

ANALYTIC THREADS

Annual newsletter of the Department of Mathematics, Physics and Statistics

Fall
2018

Faculty News



Matthew Farrar

Dr. Matthew Farrar presented "A Direct Comparison of the Relative Efficacy of Modeling- Based vs.

Highly Structured Introductory Physics Labs" at the spring 2018 meeting of the American Association of Physics Teachers – Central Pennsylvania Section.



Niklas Hellgren

Dr. Niklas Hellgren spent spring 2018 on sabbatical at Linköping University in Sweden where he worked

on high power impulse magnetron sputtering (HiPIMS) of TiB₂ thin films.



Abaz Kryemadhi

Dr. Abaz Kryemadhi, along with Lindsey Barner '17, Andrew Grove '18, Jacob Mohler '18 and

Alexander Roth '17, published A LYSO crystal array readout by silicon photomultipliers as compact detector for space applications in "Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment" (October 2017).

Matthew Bressler '16, along with Lydia Goodwin '17 and Dr. Kryemadhi, published "Cosmic Ray Topography in American Journal of Physics" (November 2017).

In July 2017, Dr. Kryemadhi gave an invited presentation, A LYSO crystal array readout by silicon photomultipliers as compact detectors for space applications, at the New Development in Photodetection Conference in Tours, France. This conference was limited to 240 experts worldwide in innovative particle detectors.

The 2017-2018 academic year marked

the third year of Dr. Kryemadhi's 2016-2018 Templeton Foundation Grant. He is working with Dr. Robin Collins (Philosophy) to further the discoverability livability hypothesis drawing from particle physics.



Cynthia Lehman

Congratulations to Professor Cindy Lehman on her selection for the first group of Sawyer Faculty

Fellows at Messiah College. This inaugural group will explore ways in which technology can support and enhance their pedagogy, thus improving the digital proficiency of their students. These fellows participated in a summer 2018 intensive where they gained foundational knowledge similar to that which will be received by students who register for the fall 2018 Sawyer Certificate Program. Fellows will build upon the intensive by continuing to collaborate through a professional learning community (PLC) during the academic year. They also will also share the results of their project with their Messiah peers.

Professor Lehman (along with Professor Daniel Inouye) presented "Inclusive Excellence: First Generation Latino Students" in October 2017 as part of the fall 2017 Teaching Tuesdays Series at Messiah College.



Amanda Lohss

Dr. Mandy Lohss presented "The Statistical Structure of Concave Compositions" in August

2017 at the 18th International Conference on Random Structures and Algorithms held at The Institute of European Culture in Gniezno, Poland.

In November 2017, she was an invited speaker for Dickinson College's Math and Computer Science Chat series. Her topic was Tableaux and the ASEP.

Dr. Lohss presented "Regular Permutation Graphs" in November at the fall 2017 meeting of the Mathematical Association of America EPADEL Section held at Shippensburg University.

In January 2018, she gave the invited presentation, "Tableaux and the ASEP," in the AMS (American Mathematical Society) Special Session on Applied and Computational Combinatorics at the Joint Math Meetings in San Diego.

Dr. Lohss received a National Science Foundation research grant for 2018-2019. She will be working with three student collaborators: Ryan Althoff '21, Daniel Diethrich '19 and Emily Wichert '19.

In 2018-2019, Dr. Lohss will continue as a Project NExT Fellow in the Mathematical Association of America (MAA). Project NExT (new experiences in teaching) is a national and competitive professional development program for new or recent Ph.D.'s in the mathematical sciences. Fellows learn together about all aspects of an academic career: improving the teaching and learning of Mathematics, engaging in research and scholarship, finding exciting and interesting service opportunities, and participating in professional activities. As a fellow, she attended and will attend, targeted professional development seminars at MAA national meetings in July 2017, January 2018 and July 2018.



Douglas Phillippy

Dr. Doug Phillippy published "Finding Meaning in Calculus (and Life)" in Association of Christians

in the Mathematical Sciences (ACMS) 21st Biennial Conference Proceedings (May 2018).

Faculty news, continued on page 2



Samuel Wilcock

Congratulations to Dr. Sam Wilcock on his selection for the first group (2018-2019) of Sawyer

Faculty Fellows at Messiah College.

In June 2018, Dr. Sam Wilcock was a tenth-time participant in the Statistics AP Reading held in Kansas City, Missouri. He joined these departmental alumni in that endeavor: Doug Tyson '92, Leigh (Leisenring) Nataro '92, Kevin Robinson '93, Bryan Crissinger '97 and Erica (English) Chauvet '01.

Retired Faculty News



Marvin Brubaker

Numerous times since his retirement after the spring 2005 term, Dr. Marvin Brubaker has been

invited back to campus by Dr. Phillippy to guest lecture in one of his classes. In spring 2018, he lectured on Applications of the Parabola in MATH 308 (Differential Equations) and on Recursion and Its Applications in MATH 195 (First Year Mathematics Seminar).

Welcome



Binbin (Ben) Huang

In fall 2018, Dr. Ben Huang will join the Department of Mathematics, Physics, and Statistics

as assistant professor of Mathematics. He received his Ph.D. in Mathematics from Binghamton University-SUNY (State University of New York) in May 2018, with research on pseudodifferential calculus over manifolds with boundary with modest decay. He received his B.A. in mathematics and applied mathematics from South China Agricultural University. Dr. Huang is involved in a few on-going projects with his doctoral advisor, including textbooks and research papers.

Dr. Huang grew up in an atheistic environment and came to know Christ as his savior through a Chinese Christian Fellowship group in Binghamton. He is also a music lover and amateur guitar player/singer. He serves as worship leader/coordinator regularly in his current Chinese Christian church in Binghamton. He is always looking to collaborate and exchange ideas with other music lovers.



Lamarr Widmer, pictured above with his mother-in-law, Julia Kimani Kinuthia, and his father-in-law, Gershon Kinuthia Nganga, is retiring after 30 years at Messiah College.

Thank You & Farewell Lamarr Widmer

Spring 2018 marked the end of professor of Mathematics Lamarr Widmer's long tenure at Messiah College. He came to Messiah College as a theoretical mathematician in fall 1988 after completing his Ph.D. in mathematics at the University of Iowa. He had previously earned his B.A. and M.S. there.

After earning his B.A., Dr. Widmer worked for the world's largest printer of business forms (Moore Business Forms) for one year and then spent seven years with the Mennonite Central Committee (MCC). After a year of French language study in Brussels, Lamarr spent six years teaching secondary mathematics at an American Baptist school in Zaire (now the Democratic Republic of the Congo).

While on the faculty at Messiah, Dr. Widmer spent two academic years in Kenya. In 1994-1995, he was the Messiah College teaching representative to Daystar University which was affiliated with Messiah at that time. During that year, he developed a relationship with Margaret Kinuthia, Assistant Registrar at Daystar.



That friendship blossomed into a romance and they were married in 1999. Over the years, they have returned to Kenya numerous times for family visits.

For his sabbatical in 2009-2010, Dr. Widmer returned to Daystar to teach and advise them in the development of a mathematics major. By then, Daystar had become an independent university.

Dr. Widmer was part of several Colaboratory teams whose work focused on meeting critical needs in several African nations. He was particularly well suited for this involvement due to his love of Africa, his concern for these needs, and working knowledge of the French language. In this role, he was part of numerous site visits: Burkina Faso (1 time), Ghana (4), Kenya (1), and Mali (4).

As a theoretical mathematician, Dr. Widmer loves abstract theory. In midcareer, he said, “I’m freshly discovering how much fun it is to be curious.” In several of his courses, he sought to infect his students with this curiosity by having them explore where his and their curiosity led.

In his 30-year tenure at Messiah, he taught many courses taken by department majors: Calculus I, Calculus II, Discrete Mathematics, First Year Mathematics Seminar, Calculus III, Linear Algebra, Numerical Analysis, Differential Equations, Algebraic Structures (his favorite course to teach), History of Mathematics, Introduction to Mathematical Research, Senior Mathematics Seminar, Principles of Proofs, Number Theory, Complex Variables and Algebraic Structures II.

Dr. Widmer advised the Math Problem-Solving Group (Math Club) for many years. He also supervised honors projects in mathematics for five students: Kayla Blyman '09, Joel Derstine '93, Scott Pickard '05, Matthew Wright '06 and Nicholas Zoller '03.

Dr. Widmer was one of two co-editors of the Problems Section of The Journal of Recreational Mathematics for many years. In that role, he selected and clarified mathematical problems and their solutions. As an outgrowth of that role, he assisted in the organization of the first two MOVES (Mathematics of Various Entertaining Subjects) Conferences held at the National Museum of Mathematics (MoMath) in New York.

Dr. Widmer's post-retirement plans include gardening and lawn work, enjoying his 1979 Ford, keeping up with the responsibilities of his position at Slate Hill Mennonite Church, and daily walks with his wife. He plans to take one year to determine how busy he wishes to be before likely committing to a couple of volunteer opportunities and/or part time employment.

Dr. Widmer will be greatly missed by his colleagues. We appreciated his enthusiasm for teaching, concern for our students, reliability, and steadying influence in department deliberations. He was a real team player.

Former students and colleagues will have an opportunity to celebrate Dr. Widmer's retirement with him at a reception during Homecoming. (See the Future Events section.)

Student News Honors



Clockwise from top left: Jason Price, Jacob Mohler, Hallie Miller, Leanne Weaver, Kyler Shea, Olivia Tamm

- Congratulations to the Department's top scorer on the mathematics major field test, **Jason Price!** Price graduated with department honors in mathematics. His thesis was entitled “Diophantine Equations.”
- Congratulations to the Department's top scorer on the physics major field test, **Jacob Mohler!**
- **Hallie Miller** graduated with department honors in physics. Her thesis was entitled “Growth and Characterization of ZnSe Thin Films by RF Magnetron Co-sputtering.”
- **Olivia Tamm** graduated with department honors in mathematics. Her thesis was entitled “Spherical Geometry and its Applications.”
- **Kyler Shea '21** was selected as the Middle Atlantic Conference (MAC) Cross Country Male Rookie of the Year.
- **Leanne Weaver '20**, the MAC Outdoor Track Female Athlete of the Year, was the MAC champion in the 800 m, 400 m Hurdles, and 4 x 400 m relay. She qualified for the NCAA III National Outdoor Track & Field Championships

where she finished 10th. Leanne earned U.S. Track & Field and Cross Country Coaches Association (USTFCCCA) All-Academic honors for NCAA Division III Women's Track & Field. During this past season, she improved her own Messiah College 800 meter school record to 2:10.97.

Presentations

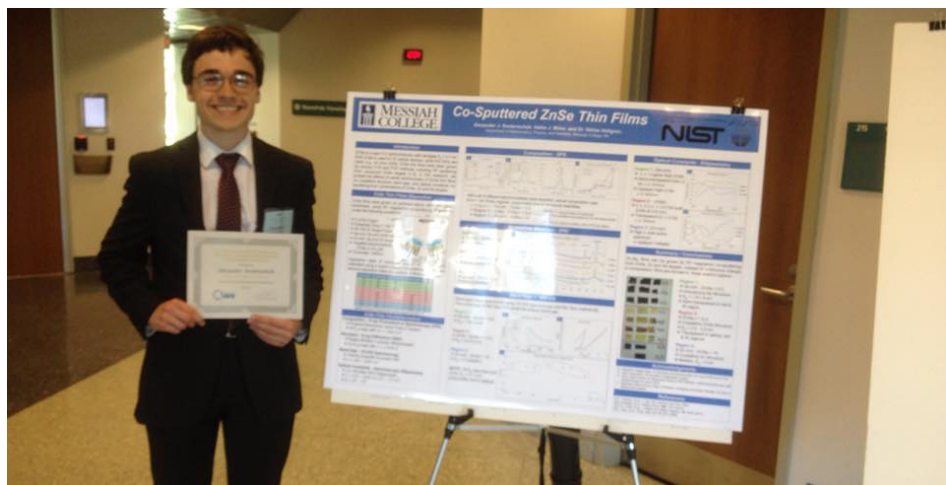
In May 2018, Alexander Sredenschek presented the poster Co-Sputtered ZnSe Thin Films at the American Vacuum Society Mid-Atlantic Chapter Meeting held at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland. This poster was based on research that he and Hallie Miller '18 conducted under the supervision of Dr. Hellgren. In competition with graduate students from research universities, Alex won Honorable Mention and a \$50 cash prize.

Presentations at the 15th Annual Symposium of the School of Science, Engineering, and Health on May 4, 2018

Mathematics

- **Laura Bigelow '19:** “What Math is Really True?”
- **Jacob LaGrand '18:** “The History of the Fourier Series”
- **Ming Luo '18:** “Series Solutions of Linear Equations”
- **Hannah Mackenzie '18:** “PageRank Algorithm – A Glimpse of Understanding Google”

Student news, continued on page 4



Alex Sredenschek presented at the Mid-Atlantic Chapter meeting of the American Vacuum Association.



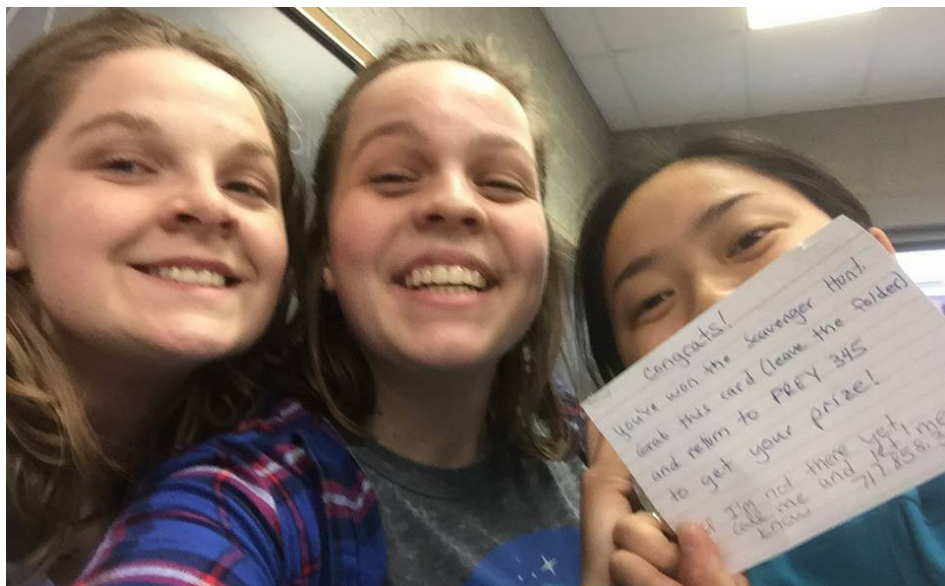
Clockwise from top left: Laura Bigelow, Jacob LaGrand, Ming Luo, Joshua Skula, Thien Nguyen, Hannah Mackenzie

- **Thien Nguyen '18:** "Dota 2 eSport Tournament Prediction"
- **Jason Price '18:** "Diophantine Equations"
- **Joshua Skula '18:** "An Examination of the History, Structure, and Applications behind Quaternions"
- **Alexander Sredenschek '19:** "Fourier Series"
- **Olivia Tamm '18:** "Spherical Geometry and its Applications"



Physics

- **Andrew Grove '18:** "Portable Cosmic Ray Muon Detector for Education"
- **Hallie Miller '18 and Alexander Sredenschek '19:** "ZnSe Film Growth via Magnetron RF Sputtering"
- **Jacob Mohler '18:** "Fractional Calculus"



Math Problem Solving Group's cryptology scavenger hunt

Summer 2018 Activities: MPS Discipline-Related



- **Ryan Althoff '21** had a statistics and accounting position in Student Financial Services at Messiah College.
- **Hallie Miller '18 and Alexander Sredenschek '19** had a Physics Summer Undergraduate Research Fellowship (SURF) at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland.
- **Bailey Rhodes '20** participated in a Physics and Chemistry REU (Research Experiences for Undergraduates) at Colorado State University.



Class of 2018: Employment and Education Placements (To Date)



- **Joshua Conrady**, mathematics, engineering with computer engineering and electrical engineering concentrations: Deloitte in Mechanicsburg, Pennsylvania – Solutions Analyst
- **Jacob LaGrand**, mathematics, philosophy: Peace Corps in Lesotho – Secondary Mathematics Teacher
- **Hannah Mackenzie**, mathematics, youth ministries minor: Black Forest Academy in Kandern, Germany – Resident Assistant
- **Hallie Miller**, physics (B.A.): Materials Science and Engineering (Ph.D.) at University of Utah
- **Olivia Tamm**, mathematics with certification: West Shore Christian

Academy in Shiremanstown, Pennsylvania – Secondary Mathematics Teacher

Department News

The Department of Mathematics, Physics and Statistics houses six majors: actuarial science, mathematics, mathematics with certification, physics (B.A.), physics (B.S.), and physics with certification. It also houses three minors: mathematics, physics, and statistics. Full-time faculty members are Dr. Eby, Dr. M. Farrar, Dr. Hare (Dean of the School of SEH), Dr. Hellgren, Dr. Huang, Dr. Kryemadhi, Prof. Lehman, Dr. Lohss, Dr. Phillippy, and Dr. Wilcock (Chair of the Department of MPS).

MPS Department Graduates

Eleven students graduated in December 2017 and May 2018 with majors in the

MPS Department. Two of these were a double major with the second major in another department. Here is the breakdown by major.

Mathematics: 5

Mathematics with certification: 3

Physics (BA): 2

Physics (BS): 1

Program News

Actuarial Science

In fall 2017, the Department of Mathematics, Physics and Statistics launched the actuarial science (B.S.) major and enrolled its first majors.

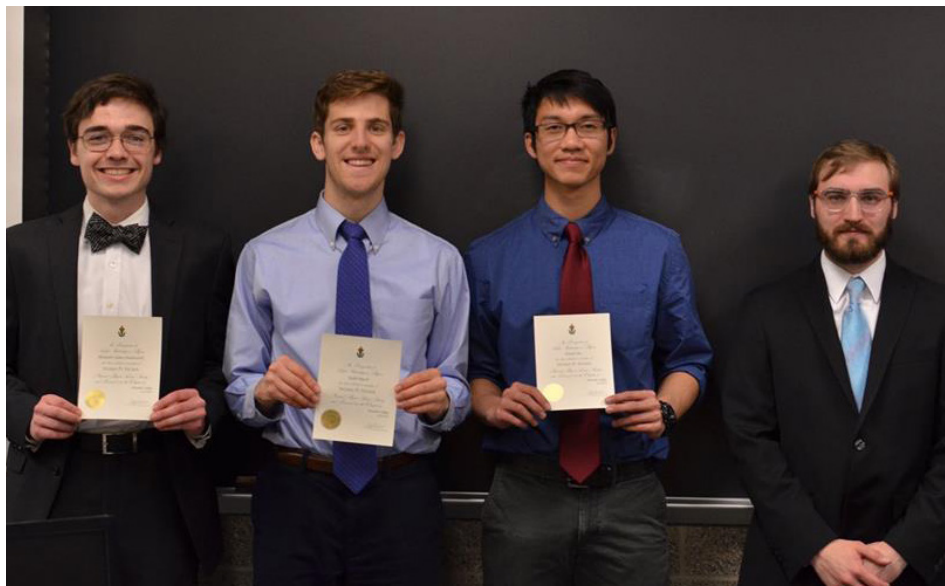
We are building an actuarial science resource list of Messiah College graduates who are working, or have recently worked, at any level in the actuarial science field. If Dr. Eby has not already contacted you about having your name included on that list, please email him at eby@messiah.edu. If you are one of these graduates, we hope that you will be willing to be on this list. Sometimes a student has a question that is best answered by a professional actuary. It is helpful for us and them if we can refer them to you and they can ask their question directly by email. We also hope that some of you, if your logistics allow, will be able to visit us sometime to meet with and speak to our students. Please do not feel any pressure from us to be involved more than you wish or are able to.

This year, Dr. Lohss received funding from the Library Special Projects Fund to buy resource materials for this new major.

Mathematics

With Dr. Lohss as advisor, the Math Problem-Solving Group was quite busy this year with these activities:

- **The Great Math Race (Service Event):** assisted in the coordination of this event in which students from local high schools come to campus to interact with Messiah College students through fun math problems. The Club wrote all the math problems for this event and volunteered during the event to run some of the tables. Some of Messiah students also had lunch with the high school students to answer questions about Messiah College.
- **Putnam Exam Problems:** discussed previous problems to help prepare some of the students for the exam.
- **Cryptology Scavenger Hunt:** Dr. Lohss



2018 Sigma Phi Sigma Physics Honors Society inductees (from left) Alex Sredenschek, Kaleb Burch and Daniel Ma with alumnus Matthew Bressler

organized a scavenger hunt for the students in which each station had an encrypted code along with a description and brief historical background of the cipher used.

- **Movie Night:** watched a documentary on Isaac Newton.
- **Careers in Mathematics:** two Messiah College alumni spoke in a panel session focusing on Actuarial Science.
- **Math/Logic Puzzles**
- **Game Night**
- **Mathematical Origami**

Physics

Messiah's 8th Annual Nobel Prize Seminar was held on Nov. 28, 2017. The Nobel Prize in Physics 2017 was discussed by Dr. Matthew Farrar. That prize was divided with one-half awarded to Rainer Weiss and the other half jointly awarded to Barry C. Barish and Kip S. Thorne "for decisive contributions to the LIGO (Laser Interferometer Gravitational-Wave Observatory) detector and the observation of gravitational waves."

The Physics Club Demo Show on Dec. 6, 2017 was a rousing success again. Demonstrations focused on gravity and motion, levitation, steam power and plasma in a bottle. After the show, there were some hands-on demonstrations in the lobby.

Three students were inducted into the Sigma Phi Sigma Physics Honors Society in March 2018: Alexander Sredenschek '19, Kaleb Burch '18, and Daniel Ma '19. The induction ceremony was combined with a Physics Club event in which alumnus Mat-

thew Bressler '16 gave a presentation about his graduate research at Drexel University.

A new course, PHYS 218 – Speech Hearing Science, was approved as part of a new minor in Speech and Language Pathology. It will be offered for the first time in the 2018-2019 academic year. This course was developed, and will be taught, by Dr. Matthew Farrar. It focuses on acoustics as applied to sound generation, detection, and analysis.

Opportunities for Adjunct Teaching at Messiah

Are you or someone you know interested in teaching mathematics or physics at Messiah College? Interested persons with at least a master's degree in a related field are encouraged to send their resume and statement of interest to Dr. Wilcock at One College Avenue, Suite 3041, Mechanicsburg, PA 17055-6807. The MPS department often needs part-time adjunct instructors to teach general education courses, and we welcome applications from alumni and their friends and family.

Address Reminder

Use the following address format to contact a faculty member by regular mail.

Name of faculty member
One College Avenue, Suite 3041
Mechanicsburg, PA 17055-6807

Alumni Campus Presentations



Matthew Bressler '16

In March 2018, Matt Bressler, graduate student at Drexel University, presented on his research

PICO: Using Tiny Bubbles to Probe the Universe's Biggest Mysteries.



David Kline '10

Dr. David Kline presented A Joint Spatial Model of Opioid Associated Deaths and Treatment Admissions

in Ohio in April 2018. He earned his Ph.D. in Biostatistics from The Ohio State University and is currently a research scientist at The Ohio State University in the Department of Biomedical Informatics Center for Biostatistics.



Eric Mann '87 and

Ryan Griffith '07

Eric Mann and Ryan Griffith (pictured left)

spoke in the Math Problem-Solving Group Careers in Mathematics Series in April. Their event focused on actuarial science.



Collaboratory News

Staff and students from the MPS Department continue to be heavily involved in projects within the Collaboratory for Strategic Partnerships and Applied Research (messiah.edu/collaboratory).

Dr. Matthew Farrar is project manager for the Diagnostics of Viral Disease Project which is targeted towards determining viral loads in developing countries with endemic HIV infections.

Dr. Phillippy is Advisor for the Straight Vegetable Oil Project which completed its work product for Messiah alumnus Matthew Walsh '00 who now serves as a missionary in Burkina Faso.

Future Events

Saturday, Oct. 20, 2018

Homecoming Reception Honoring Dr. Widmer

All alumni are invited to attend a reception celebrating Dr. Widmer's 30 years at Messiah. It will be held during Homecoming (Saturday, Oct. 20, 2018) at Dr. Wilcock's home (5 Summit Drive, Dillsburg – just across the street from Shoemaker Soccer Field). Email our administrative assistant, Jean McCauslin (JMcCausl@messiah.edu) by Wednesday, Oct. 17 if you plan to attend.

Friday May 3, 2019

School of Science, Engineering and Health 16th Annual Symposium

The MPS Department's involvement in an event like this began as the School of Mathematics, Engineering and Business (MEB) Scholarship Day. It then became the MEB Student Scholars' Expo. With the formation of the School of Science, Engineering and Health, it became the School of Science, Engineering and Health Annual Symposium. If you live within driving distance of the College, we encourage you to visit this symposium, which is always held on the last Friday of the spring term and features student (mostly) and staff presentations. There is no registration fee, and snack breaks are provided. For details including abstracts, check the SEH School website in Spring 2019 (messiah.edu/seh_symposium).

Request for Internship Opportunities

Does your employer hire interns in mathematics, physics, statistics or actuarial science? Our majors often pursue minors in business, economics or statistics and are seeking internships in their third and fourth years. Please inform the MPS Department of such opportunities by emailing Dr. Wilcock (swilcock@messiah.edu).

Even if you live far from Messiah, we may have a student from a nearby hometown interested in a summer internship.

Support Opportunities

Your continuing support of Messiah College in all ways is greatly appreciated. With respect to financial support, some of you may wish to target donations to specific projects related to the department. Of course, your gift is doubled when your employer has a matching gift program. Consider a gift to the College that is earmarked as described below.

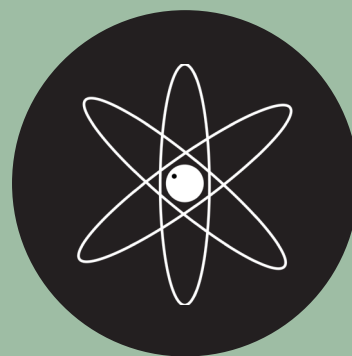
- Send your tax-deductible gift – check made payable to Messiah College – to Office of Development, One College Avenue, Suite 3013, Mechanicsburg, PA 17055-6807.
- To make a donation to the Department of Mathematics, Physics and Statistics, put MPS Dept. on the memo line of your check.
- To support the Collaboratory Diagnostics of Viral Disease project, put Collab. – DVD project on the memo line of your check.
- The SEH School has an enrichment fund that is used to fund student travel to out-of-state academic conferences to present their work. This fund rolls over year to year, so it is a great place for one-time gifts. Donors should specify SEH School – Enrichment Fund.
- If you are interested in contributing to a scholarship for students in the MPS Department, contact the Office of Development. It takes \$25,000 to underwrite (seed) a scholarship.
- If you are interested in contributing to an endowed scholarship chair for faculty members in the MPS Department, contact the Office of Development. It takes \$2 million to underwrite an endowed scholarship chair.



Mathematics

Reason logically to answer challenging questions.

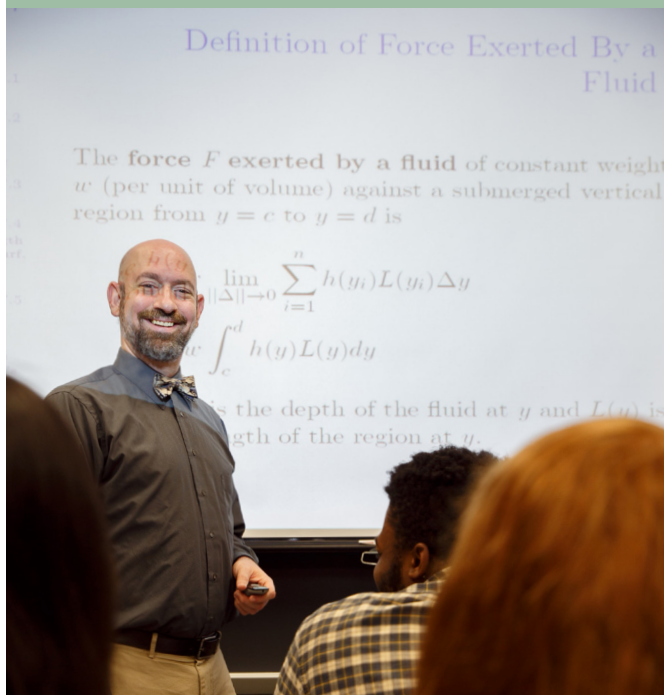
Go beyond the realm of mere facts and numbers as you develop creative problem-solving skills you can apply to complex problems in almost any field. With Messiah's Christian professors as your guides, experience the intricate balance of art and science and learn to maximize both your intuitive and analytical skills. You'll also grow to appreciate how your Christian faith and mathematics complement each other as you acquire the intellectual and spiritual vigor necessary to *interpret information and solve problems*.



Physics

Probe a universe of interactions.

Study the building blocks of the universe, from quarks to galaxies, and explore the basic laws and forces of nature. Then, with a solid theoretical foundation and hands-on research experience, you may just find yourself mapping out the dark matter in the universe or discovering the optimal atomic structure for next-generation solar cells. Study complex theories in class, then apply what you've learned through hands-on research or an internship where you'll *solve problems and serve communities*.





DEPARTMENT OF MATHEMATICS,
PHYSICS AND STATISTICS

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ANALYTIC THREADS

Analytic Threads is the annual newsletter of the Department of Mathematics, Physics and Statistics (MPS) at Messiah College. It is sent annually to alumni and is also available electronically at the website messiah.edu/MPS.

Parting Thoughts

We hope that all is well with you and your families. We enjoy receiving updates and having you visit us at Messiah. However, we will generally not publish your updates. Since your circle of connections at Messiah College was bigger than the MPS department, we encourage you to send the updates that you want to be published to the Class Notes section of *The Bridge*, the College's magazine for alumni, parents and friends (messiah.edu/alumni/sendnews).

To update your email address, please contact our administrative assistant, Jean McCauslin, at jmccausl@messiah.edu.

Editor: Dr. Marlin Eby (Eby@messiah.edu)