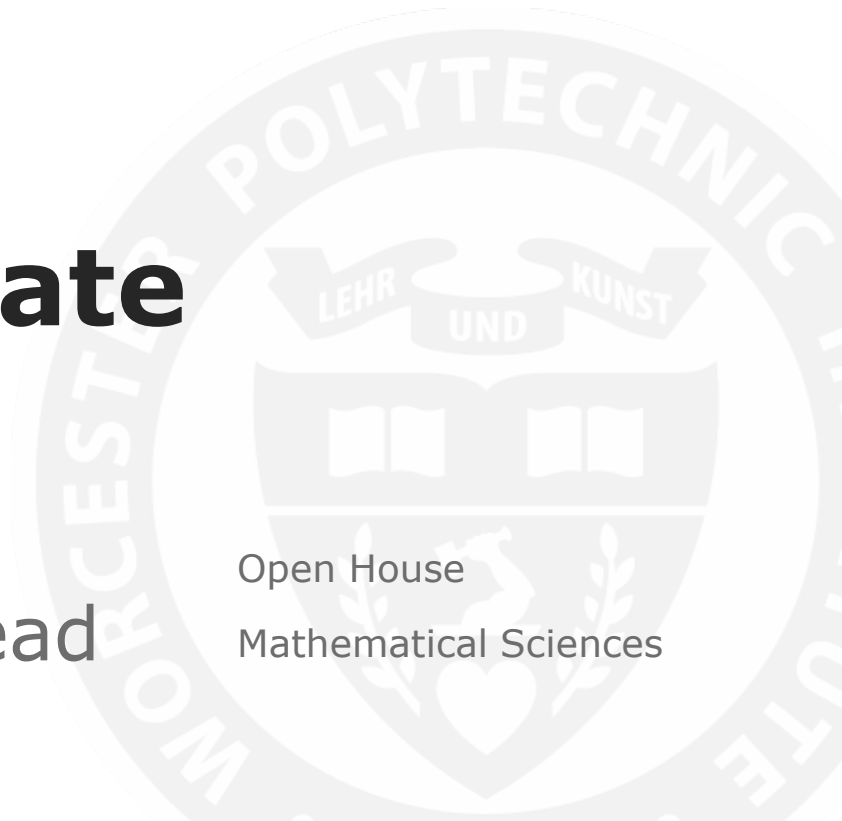
WPI

Mathematical Sciences at WPI

The Undergraduate Experience

Marcel Blais, Associate Head

Open House
Mathematical Sciences



WPI Undergraduate Experience

- Flexibility with four terms per year
- Close interaction with faculty
- Collaborating with faculty active in fundamental research (MQP)
- Good job and graduate school prospects

WPI First Year Focus

- **Mathematics**
- **Science**
- **Humanities or Social Science**

First Year Mathematics

- Traditional Calc Sequence MA1021-1024
- Calculus with Review MA1020, 1120
- Analysis Sequence MA1033-1034
- Bridge to Higher Math MA1971
- Linear Algebra, Differential Equations,
Probability, Statistics...

“Traditional” Calculus MA1021-1024

- MA1021 – Derivatives and applications
- MA1022 - Integrals and applications
- MA1023 – Infinite Series, Parametric Curves, Vectors
- MA1024 – Partial Derivatives and Multiple Integrals

All are term-length courses for 1/3 unit credit

Calculus with Pre-Calculus Review

- **MA1020** – Derivatives and applications
 - Semester-long (14 weeks) course in the fall
 - Pre-Calculus Review!

- **MA1120** – Integrals and applications
 - Semester-long course in the spring

The Analysis Sequence

MA1033 in A term, MA1034 in B term,

- Rigorous treatment of calculus III and IV (with proofs)
- Appropriate for math majors and those who want the theory behind the calculus

MA1971: Bridge to Higher Mathematics

- Introduction to mathematical thinking
- Develop mathematical logic and reasoning skills
- Learn to explain, justify, defend, disprove, conjecture and verify mathematical ideas, both verbally and in writing
- Recommended for all Mathematical Sciences majors (MA & MAC)

Advanced Placement Credit

- **College Transfer Credit**
- **Advanced Placement (AP) Exam**
- **WPI Retroactive Credit**

AP Exam Credit

- 4 or 5 on AB exam
 - Credit for Calculus I and Calculus II
 - Take Calculus III in A term
 - Take Calculus IV in B term

- 4 or 5 on AB exam
 - Credit for Calculus I, II, and III
 - Take special Calculus IV in A term
 - Take special Differential Equations in B term
 - Take special Linear Algebra MA2072 in C term

Retroactive Credit

- Get free **credit for Calculus I** if*
 - Take and **pass Calculus II** in first year
 - Take and **pass Calculus III** in first year

- Get free **credit for Calculus I and II** if*
 - Take and **pass Calculus III** in first year
 - Take and **pass Calculus IV** in first year

* No changes and no substitutes, no math NRs

For Math Majors after the First Year

- Choose a Concentration... Transition Courses
 - Math Modeling with Differential Equations
 - Graph Theory, Combinatorics
 - Probability Theory
 - Linear Algebra II
- Upper Level Courses for breadth and depth
- Major Qualifying Project as a capstone

Some Mathematical Sciences MQPs

- Mathematical Model of Brain Tumors
- Differential power analysis side-channel attacks in cryptography
- Robustifying Logistic Regression for Nonresponse: An Application to BMI
- One-dimensional Viscoelastic Cell Motility Model
- Optimal Portfolio Analysis with Turnover Constraints
- Optimization of the Sierpinski Carpet Fractal Antenna
- An Investigation of Polya's Function
- Regulatory Network Models for Biology
- Thin-film Ferrofluidics
- Nanoionic Particle Composite Homogenization
- Network Anomaly Detection Using Robust Principal Component Analysis
- Calibration of an Optimal Bidding Model for the Mobile Advertisement Markets

BS/MS Programs

We have two BS/MS programs, which enable students to obtain both a BS and MS degree with 5 years of study:

- The 5-year BS/MS Program
- The “standard” BS/MS Program

The 5-year BS/MS Program

- Exclusive to Math Sciences Dept
- Apply when applying for admission as a freshman
- If accepted, progress reviewed in junior year
- Work as a PLA while an undergraduate
- 5th year is tuition-free; work as half-time TA
- Available for Financial Math, Industrial Math, Applied Math, & Applied Statistics MS programs.

“Standard” BS/MS Program

- Apply in junior year
- If accepted, can double-count courses to enable BS and MS in 5 years
- Available for the following Math Sciences MS programs:
 - Applied Mathematics
 - Applied Statistics
 - Financial Mathematics
 - Industrial Mathematics

Mathematical Sciences Minors

- **Can minor in Mathematics or Statistics**
- **Take 5 Courses + 1 Capstone**

Center for Industrial Mathematics and Statistics



- Build connections between academics and business and industry
- Students work on real-world projects that come directly from industry, government and finance

<http://www.wpi.edu/+CIMS>

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UTRC



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BOSE



CIMS Industrial Partners

200+ students have worked on
110+ industrial projects from
50+ companies



A Passion to Perform.

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For More Information

<http://www.wpi.edu/+MATH>