

ANALYTIC THREADS

FALL 2016

News from the department faculty



Matthew Farrar

Drs. Emily (engineering) and Matthew Farrar mentored two Steinbrecher Undergraduate Summer 2016

Research Fellowship recipients, Brianne Roper and Daniel Haas, on the Collaboratory Diagnostics of Viral Disease (DVD) project. Their particular project is entitled Diagnostic Protein Probe for HIV Detection. The DVD project aims to use dynamic light scattering and a novel molecular probe to diagnose HIV at point of care in the developing world.



Angela Hare

After a national search, Dr. Angela Hare was chosen as dean of the School of Science, Engineering and Health, effective March 17,

2016. Congratulations! She had served as interim dean since Feb. 13, 2015. Dr. Hare joined the Messiah College community in 1996 and had served as professor of mathematics, chair of the Department of Information and Mathematical Sciences and interim dean. In announcing Dr. Hare's appointment, Provost Randall Basinger said, "I am very pleased with Dr. Hare's acceptance to continue in this capacity on a permanent basis. She is well positioned to provide ongoing leadership to the School and the College." She will also retain her academic appointment in the Department of Mathematics, Physics and Statistics.

Under Dr. Hare's direction, mathematics-with-certification majors Victoria Dix, Jessica Martin and Rebekah Curtis Shoemaker, and Emily Smetak (mathematics '17) completed a mathematics primer in the French language for children in the middle-level grades in Burkina Faso, West Africa. This primer was designed to help these children prepare for a national middle school entrance exam. The students



Clockwise from top left: Burkina Faso Outreach teacher with two mathematics students. Emily Smetak directing a craft activity. Victoria Dix distributing bracelets at a Burkina Faso Outreach party. Emily Smetak, Jessica Martin, Victoria Dix and Rebekah Curtis Shoemaker at an artisan village in Ouaga. Rebekah Curtis Shoemaker with a canine friend in Yako.



worked with Dr. Hare for three semesters to draft this resource for their partner organization, Burkina Faso Outreach, and traveled to the village of Yako in Burkina Faso for two weeks in January 2016 to receive input from local teachers before completing the resource in spring 2016.

In fall 2015, Dr. Hare taught MATH 490 – Graph Theory. This is an uncataloged course with a co/prerequisite of

MATH 261 – Linear Algebra.

In May 2016, Dr. Hare traveled with Drs. Randall Fish (engineering) and Scott Weaver (computer and information science) to Seoul, South Korea to explore a potential study-abroad partnership with Korea University through the Veritas Christian Study Abroad Program.

Faculty news, continued on page 2



Twenty-four Messiah students (including two from MPS) in front of a Norwegian stave church on the Scandinavia cross-cultural course, led by Dr. Hellgren and Dr. Noble.



Niklas Hellgren

Congratulations to Dr. Niklas Hellgren on his promotion to associate professor of physics!

Dr. Hellgren presented at two professional conferences this year: “In situ XPS Analysis of CN_x Thin Films” at the 62nd International Symposium of the American Vacuum Society (AVS) in San Jose, California on Oct. 19-23, 2015 and “Exploratory Physics – A New Introductory Physics Course at Messiah College” at the Central Pennsylvania Section of the American Association of Physics Teachers (AAPT-CPS) at Moravian College on April 8-9, 2016.

In May 2016, Dr. Hellgren and Dr. Alison Noble (Chemistry & Biochemistry) led 24 students on a cross-cultural trip to Iceland, Sweden and Norway.



Abaz Kryemadhi

On Feb. 2, 2016, Dr. Kryemadhi presented an invited talk, “Implementation of CERN-Based Data Monitoring System,” at the

University of Maryland. The invitation was extended by the ISS-CREAM Collaboration (International Space Station – Cosmic Ray Energetics and Mass), a collaboration of physicists planning to send a high energy cosmic ray detector into space. CERN is the European Organization for Nuclear Research. (Editor’s note: Yes, “ISS-CREAM” is pronounced “ice cream.”)

On March 7, 2016, Dr. Kryemadhi returned to the University of Maryland to give an invited talk to the physics department, “Study of Silicon Photomultipliers Coupled to LYSO Crystals as Compact Photon Detectors.”

Dr. Kryemadhi attended the American Physical Society Meeting on April 16-19, 2016 in Salt Lake City and presented “Study the Performance of LYSO and CeBr₃ Crystals Using Silicon Photomultipliers.”

Dr. Kryemadhi was awarded a \$9,036 NASA Pennsylvania Space Grant Consortium. The grant, Compact Detectors for Cosmic Rays and Dark Matter Searches in Space, will involve five students – Lindsey Barner, Andrew Grove (physics ’18), Jacob Mohler (physics ’18), Caleb Sisson (physics, engineering ’18), and Alexander Roth (engineering; physics minor ’17) – in research and development.

Dr. Kryemadhi and Dr. Robin Collins (philosophy) received a \$54,000 grant for 2016-2018 from the John Templeton Foundation Providence and Chance initiative to work on the project Discoverability and Providence. Of this grant, \$34,000 is allocated to Dr. Kryemadhi’s work on discoverability in particle physics.

In 2016-2017, Dr. Kryemadhi will serve as President of American Association of Physics Teachers – Central Pennsylvania.



Cynthia Lehman

With the appointment of Dr. Hare as SEH dean, a mathematician vacancy was created in the MPS department. The department was

granted permission by Provost Basinger to immediately begin a national search for her replacement. The department had to look no further than its own midst. Cindy Lehman (mathematics-with-certification ’94) who served the department as lecturer in mathematics in 2015-2016 accepted the College’s offer of a continuing position as senior lecturer in mathematics beginning in 2016-2017. Dean Hare is very pleased with the hire and believes that the department’s choice to hire someone who can provide attention and oversight to the QuEST (General Education) courses is a good and strategic one. On the other hand, Dr. Hare noted how quickly the department had replaced her. For more information about Professor Lehman, see Analytic Threads – fall 2015.



Douglas Phillippy

In May 2016, Dr. Phillippy accompanied a Collaboratory team to Panama to build a pedestrian bridge across a river. Among other

things, this new bridge will allow children

to cross the river on the way to school when rain would make fording the river dangerous. Dr. Phillippy was a last-minute replacement for tech. Andrew Erikson (engineering) whose father, Professor Emeritus Carl Erikson, was terminally ill. For news of Professor Erikson’s passing, see the In Memory section.



Christine Robinson

Dr. Christine Robinson was competitively selected for participation in the Park City Mathematics Institute Summer Undergraduate Faculty Program. This program was sponsored by the Institute of Advanced Studies in Princeton, New Jersey. She spent three weeks in July 2015 in Salt Lake City studying and researching the geometry of moduli spaces and representation theory and participating in discussions of pedagogy and practice. This program ran concurrently with programs for research faculty, graduate students, undergraduate students and secondary school teachers.

Dr. Robinson gave a talk entitled, “First Impressions: Using a Reciprocal Interview Activity to Set the Tone for the Semester,” at the STEM-UP PA Innovations in Teaching Symposium held at Dixon University Center in Harrisburg on Dec. 5, 2015.

In June 2016, Dr. Robinson was a first-time participant in the Calculus AP Reading held in Kansas City, MO.



Lamar Widmer

Dr. Widmer, a member of the organizing committee and a session moderator, attended the Second MOVES (Mathematics of Various

Entertaining Subjects) Conference held at the National Museum of Mathematics in New York on Aug. 2-4, 2015. He had been one of two co-editors of the Journal of Recreational Mathematics for many years.

After traveling to Ghana in July 2015, Dr. Widmer also traveled there twice in 2016 (January and June) as part of the Collaboratory Africa WASH (Water, Sanitation, and Hygiene) and Disability Study Team. This team continues its work with disability awareness and accommodations for access to sanitary facilities and water sources for people with disabilities.

Faculty news, continued on page 3



Samuel Wilcock

Congratulations to Dr. Wilcock on his promotion to professor of statistics!

Dr. Wilcock represented the ASA (American Statistical Association) Statistical Education Section on the Program Committee for the ENAR Spring Meeting held in Austin, Texas on March 6-9, 2016. ENAR is the Eastern North American Region of the International Biometric Society.

In June 2016, Dr. Wilcock was an eighth-time participant in the Statistics AP Reading held in Kansas City, Missouri. He joined several departmental alumni in that endeavor.

Retired Faculty News



Gene Chase

Dr. Chase continues as a Collaboratory consultant in the area of artificial neural networks (ANNs). The Wireless Enabled Remote

Co-presence (WERCware) system enables a job coach to monitor multiple employees in order to provide emotional assistance. The ANN, once trained, automatically detects stress from voice modulation and electrodermal response so that the job coach can intervene. Government agencies see WERCware as helping those with post-traumatic stress disorder to hold jobs.

In Memory



Carl Erikson

In announcing Professor Emeritus Carl Erikson's (engineering) passing on May 29, 2016, Dean Angela Hare stated, "With sadness but

rejoicing in a life lived for the Lord, I write to let you know that Carl died peacefully last night. Many of you know Carl well as a dedicated professor in engineering for many years and recent chair of that department. Carl's work for Messiah College was sacrificial, always thinking of and working for the good of the program, and he was a true Christian brother in Christ with us his colleagues." Since Professor Erikson occasionally taught a course in our department, some of you may remember him as one of your professors. His obituary may be viewed at messiah.edu/eriksonmemorial.

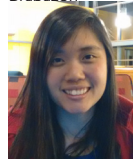
Student News

Honors



Brabazon

• Congratulations to the department's top scorer on the physics major field test, **John Brabazon!**



Chua

• **Phoebe Chua '16** graduated with department honors in mathematics. Her thesis was entitled "Communication Strategies for Spontaneous Teamwork."



deNyse

• Congratulations to the department's top scorer on the mathematics major field test, **Angela deNyse!**



Schrock

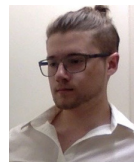
• **Katrina Schrock** graduated with department honors in physics. Her project was entitled "Low Cost, High Speed Correlation for Dynamic Light Scattering on a Field Programmable Gate Array and Potential Applications in HIV Detection."



Beam



Ritenour

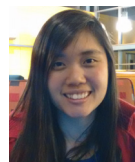


Saylor

• **Christopher Beam** (computer and information science, mathematics), **Laura Ritenour** (molecular biology, mathematics), and **Dallas Saylor** (English, mathematics), graduated with department honors in their respective second majors.



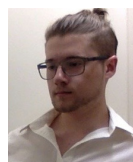
Beam



Chua



Ritenour



Saylor



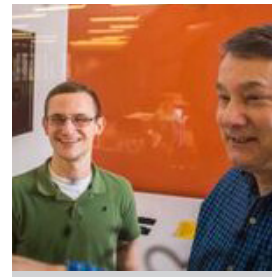
Schlogl



Schrock

• Six MPS department graduates were members of the College Honors Program:

Christopher Beam, Phoebe Chua, Laura Ritenour, Dallas Saylor, Rachel Schlogl and Katrina Schrock.



Dr. Eby and Nicholas Weaver discussing a theoretical statistical problem

• **Nicholas Weaver** (mathematics '17) and Dr. Eby were the subject of a full-page feature in Lancaster Mennonite School Bridges – Winter 2016. This issue of the LMS community magazine focused on current teachers, students and alumni who are scientists, mathematicians or teachers of science and mathematics. LMS is a significant feeder school to Messiah College.

community magazine focused on current teachers, students and alumni who are scientists, mathematicians or teachers of science and mathematics. LMS is a significant feeder school to Messiah College.

Presentations



Chua

• **Phoebe Chua** read her reflection, "Stillness through the Seasons," at the 2016 Baccalaureate Service.

• **Lindsey Barner, Andrew Grove, Jacob Mohler, Caleb**

Sisson and Alexander Roth presented "Development of Prototype Detectors for Cosmic Ray and Dark Matter Searches in Space" at the Central Pennsylvania Section of the American Association of Physics Teachers (AAPT-CPS) Spring Conference held at Moravian College on April 8-9, 2016.



Lindsey Barner, Jacob Mohler, Caleb Sisson, Andrew Grove, and Alexander Roth presenting research at the annual meeting of Central Pennsylvania Section of the American Association of Physics Teachers, at Moravian College.

Summer Activities: Discipline-Related



LaGrand

• **Jacob LaGrand** (mathematics, philosophy '18) was a teaching fellow (eighth grade mathematics) in the

Breakthrough Collaborative Teaching Residency Program held at the University of Texas, and local public and private middle schools, in Austin. To participate in Breakthrough, a student must be excelling within their public school district and an aspiring first-generation college student. For more on BCTRP, see www.breakthroughcollaborative.org.



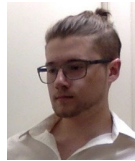
Schwiker

- **Kelly Schwiker** (mathematics '17) participated in the 2016 PIMS-NSF Undergraduate Workshop on Supersymmetry held at the Pacific Institute for the Mathematical Sciences at the University of British Columbia.



Ritenour

- **Laura Ritenour** (molecular biology, mathematics; chemistry minor): cell and molecular biology - cancer biology concentration (Ph.D.) at University of Pennsylvania



Saylor

- **Dallas Saylor** (English - writing concentration, mathematics): Poetry (M.F.A.) at University of Houston



Schrock

- **Katrina Schrock** (physics - B.S.; computer science minor): physics - optics concentration (Ph.D.) at University of Iowa



Shoemaker

- **Rebekah Curtis Shoemaker** (mathematics-with-certification): Widefield High School in Colorado Springs, Colorado - Mathematics Teacher

Class of 2016: Employment and Education Placements (to date)



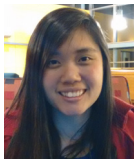
Beam

- **Christopher Beam** (computer and information science, mathematics): Katapult Engineering in Dillsburg, Pennsylvania - Software Developer



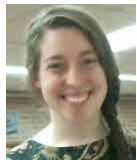
Bressler

- **Matthew Bressler** (physics - B.S., mathematics): Physics - Particle Physics concentration (Ph.D.) at Drexel University



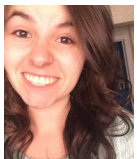
Chua

- **Phoebe Chua** (mathematics; statistics minor, computer science minor): Informatics (Ph.D.) at University of California - Irvine



DeNardo

- **Julia DeNardo** (studio art; mathematics minor): Peace Corp in Namibia (south-west Africa) - secondary and upper primary education mathematics teacher



Martin

- **Jessica Martin** (mathematics-with-certification): Delaware Valley Charter High School in Philadelphia, Pennsylvania - Mathematics Teacher



Ratzlaff

- **Lucas Ratzlaff** (mathematics; statistics minor): Walkway over the Hudson in Poughkeepsie, New York - Intern



Physics graduates: Katrina Schrock, Mike Joy, Grant Henry, Matt Bressler, Kylee Bridel and John Brabazon



Frey 367 serves as the MPS Lounge and Mathematics and Physics Help Room

Department News

The Department of Mathematics, Physics and Statistics houses five majors: 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, Dr. Hellgren, Dr. Kryemadhi, Prof. Lehman, Dr. Phillippy, Dr. Robinson, Dr. Widmer and Dr. Wilcock (chair).

MPS Department graduates

Seventeen students graduated in December 2015 and May 2016 with majors in the MPS department. Three of these were double majors with a second major in another department, and one was a double major with both majors in our department. Here is the breakdown by major.

Mathematics: 8

Mathematics-with-Certification: 4

Physics (B.A.): 3

Physics (B.S.): 3

Physics-with-Certification: 0

MPS Lounge

During summer 2015, the department repurposed Frey 367 as the Mathematics, Physics and Statistics Resource Room, or the MPS Lounge, as it is more commonly known. (Several years ago, Frey 366 was partitioned into Frey 366 and Frey 367.) White boards on all walls, round tables, journals, textbooks and comfortable seating make this a wonderful collaborative workspace for our students, with easy access to faculty offices. The MPS Lounge also serves as our Mathematics and Physics Help Room, where, four nights a week, peer tutors provide extra help for students in our lower division courses. This space is becoming a department hub for students to exchange ideas, help each other, get excited about doing mathematics and physics outside of the classroom and build community.

Program News

Mathematics

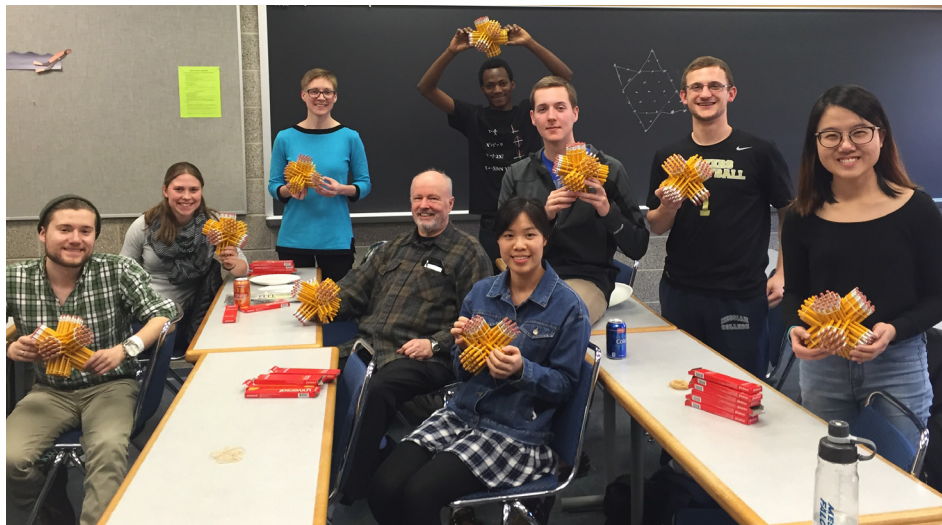
During 2015-2016, the Math Club met weekly, focusing on problem-solving techniques and preparing for the Putnam Exam in the fall, with a more recreational emphasis in the spring. Activities included a Pizza and Problem-Solving Night, constructing Conway pencil models and exploring their symmetries, and a mathematical movie night. Dr. Robinson advises the club.

Physics

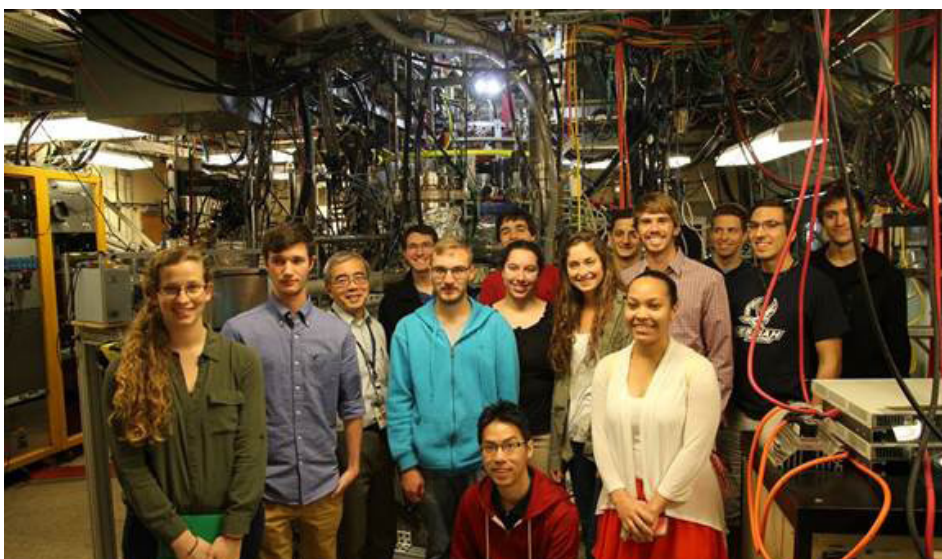
As seen in department news above, six students graduated with degrees in physics – the most ever.

The Physics Club took two field trips in 2015-2016: Princeton Plasma Physics Laboratory in November and National Institute of Standards & Technology in January.

The Sigma Pi Sigma Physics Honors Society – Messiah Chapter was chartered in December 2015 with five inductees: John Brabazon, Matthew Bressler, Tyler McManiman (physics-with-certification '17), Alexander Roth and Katrina Schrock.



Math Club members construct Conway pencil models.



The Messiah College Physics Club on a field trip to the Princeton Plasma Physics Laboratory.

Collaboratory News

Faculty 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). Details of these projects are given in faculty news and retired faculty news sections.



Sigma Pi Sigma Physics Honors Society – Messiah Chapter chartering ceremony, (front – left to right) inductees: Katrina Schrock, Alexander Roth, Matthew Bressler, John Brabazon and Tyler McManiman; (back – left to right) Faculty: Drs. Hellgren, Farrar, and Kryemadhi and representative from Sigma Pi Sigma national office, Sean Bentley.

Future Events

Monday, Nov. 14, 2016: Alumni Mathematics Teacher

Dinner – Each fall, our MATH 407 (Professional Issues in Secondary Mathematics Education) class of current student teachers invites alumni who are middle or high school mathematics teachers to join them for dinner. They are very interested in hearing your advice for new teachers, how to find a good job, and how to be an effective and sane teacher of adolescents. If you are a secondary mathematics teacher and would like to reserve a place, please email Dr. Wilcock (swilcock@messiah.edu) by Nov. 9. The dinner will be held from 6-7 p.m. It is free, and the conversation is friendly and helpful.

Friday, April 28, 2017: School of Science, Engineering and Health 14th 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 faculty presentations. There is no registration fee and snack breaks are provided. For details including abstracts, check the SEH School website in spring 2017 (messiah.edu/sehsymposium).

Request for Internship Opportunities

Does your employer hire interns in a mathematics-related area such as actuarial science, statistics or finance? Our mathematics 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.

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

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 your 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.



DEPARTMENT OF MATHEMATICS,
PHYSICS AND STATISTICS

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Address Service Requested

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)

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.