

Computational Times



Newsletter for the Wittenberg University Department of Mathematics and Computer Science

<http://www.wittenberg.edu/mathematics/>
http://www.wittenberg.edu/computer_science/

Volume 5, Issue 1, Fall 2010

VIEW FROM THE DEPARTMENT CHAIR

It was great to be on sabbatical last spring, and I got a lot done: finishing off a stat consulting job for the crime lab at the Ohio State Highway Patrol, preparing a presentation for the Statistics Education section at the big summer stat conference in Vancouver, conducting some personnel reviews, and helping caring for my folks, who were hospitalized five times between the two of them over the past year. But it's also good to be back in the saddle (or is it a yoke?) as department chair. My thanks go out to Brian Shelburne, who took over the chair duties while I was on leave.

As usual, there have been some notable developments this semester in the life of the department, and once again some of these developments involved personnel changes. After a successful national search, we're delighted to announce the arrival of our new Math Workshop director, Obed Lewis. Look for an article about Obed later in this issue. In other personnel news, the dynamo behind our computational science (COSC) program, Eric Stahlberg, has just announced that he will be leaving in December to become the director of bioinformatics at a government organization that supports the research at the National Cancer Institute. We stand in awe of everything Eric has accomplished in only a few short years, and we will sorely miss Eric's truly incredible energy and optimism and enthusiasm. The process is under way already to find a new COSC director, so stay tuned for further details on this front as well.

There were other notable events and successes this fall. In particular, Witt sent two teams to the ACM's huge International Collegiate Programming Contest – and one of them placed in the top 10 among over 100 teams, most of which were from schools with much bigger programs than ours. Congrats to all the students who participated, and to coach Steve Bogaerts as well. Then just last month, Witt hosted the Midstates Conference on Undergraduate Research in Computer Science and Mathematics. A huge round of applause goes out to Adam Parker and Steve Bogaerts for organizing the event, which attracted students from several states to show off their neat projects in our disciplines.

It's good to be back. And there's plenty of good work to do, so let's get to it....

Doug Andrews

COMPUTER SCIENCE TEAM EXCELS AT REGIONAL COMPETITION

A team of students from Wittenberg University recently made news in the world of Computer Science, with their stellar performance in the Association for Computing Machinery-International Collegiate Programming Contest (ACM-ICPC). Sponsored by IBM and widely considered as the premier international programming contest the ACM holds regional contests every fall in order to select the top teams which will compete in the following spring's World Finals. This coming spring, the World Finals will be held in Egypt.

Wittenberg, which hasn't participated in several years, sent two teams to the ACM-ICPC East Central North America Regional contest, held on October 23, 2010 at the University of Cincinnati. One of these teams, the Cowgorithms, which included **Jordan Hildebrandt ('12)**, **Peiqian Li ('14)**, and **Brandon Nesiba ('13)**, finished sixth out of 112 teams. Making this strong finish even more impressive is both the caliber of the competition and the difficulty of the problems.

The East Central North America Regional contest featured schools from Ohio, Michigan, Indiana, western Pennsylvania, and eastern Ontario. Among the schools participating were the Ohio State University, the University of Michigan, Carnegie Mellon University, the University of Waterloo, and the University of Toronto. Many of the schools in attendance were much larger than Wittenberg, and have many more Computer Science students to draw from for their teams. Nonetheless, the Cowgorithms finished ahead of teams from every school present.

In addition to the stiff competition, the Cowgorithms faced challenging problems. Each team was given eight problems and five hours to program solutions in either C/C++ or Java. According to

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COMPUTER SCIENCE TEAM EXCELS AT REGIONAL COMPETITION

the ACM-ICPC's website, question designers "look for two problems that could be solved in an hour by a first or second year student, two that could be solved in an hour by a third year student, and two that will likely determine the winners." The scoring of the solutions reflects both time and accuracy. Teams may submit solutions more than once, but the point maximum decreases as time goes on and points are subtracted for incorrect submissions. The Cowgorithms managed to correctly solve six of the eight problems they were given. Only two teams answered more, while 34 teams were unable to answer a single question.

Wittenberg's other team, the Witt Tigers, consisted of **Thomas DeBell ('11)**, **Deanna Fink ('12)**, and **Dang Mai ('11)**. Both Wittenberg teams were coached by **Dr. Steve Bogaerts**, Assistant Professor of Computer Science, and are continuing to practice. Wittenberg will be sending teams to at least one programming competition in the spring, and Dr. Bogaerts encourages others to get involved, even if they aren't Computer Science majors. "The contest is hard, but anyone is welcome to join in with us if they're interested," Dr. Bogaerts said, adding "some of the contests are much lower key. They won't all be as cutthroat or competitive."

The Cowgorithms' performance at the ACM-ICPC East North America Regional is a testament to the quality of students and faculty at Wittenberg, and a superb achievement for the Department of Mathematics and Computer Science. Congratulations to all who were involved!

MATH AND COMPUTER SCIENCE COLLOQUIUM CONTINUES

The newly revitalized department colloquium finished up a great fall, and will continue this spring.

After an open call for names, the department settled on SMACCM, which stands for **Statistics, Math and Computer / Computational Mondays**. In the fall, there were seven seminars with students, professors, and outside speakers talking on the results of their research and reporting on interesting topics. Students that presented were **Deanna Fink, Zach Hedges, Courtney Dollinger, Jordan Hildebrandt, Alex Griffith and Alex Sitarik**. The colloquia were so well attended that the department was forced to move the talks to larger rooms several times.

We encourage everyone to attend the spring SMACCM. The dates of the talks are:

January 24	February 7	March 21	April 4	May 2
	February 21		April 18	

Talks are held in Room 319 in the Science building from 4:10-5:00. Join us a few minutes early for refreshments in room 320. You can read descriptions of the talks when they become available by going to the colloquium web site at

<http://www5.wittenberg.edu/academics/computerscience/colloquia.html>

We hope to see you there.

WITTENBERG HOSTS MATH AND COMPUTER SCIENCE CONFERENCE

On Saturday November 20, 2010, Wittenberg hosted the annual Midstates Conference for Undergraduate Research in Computer Science and Mathematics (MCURCSM). The Conference, chaired by **Dr. Steven Bogaerts** and **Dr. Adam Parker**, featured presentations of original research done by undergraduate students from colleges and universities throughout the midwest.

MCURCSM, which changes location every year, started a decade ago in order to provide a venue for undergraduates doing research in mathematics and computer science to present their work. Despite the rising number of quality research experiences for students in computer science and mathematics, very few opportunities exist for these students to publish and share their results. MCURCSM does just that, as students not only present their work, but also have their papers published in the conference proceedings.

The 2010 edition of MCURCSM featured talks on a myriad of subjects, ranging from modeling computer system architecture to knot theory, and drew students from a variety of schools. The schools represented included Denison University, Marquette University, Moravian College, Oberlin College, Ohio University, and the College of Wooster. The fact that MCURCSM drew stu-

WITTENBERG HOSTS MATH AND COMPUTER SCIENCE CONFERENCE



Attendees at MCURCSM '10 prepare for the next talk

row of seats, and what they witnessed was a well-organized conference that brought attention to quality undergraduate research. The strong showing of Wittenberg students and the excellent job done by conference chairs Dr. Bogaerts and Dr. Parker, as well as other members of the Department of Mathematics and Computer Science who contributed their efforts means that whoever decides to host next year's MCURCSM will have a tough act to follow.

dents from as far away as Milwaukee, WI (Marquette) and Bethlehem, PA (Moravian), speaks to both the reputation of MCURCSM and the valuable experience it provides for undergraduate researchers.

The conference was held in Bayley Auditorium, and the event was kicked off by a welcome speech from Professor of Religion/Interim Provost/Mayor of Springfield, Dr. Warren Copeland. In addition to Dr. Copeland and the student presenters, MCURCSM featured an invited talk by Wittenberg's Director of Computational Science, Dr. Eric Stahlberg. Dr. Stahlberg's talk, entitled "When Technology and Creativity Collide," highlighted a list of ideas that he has found to be important throughout his years in both industry and academia. In addition to his insight, Dr. Stahlberg managed to engage the crowd with a variety of multimedia elements, including a few YouTube videos.

While Wittenberg did not have any students presenting at MCURCSM, it was still well represented, as the university was an excellent host and a number of Witt students were in attendance. Wittenberg math and computer science students managed to fill an entire

NEW MATH WORKSHOP DIRECTOR HIRED: Introducing Obed Lewis

This year there is a new face in the Math Workshop. In September, Wittenberg welcomed **Obed Lewis** as the new director of the Math Workshop, replacing Kathy Johnson, who left to pursue a teaching career. Obed has done a wonderful job of making the transition of leadership smooth and maintaining the workshop as a valuable resource to students.

Obed comes to Wittenberg from Muskingum University in eastern Ohio, where he worked as a learning consultant. As a learning consultant, he served as a professional tutor for students with learning disabilities. Before that, Obed was a statistician for the University of Pittsburgh Medical Center for five years, working in their genetics department. Obed is originally from the Pittsburgh area, and studied at the California University of Pennsylvania, where he obtained a Bachelors degree in Mathematics and a Masters of Education.



Welcome Obed Lewis!

For Obed, serving as director of the Math Workshop is truly a "dream job." He is a strong believer in the type of Liberal Arts education that Wittenberg provides, and loves the combination of mathematics and helping students. "This job combines everything I love," Obed said.

If you would like to stop in and say hi to Obed (or get help with math, computer science, physics, chemistry, economics, etc.), the Math Workshop is located in Hollenbeck 218, and is open 9AM-9PM Monday thru Thursday, 9AM-5PM Friday, and 5PM-9PM on Sunday.

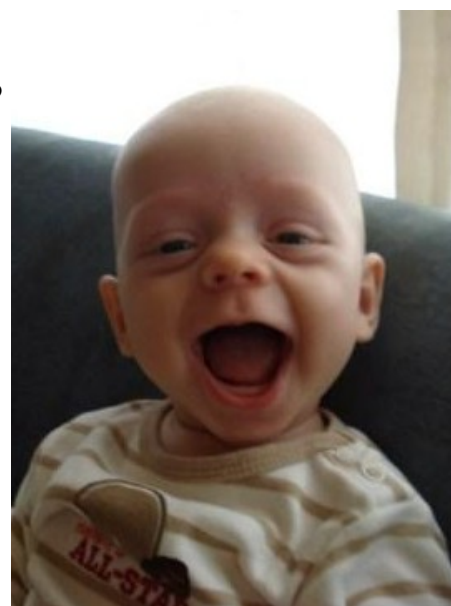
FACULTY NOTES

Doug Andrews—I had a blast at the mega stat meetings in August, held this year in beautiful Vancouver. As usual, I spent essentially all my time at the sessions for the Stat Education section of the big stat organization. I myself gave a presentation reviewing how statistical consultancy is taught at the undergraduate and graduate levels. In the process of doing all the research for this talk, I came to appreciate that the stat consulting seminar that we tried in Fall '08 and Fall '09 here at Witt was fairly remarkable, and I'm eager to try it again. I also had a couple fun trips over the summer, most notably a few weeks with my partner in Alaska, hiking and climbing and kayaking and taking field seminars on geology and on plant and animal ecology.

Steve Bogaerts—You've probably already read the big news in this newsletter about our programming teams at the recent ACM programming contest. It was a great trip and I'm very proud of all of our participants. We're preparing for more contests, so if you want to get involved, please contact me!

On 10/17 and 10/18 I attended a workshop and two tutorials at SPLASH-2010 (Systems, Programming, Languages, and Applications: Software for Humanity) in Reno, NV. At the workshop, entitled "Curricula for Concurrency and Parallelism", I presented the paper "Concurrency and Parallelism as a Medium for Computer Science Concepts". In the presentation, I described some of our work in the NSF-sponsored Accelerators to Applications project, particularly relating to the integration of multiprocessing into Comp 150. A number of attendees were very interested in this truly unique work we are doing here. Work continues on this project; I'm looking forward to integrating some of these topics into Comp 250 in the spring, and other courses later on.

On a personal note, over the summer my wife and I had our first child, Timothy. It has been wonderful and tiring all at once. He's in the upper 90's percentile for height on the World Health Organization chart, and he seems to calm down when I sing barbershop to him (Yes!! Family quartet in the making!). I once said to him "Wiggle aimlessly if you're going to take Comp 250 in Spring 2012." I think you know his answer.



Timothy Bogaerts is simultaneously the worlds tallest baby and shortest computer scientist!

Kyle Burke—This semester has been great! Our new Combinatorial Games class is unique to Wittenberg and my students did a great job of putting up with me as I twisted Math and CS topics into the coursework. The best part of this experience has been the desire of the students to learn how to figure out which player can win our board games. I couldn't teach them each technique fast enough!

Teaching the Algorithms class has also been a real treat. After one shot, I'm convinced that covering parallel algorithms in *this* class works really well. After each sequential algorithm, students clamored to see the faster parallel version.

I've kept up with some other projects, including my games blog, but also started blogging about algorithmically ranking football teams and working out a little tutorial for the Chapel programming language with the help of my aide, Ernie Heyder. (All of this nonsense can be found on my homepage).

Bill Higgins — In August, I attended MathFest, the MAA's national summer meeting, in Pittsburgh. There I attended a meeting of the MAA Committee on Undergraduate Student Activities and Chapters on which I serve. During that same trip, I accompanied our son Vijay (a senior at Springfield High) on visits to colleges in the Philadelphia and Pittsburgh area. It was interesting to experience admissions events at several schools from the perspective of a parent. At MathFest, I served as one of the judges in the MAA Student Talk Sessions.

At Vijay's urging, I am the coordinator for Springfield High School's participation in the Mandelbrot Competitions (www.Mandelbrot.org). There are two competitions - an individual competition called the Mandelbrot Competition consisting of five rounds of short answer problems throughout the school year and three rounds of Mandelbrot Team Play in which groups of students submit solutions to problems which require proofs. About a dozen Springfield High students took part in the first round of the Mandelbrot Competition and seemed to enjoy the experience. The Team Play competition begins in January.

FACULTY NOTES (CONTINUED)

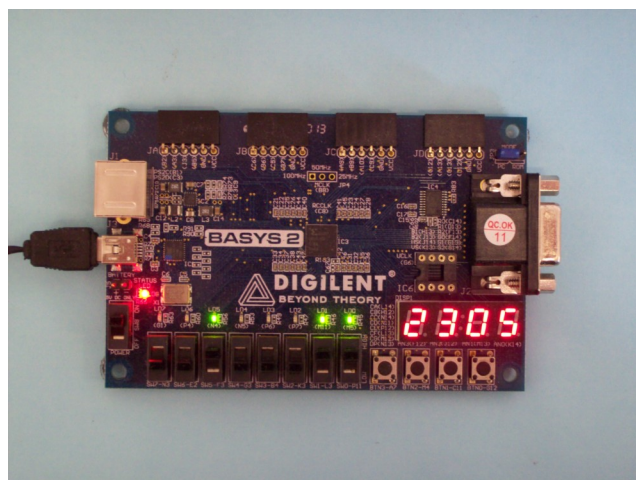
Adam Parker—Like Bill and Al, I went to the summer MAA meetings in Pittsburgh, PA. It was a great time as always. I caught up with many grad school friends that I hadn't seen in several years and also went to a Pirates game (and they won!) It wasn't all relaxation though, as I gave a talk on using primary sources to teach an ordinary differential equations class. The talk was very well received, with many of the attendees asking for my slides and even one journal requesting a paper on the topic. In addition, like Bill, I judged some of the student talks.

Professionally this semester was very busy. Mike Mattison, the director of the writing center here at Wittenberg, and I wrote a paper together called "By The Numbers" which just came out this November. **Susannah Engdahl**, one of my current students, and I wrote a paper translating a neat note from Giuseppe Peano from 1889 about the Wronskian. It has been submitted and if it's accepted I'll tell you more about it. **Amanda Furness (math '10)** and I also completed a paper extending her honor's thesis which we hope to submit in the next few weeks. Steve and I also hosted the MCURCSM '10 conference that you can read about on page 2.

By far the most time consuming (and important) thing I did this semester was submit my tenure and promotion files. I know that some of you wrote notes to Doug that went into it, and I wanted to thank you all for doing that. I'd also like to thank the rest of my colleagues for their support and encouragement during the process. I don't know anything yet, but you'll certainly be reading about the decision in future issues.

Brian Shelburne— During the Spring of 2010 I was the acting chair while Doug Andrews was on sabbatical; it with great relief when I returned the honor (?) of being chair back to Doug when his sabbatical ended.

Over the summer with the financial support of Wittenberg's NSF-sponsored "Accelerators to Applications" program I spent time on redesigning our "hardware course" (Comp 351) using FPGA's (field programmable gate arrays). The FGPA board I used has 8 switches, 4 push buttons, 8 LED's and 4 seven-segment displays. Circuits designed schematically or using VHDL (a hardware definition language) on a PC are compiled into *bit files* which are downloaded to the on-board Xilinx Spartan-3E FPGA. Bit files *physically reconfigure* (i.e. re-wire) the circuits of the FPGA to implement a circuit design in hardware; it's not a simulation. In a programming class you compile high level programming languages into the native machine code that executes on a processor; in this class your circuit designs are translated into hardware. One project involved creating a 4-bit adder (the 8 switches allowed two 4-bit inputs) that displayed the sum to the seven-segment display. In the example below $2 + 3 = 05$.



Dr. Shelburne's FPGA circuit showing that $2 + 3 = 5$.

Al Stickney — As I write this, we are getting ready to take part in the Putnam Contest again this year. It looks as though we will have 10-12 students taking the test. As is the tradition, my wife and I will be hosting a "Putnam Lunch" for the participants at my house. We all look forward to that, especially since it includes a famous Bill Higgins cheesecake.

Because of my duties as Governor of the Ohio Section of the MAA, I've been traveling more than usual recently. In the past 18 months, I've been to Portland, Oregon, San Francisco, and Pittsburgh. I'll be going to New Orleans in January. Although I have been to the other three cities previously, I've never been to New Orleans, so that will be a new experience for me. Also, I was recently appointed to a three-year term as a member of the MAA's Committee on Technology in Math Education. I'm excited to be able to serve on this national committee because much of my professional activity over the years has been related to the impact of technology on math education.

Meanwhile, back here at Wittenberg, the current year has turned out to be "The Year of Calculus" for me. I will teach a total of 5 calculus classes during 2010-11; two in the fall semester and three in the spring. This fall, I've been experimenting with the use of "classroom clickers" in my calculus courses and I've been very pleased with the results. They seem to be yet another way that technology can enhance the classroom experience. I'm also teaching two independent studies in Number Theory this year, and I always enjoy that because it's one of my favorite areas of mathematics.

ALUMNI NOTES

Sheri (Graw) Feest (math major, '85) worked in the actuarial department at The Hartford for 5 years, then worked for ITT in a couple places in the UK for 8 years, and is now in Lexington, KY.

After a year of teaching high school math, **Joseph Rittenhouse (math major '88)** has been teaching Ballroom and Latin dancing for over 20 years now. “You would be amazed at how much math is involved in the dancing.” Joe has also been training registration employees at a hospital system in Florida – on insurance, computers, collection and anything else they needed to perform the job – and selling and repairing and training people on Apple computers. “I am a teacher no matter what I do in life.”

Emily (List) Dennett (math major, '07) finished grad school and has taken a full-time teaching position at Central Ohio Technical College, in Newark.

Brian Ervin (math major, '08) is in the Master's program in electrical engineering at the University of Cincinnati. “My research is in the Brain Computer Interface. I am still involved in Athletes In Action (at UC), as well as various other ministries. I am interested in theology/Christian studies.”

Mark Lintern (comp and math major, '08) is a Desktop Administrator, in which capacity he manages all internal servers, computers, and networks for a company of about 40 people.

Kyle Eichenauer (math major, '09) teaches math at Elmwood High School (Bloomdale, OH), and coaches football and baseball.

Shannon Cooper (math major, '09) is in the Master's program in math at Miami University.

Alyssa Armstrong (math major, '09) is in the PhD program in math at North Carolina State University.

Ben Scott (math major, '09) is in the Master's program in math at John Carroll University, and has joined the JCU rugby team.

Hannah Scherger (math major, '09) teaches geometry, precalculus, and AP chemistry at Catholic Central High School here in Springfield.

Monica Karsai (math major, '09) is in the Master's program in clinical psychology at Eastern Illinois University. In addition to being a student, she works at a crisis nursery that provides care for children, from birth to age five, during times of family crisis.

Danny Marous (math major, '09) is in the PhD program in pharmacology at Johns Hopkins University school of medicine in Baltimore, and goes biking with Andy Bates (math '09).

Andy Bates (stat track math major, '09) is an Operations Research Analyst at the NASA Goddard Space Flight Center in Greenbelt, MD, providing independent cost and schedule assessments of the center's projects. He enjoys biking and exploring the Washington D.C. area.

Sarah Braden (stat track math major, '10) now works in the Houston area for Reasoning Mind, a hybrid of online and face-to-face instruction, specializing in individual help and attention for the students in inner-city schools, suburban schools, private schools, and magnet schools – and especially students from economically disadvantaged communities.

Aaron Dugger (math major, '10) is studying at the Air Force Institute of Technology. His current job assignment is to “understand and implement a robust algorithm for image processing for a chromotomography instrument using a rotating direct vision prism as a dispersive element.” For fun these days, he plays Magic the Gathering.

James Duff (math and cosc minor '10) is in the physics PhD program at the University of Wisconsin, doing research on the Madison Symmetric Torus Plasma experiment, specifically the CO₂ interferometer.

ALUMNI NEWS (CONTINUED)

Kaitlyn Sherrock (math minor '10) is in medical school, specifically the Ohio University College of Osteopathic Medicine.

Kate Snead (stat track math major, '10) is now in the PhD program in Industrial/Organizational Psychology at Virginia Tech. She has a graduate teaching assistantship, for which she teaches a recitation section of introductory psychology.

Nam Vu (math major, cosc minor, '10) is in the PhD program in economics at Vanderbilt. He has taken up taekwondo, classical guitar, traveling and photography.

Melisa Shock (math major, cosc minor, '10) is in the Master's program in Organizational Leadership at Wheeling Jesuit University, where she also serves as assistant coach of the softball team.

Paul Weber (math major, '10) is publishing a paper based on research done at an REU during the summer of 2009 in the International Journal of Dynamical Systems and Differential Equations. "Pretty big deal and I'm definitely excited to see our paper in print!"

MAJOR NEWS

Christa Snyder (math minor '11) — I spent the summer at KU for my REU, and recently won the ALA-ASDL Young Scientist Poster Award, so I'll be going to Palm Springs, CA at the end of January!!!

Alex Griffith (math major '11) — This summer I participated in an NSF-sponsored REU in Mathematical Cryptology, jointly offered by Northern Kentucky University and the University of Cincinnati. My project focused on the algebraic cryptanalysis of stream ciphers, and I am continuing the project for my senior honors thesis.

This fall, **Susannah Engdahl (cosc minor '13)** worked with Dr. Parker on a project for the Cultures and Languages Across the Curriculum program. It involved translating several papers written in French about the Wronskian determinant and writing an analysis of the mathematical ideas contained within these papers.

Alex Sitarik (math major '11) attended the Genetic Analysis Workshop in Boston this fall where researchers attempt to improve current statistical methods used in Statistical Genetics.

Jordan Hildebrandt (cs major '12) presented his summer research on geomagnetic polarity timelines at the annual American Geophysical Union conference in San Francisco. This internship, which took place in Manhattan through Columbia University, will culminate with a journal publication and probably more scrumptious NY cheesecake.

With Wittenberg's Center for Civic and Urban Engagement, **David Rea (math major '12)** created an analysis system that allowed a farm based after school program called On the Rise for behaviorally challenged kids to track their client's improvement in multiple aspects. The information they gather can be used to get governmental grants.

Courtney Dollinger (math major '12) worked for NASA at Marshall Space Flight Center in Alabama, doing parametric cost analysis for space-based telescopes.



Seven Students took the Putnam Exam this year. (From L to R) Peiqian Li, Manas Mudbari, Alec Biehl, Deanna Fink, Savannah Kiser, Alex Sitarik and Patrick Copeland

Considering a Donation ?

If you would like to make a donation to the math department, you can make a donation to the "MATH DEPARTMENT GIFT FUND" at

The Wittenberg Fund
 Wittenberg University
 PO Box 720
 Springfield, Ohio 45504-0720

Make sure to designate your donation to the math department. Your gifts help support undergraduate research, travel, and the general mission of the department. We appreciate all of your help.



WELCOME!

The department would like to welcome all of our new majors and minors that have declared during the spring. We're happy to have you in the department!

Mathematics Majors:

- Hannah Fournier '14—Dayton, OH
- Brandia Hayes '14—Reynoldsburg, OH
- Sven Isaacson '13—Dalton, OH
- Robert Kehl '11—Coshocton, OH
- Adam Markins '13—Chillicothe, OH
- Sarah Skidmore '13—Troy, OH
- Yuanyi Zhong SCE—Troy, OH

Mathematics Minors:

- Alex Burwell '11—Sunbury, OH
- David Klvana '11—Ridgefield, CT
- Peiqian Li '14—Changchun, China

Computer Science Majors:

- Peiqian Li '14—Changchun, China
- Eric Mann '14—Swanton, OH

Computational Science Minor:

- Christian Barille '11—Mayfield Hts., OH
- Jonathan Clinger '13—Springfield, OH
- Hallie Donathan '13—Tipp City, OH
- Alaina Engdahl '13—Columbus, OH
- Susannah Engdahl '13—Columbus, OH
- Kelly Foley '11—Dublin, OH
- Karissa Goodridge '11—Springfield, OH
- Arianna Hamilton '12—Springfield, OH
- Adam Markins '13—Chillicothe, OH
- Dang Mai '11—Springfield, OH
- Lucas McKean '13—Jeromesville, OH
- Elias Pavlatos '13—South Charleston, OH
- David Rea '12—Rocky River, OH
- Jessica Rohr '13—Pickerington, OH
- Alex Sitarik '11—East Liverpool, OH
- Sarah Skidmore '13—Troy, OH
- Anya Weaver '13—Pleasant Hill, OH

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Postage

