

# Computational Times



Newsletter for the Wittenberg University Department of Mathematics and Computer Science

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## View from the Department Chair

Welcome to the first edition of Computational Times!

We're having a busy Fall semester here at Wittenberg. John Davenport is still with us as a sabbatical replacement for Al Stickney. Sad to say Sarah Hodel has moved on and is no longer with us; she did get married this summer and is now working in Maryland.

On the up-side of things we currently have a 14 senior mathematics majors which I think is a record. Another record set this Fall is that the Department has offered six colloquia, many of them given by students who talked about their summer research.

On a not so happy note, this is Jim Noyes' last semester with us; he's retiring at the end of the Fall Semester and already we've begun the search for his replacement to come on board next August (as if Jim Noyes could be replaced). Thanks to Jim's tireless efforts the new program in Computational Science seems to be growing.

Finally we've been able to put the finishing touches on revisions to both our Computer Science major and our Mathematics major. The Computer Science changes which have been approved by the Educational Policies Committee (the faculty committee that has oversight for approving all such changes) includes offering two new courses in Computer Science: Comp 253: Principles of Software Design which will be required and Comp 290: Databases and Web-Based Computing which will be an elective. And we've switched to teaching Python as our first computer science language in Comp 150 although in Comp 250 we will segue back to using C++. I will save discussing the changes in our Mathematics major until the Spring Issue.

I sincerely hope that you enjoy reading about the many exciting things that we're doing here in the Wittenberg Department of Mathematics and Computer Science!

Brian Shelburne, Chair

## In the Spotlight—Emily List '07

What's a better way to spend a summer than to be doing math in a new place with a different and interesting group of people? In my opinion, there isn't any. This past summer I was fortunate enough to participate in a Research Experience for Undergraduates (REU) at



Emily List, third from the left, flashes an "iff" sign with the rest of her REU.

Mount Holyoke College in South Hadley, Massachusetts. Our project was funded by the National Science Foundation and advised by two energetic and interesting professors from Mount Holyoke, Dr. Alan Durfee and Dr. Don O'Shea. My group consisted of four other students from Rutgers University, St. Mary's College in Maryland, Carnegie Mellon University, and Pomona

College.

So what did we study all summer? Our project was in the subject of Knot Theory. Knot theory studies just what its name suggests: Knots. A mathematical knot is very similar to knots we use to tie our shoes except that the ends are glued together. We looked at polynomial equations of these knots and we were specifically interested in the degrees of the polynomials that represented the

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## Computational Science Awarded Million Dollar Grant

Imagine trying to build a hybrid car engine, one that would run off alternative energy, yet be faster and more powerful than current engines: One would have to do the research, design the prototype, build it, test it intensively, and if it performed as intended, the engine would go into production. In real life, once the engine design is finalized, building the engine to test it is less efficient and more expensive than creating a simulation of the engine on a computer and testing it on the computer itself. That's model-based design and that is a very desirable skill for employers.

This is where Dr. Noyes of the Department of Mathematics and Computer Science at Wittenberg University feels computational science steps in. Computational science is the field of study that integrates behavioral and natural sciences, computer science and applied mathematics in order to better solve complex problems. Wittenberg's computational science program attempts to produce computationally competent scientists and familiarize them with reliable analytical and numerical methods. Dr. Noyes feels that computational science has been overlooked for far too long; it is recognized on a national and statewide level but not always at the local levels. As the director of Wittenberg's computational science program, it is precisely this viewpoint that he is trying to change. The computational science minor has drawn a lot of attention recently after it received a \$1million grant from the Department of Energy Funds through an earmark from Congressman David Hobson. Since receiving the grant less than a year ago, Wittenberg has already utilized it to fund scholarships for students, training for science faculty, modeling software, funding for high-tech student internships and research.



*Dr. Jim Noyes*

Not only does computational science introduce new concepts and new software to the student, it is also an excellent minor to take to supplement one's science major. The biggest strength of computational science is that it augments the theory for science majors by giving students tools to visualize and solve real life problems. By taking the classes required for the minor, students are introduced to not only new software and paradigms, but are better prepared for internships and research programs. An added attraction of the minor is that since it integrates so well with science majors, students need to take a smaller number of additional courses, typically 1-4 extra classes, to fulfill the minor requirements. Students also get additional opportunities in the form of internships and summer research programs that are funded by this grant. Each COSC research grant is typically worth \$5000 and lasts for 10 weeks. Students have been able to get valuable research experience from their internships at locations such as Wright Patterson Air Force Base and the Ohio Supercomputer Center. This past summer, four students funded by the COSC Research Grant performed research internships at Wright Patterson and OSC. You can access reports on their student projects online at [http://www4.wittenberg.edu/academics/mathcomp/mathematics/students/student\\_projects/index.html](http://www4.wittenberg.edu/academics/mathcomp/mathematics/students/student_projects/index.html).

Currently Dr Noyes is on the Ohio Computational Science Cyber-Infrastructure Committee headed by OSC and funded by the National Science Foundation (NSF). They are now designing an undergraduate computational science program. When asked about the future of computational science, he said he sees the discipline expanding to the extent that it ends up being incorporated and actively used by all science departments. Reliance on computer simulation and optimization modeling is already considerable and is expected to increase. This exciting new minor prepares Wittenberg graduates for careers in which they are expected to solve complex scientific problems. As stated by the President's Information Technology Advisory Committee (PITAC) report last year, "Computational Science – the use of advanced computing capabilities to understand and solve complex problems – has become critical to scientific leadership, economic competitiveness, and national security ... [it] is one of the most important technical fields of the 21st century because it is essential to advances throughout society."

### In The Spotlight (cont.)

knots. For example, the simple over hand knot, or the Trefoil knot as it is known, can be represented by the parametric equations:  $x(t) = t^3 - 3t$ ,  $y(t) = t^4 - 4t^2$ ,  $z(t) = t^5 - 10t$ . We defined the degree of the knot to be the highest degree of any polynomial that made the knot. For the trefoil mentioned above, the degree is 5. The big result of the summer came when we were able to prove that for any knot in degree  $d$ , there exists an  $\epsilon$  such that we can add  $\epsilon t^{d+1}$  to our parametric equations and still have the same knot. This means that if a knot can be represented in degree  $d$  then it can also be represented in all degrees greater than  $d$ . A corollary to this theorem allows us to add  $\epsilon t^{d+1}$  to each of the polynomials in the representation and still have the same knot.

We presented our results at the Young Mathematicians Conference at The Ohio State University in the beginning of August and we will also be presenting posters at the Joint MAA-AMS meeting in New Orleans in January.

*Emily List is graduating in the spring and is currently applying to mathematics graduate schools.*

## Computer Science Switches to Python

In no other field is staying on top of technology as important as it is in computer science. Hardware and software configurations are constantly changing and Wittenberg strives to keep up with the times and adapt to these changes. For example, Comp 150, the introductory programming course at Wittenberg, was taught using the programming language C++ until recently, when Wittenberg switched to Python as the primary language of instruction. Nancy Saks of the Department of Mathematics and Computer Science at Wittenberg explains the decision, saying “C++ has so many details ... Python is a newer language and is better for educational purposes than C++ ... it tends to be more user-friendly and easier for beginners to pick up”. Even though Python provides a friendlier introduction to programming, it does not do so at the expense of programming ability. With Python, one can accomplish the same task that could be done in C++; the only thing that changes is the approach.

Python’s strengths lie in the fact that it is an interpreted language, it has simple syntax and uses fewer symbols than Java or C++. The interpreter is especially valuable since it aids learning through experimentation. Using the interpreter, the user is able to find out exactly where errors are and is able to fix them with minimal effort. In C++, some students would get confused as to where curly brackets and semi colons would go; with Python’s simplified syntax this ceases to be a problem. Graphics and interactive displays in Python are extremely easy to create, much more so than C++, and Prof. Saks feels that this adds to the user experience. “Instead of creating text based output in their programs, students can now apply their programming skills

in creating displays and graphics” and indeed, this has been the big attraction of Python. Graphics were harder to do using C++ and consequently was a concept that was taught to students in advanced classes. I/O in Python is also easier than in C++ and is handled extremely well in general.

The shift from C++ to Python is even more worthwhile when one researches the importance of Python in modern computing. Python scripts can be used in webpages and a lot of popular software is coded at least partially in Python - BitTorrent, Blender, Battlefield 2 and Civilization IV are some examples of major software that use Python scripts. Corporations like Google and NASA also extensively use Python in their applications. Google uses Python for many web applications including Google Maps and Gmail, while NASA is currently using Python to implement its next-generation collaborative engineering environment. Students are also taught C++ in Comp 250 so that they may learn another major language and be able to compare and contrast it with Python. C++ is interleaved with Python topics starting as early as the first week of class.

Because Python is simpler to learn, it has the potential to attract more students to pursue either a major or minor in computer science. Students who have a computational science minor will also have an easier time in Comp 150 and still gain valuable experience. Python is simple, easy to learn and adds to productivity and software maintainability; it is a valuable new addition to Wittenberg’s computer science program.

## Department Colloquia Has a Great Series

The department continued what has become a very successful colloquia series this fall. Building on the momentum of last year, Visiting Professor John Davenport organized six talks with eight speakers. Especially exciting were the varied topics stretching from pure abstract mathematics to computational science.

Included in the series were presentations by 5 WUDOMACS students. Senior Emily List spoke on her summer REU experience at Mt. Holyoak, while Adam Jara, Indraroop Mohanti, Tim Verrilli, and Joe Fritchman spoke about their summer computational science internships. Having students present their work is an invaluable way to maintain the momentum of student research in the department, and indeed, these talks were well attended by younger students interested in REU’s and internships.

John also brought in external speakers from area businesses and universities. Dr. Eric Stahlberg from the Ohio Super Computer Center gave a computer science talk on greedy algorithms and Dr. Jen Brown from Kenyon gave a talk on infinite trees and their relationship to the topology of the real number line.

However, the high-point of the series had to be the talk by Dr. Mark Turner from AVETeC - a Springfield high-tech firm that uses computational methods for modeling aircraft engines. When AVETeC models an engine, they do so in 3-D using stereo-visualization. Dr. Turner and his assistant brought special computers, glasses, screens and projectors so that all attendees could experience the impressive 3-D visuals. After the talk, a flight simulation was loaded and students and professors were able to fly in 3-D.

*You can see PowerPoint presentations of some of the above talks and a schedule of upcoming talks at our web site. We would love for you to attend if you're in town.*



*Calibrating the stereo-visualization equipment*

## Alumni Notes

A recent development in the life of '98 math major Jen (Groseclose) Koval has persuaded her to switch "jobs". Jen served for several years as Senior Auditor for The Huntington in Columbus, including work on some high-profile fraud cases – and got an MBA in her spare time! But the May 16<sup>th</sup> arrival of 10 lbs. 7 oz. Christopher persuaded her to quit her paid job: "My husband still works there so I still stop in once in a while to visit. I think I will stay home until the boy, and any other siblings that might come along, are in school. Then I will venture out to find a new career.... I will search for a new calling when the time comes. For now, my hands are full and this job is certainly more challenging." Here's a shot of the culprit himself:



**Curtis Mears (math major '03)** currently works as a civilian on projects for the US Army: "I am using the things I learned in [the department's] statistics and probability classes on a regular basis.... In particular I help plan, conduct, and analyze tests on Special Operations specific equipment. This is equipment used by the Green Berets, Army Rangers, Navy SEALs, and the like. So it is cutting edge and very interesting." Curtis stopped by the department – with wife Michelle (Correll) Mears, an English major also from '03, and their cute new son, Toby – in late October to give presentations to the Data Analysis and Numerical Analysis classes on his work with the Army and on how to find and apply for government jobs.

**Jennie Williams (math major '06)** was accepted into the graduate program in Biostatistics at (The) Ohio State University. She received a fellowship and now serves as a teaching assistant: "I just started teaching this [fall] quarter. Things are going really well with that; I much prefer teaching college age students versus high school kids." Concerning her own classes, she writes that "So far, classes have been almost all review which is a good thing. But from what I've heard they will get very difficult very quickly. Right now I am taking the first course of a 3-course sequence in inference for Ph.D.'s, a regression class, and real analysis in the math department." But life is not all work: "Outside of school, I have been playing some golf and actually have played lots of raquetball. I have season tickets to the football games so I have become an expert at tail-gating! GO BUCKS!"

**Mike Andrews, computer science major from the class of 1996**, may not have gotten in on the ground floor of the Internet movement, but he was close. For nine years after his graduation, Mike worked for various Internet Service Provider (ISP) companies. In fact, Mike started his career while he was still at Wittenberg. He worked for the Computing Center for over two years, eventually becoming a full-time employee and a part-time student. While there, Mike developed some of Wittenberg's earliest web pages.

After his delayed graduation, Mike worked for dcr.net in Lexington, Kentucky, where he was one of fewer than 10 employees. As part of such a small group, Mike was really responsible for lots of different tasks – he upgraded the hardware of the machines, worked on web server maintenance and also wrote code for the billing, accounting and logging operations. Five years later, the company sold out to win.net in Louisville and as a result, doubled in size. At nearly the same time, win.net also bought another ISP, so as a result, they were trying to reconcile three different ways of handling email, billings and web integration.

In January of this year, Mike left dcr.net to work full-time as a contract engineer for what had been a sideline enterprise – fark.com. Check out the site – like YouTube, it's a content-management system, where users create the bulk of the content. In this one, which gets 1.5 million hits per day, users post links to other sites, along with accompanying comments. Rather than use open-source content management software, fark.com wrote its own system, and Mike has re-written most of the underlying code in Perl. The company's revenue comes from three sources: sponsored ads, classified ads, and TotalFark, a subscription service that provide ad-free access and additional content. There are really only two full-time employees, plus volunteers and part-time ad salespeople, but the site seems to be succeeding; it's been referred to on the Bob & Tom morning radio show, and that's caused an increase in traffic. With luck, he'll join us next fall for Alumni Careers Day.

**Glenn Sullivan, a 1985 math graduate**, never thought he would be working with radiation and radioactive material. After graduation he did not know what he wanted to do, and enlisted in the US Navy. In the Navy, he was responsible for the operation of a ship's nuclear propulsion plant, performance of radiological controls and water controls, and performance of associated chemical analyses. This allowed him to utilize his math skills, but fine tune his career. After the Navy he worked at licensing and inspecting radioactive material. He obtained his MBA in December 2005. He is presently the Radiation Safety Officer at Children's Memorial Hospital in Chicago.

**We'd love to hear from any departmental alums. Please drop a line to [DAndrews@Wittenberg.Edu](mailto:DAndrews@Wittenberg.Edu) to let everyone know what you're up to these days. And are there some fellow alums you'd like us to help track down? Send us a few leads, and we'll do our best to help find your old buddies. Thanks.**

## FACULTY NOTES

### Bill Higgins:

After six years, my term as a member of the Classroom Resource Materials (CRM) Editorial Board of the MAA comes to an end when the board meets this January at the Joint Meetings in New Orleans. The board evaluates manuscripts submitted for inclusion in the CRM book series. It has been interesting to get an opportunity to read and to judge the quality of books prior to publication. While at the national meeting in New Orleans, I'll also serve as a judge at the undergraduate student poster session where about 175 or so students, including our own Emily List, will present their mathematical results from summer REU's or honors projects.



*Bill Higgins*

Years ago, before our student MAA chapter, MAAWUC, was born we had an informal problem solving group which we called the "Problem Group". The group slowly died from lack of interest. If current students are interested in restarting such an informal group to meet every couple of weeks or so on recreational math problems, let me know and we could bring the "Problem Group" back from the grave. But let's choose a new name.



*Nancy Saks*

### Nancy Saks:

In July of 2006, Wittenberg hosted its first ever Young Women's Summer Institute, entitled From Data to Discovery: Computational Science. Eighteen seventh and eighth grade girls attended the institute, which was offered in conjunction with the Ohio Supercomputer Center. Dr. Margaret Goodman from Biology was the academic team leader, with our own Nancy Saks serving as her assistant for the week. Dr. Elizabeth George from Physics and Dr. Josephine Wilson from Psychology also presented modules.

Mrs. Saks began the academic portion of the week by presenting an introduction to computational science on Sunday evening. Then, on Monday and Tuesday afternoons, she introduced the girls to computer animation and simulation by using AgentSheets, a simulation language that most of the faculty learned at a Shodor Education Foundation workshop presented at Wittenberg in May. The girls were really excited by AgentSheets and many of them didn't want to stop when the session was over.

As the week progressed, the girls broke into groups led by one of five project mentors, who were public school math or science teachers. They decided on a project, conducted research, and developed a presentation that was given at the final program on Saturday morning. Everyone involved was impressed by the quality of the group work, and it was a valuable and enjoyable summer experience. Since the institute was meant to encourage young women to consider science as a career, it was a resounding success, and Dr. Goodman and Mrs. Saks have already agreed to reprise their roles next summer.

### Doug Andrews:

Just before the semester began in August I flew to Seattle, the site of this year's Joint Statistics Meetings (JSM), so named because all the major stat organizations convene. I'm the vice chair of the American Statistical Association's (ASA's) national Committee on Career Development this year, and our committee was quite active -- organizing a general career development seminar for all statisticians, a special panel discussion and workshop for high school and community college teachers of statistics, and an invited session on management issues for government statisticians. I'm also the Council of Chapters (CoC) representative for the Dayton Chapter of the ASA, and in that capacity I participated in the annual CoC business meeting and workshop, including leading a table discussion on the Chapter Career Day Grant Program. In one of the Statistics Education section's contributed paper sessions I gave a presentation on the pedagogical use of students' estimation of their own exam scores. Lastly, I'm part of a network of statisticians isolated primarily in small-college math departments, and this group holds its annual meeting at the JSM as well. Aside from that, I had a great time attending all the Stat Ed sessions and picking up cheap swag from the textbook and software vendors at the conference exposition.



*Doug Andrews*

Every fifth year the stat folks in Miami University's department of math and stat get to pick the topic for their annual conference, and 2006 was a stat year. I zipped down to Oxford to learn more about "Understanding Biological and Medical Systems using Statistics". The plenary speakers in particular were quite good, and I picked up some ideas that I'll use in my probability class next semester.

This semester will be my last for coordinating submissions to the CareerCorner column of the ASA's monthly publication "AmStat News". But soon I'll be up to my eyeballs reviewing submissions to the poster session of the 2007 US Conference on Teaching Statistics.

## Faculty Notes (cont)

**Brian Shelburne**

As chair I've been busy mostly doing "chair-type" things this Fall (see From the Chair's Point of View). The high point of this semester for me has been to teach Calculus I again, something I'm enjoying immensely. Even with a predicted smaller incoming class, we've had to over-enroll our Calculus sections to meet the demand. I also had a chance to take in the Fall meeting of the Ohio Section of the MAA at Muskingum College; next Fall (2007) Wittenberg will be hosting this two day event. Finally I'm trying to write some additional emulator software for use in my Computer Architecture class; I'm looking forward to Thanksgiving break to get it done!

*Brian Shelburne***Adam Parker**

Adam Parker is in the midst of his second year of teaching at Wittenberg. Last year he gave talks at the spring meeting of the Ohio Mathematical Association of America (MAA) and was also the invited speaker at Ashland University's Pi Mu Epsilon induction ceremony.

During the fall he gave talks on his research in the Algebraic Geometry seminar at Ohio State and at the Central Section

meeting of the American Mathematical Society held at the University of Cincinnati.

Adam is also active in the Mathematical Association of America, serving on the Ohio Section Curriculum Committee and participating in the young faculty development program Project NExT. He was awarded the Edith B. and Frank C. Matthies Award by Wittenberg in 2006 in order to help fund his participation in this program.

**Garry Barhorst:**

Garry currently serves as Vice-President of the Springfield Arts Council and also serves as chairman of the concessions at the Summer Arts Festival which happens to be one of the largest free summer programs in the nation. As an avid Ohio State fan, he is looking forward to the Fiesta Bowl where he hopes the Buckeyes will bring home another National Championship! Go Bucks!

**Jim Noyes**

Jim Noyes is in the final semester of a phased-out retirement. But don't let that fool you. Jim is still very busy administering the computational science grant, coordinating internships for department students and teaching. In addition, activities like writing an interactive software module on Optimization to be used by Ohio's new Ralph Regula School of Computational Science keeps him busy at home.

Jim Noyes continues to be a major advocate for computational science both on and off Wittenberg's campus. He has given presentations and demonstrations across the state and as a member of the Ohio Computational Science Cyber-Infrastructure Committee is helping standardize undergraduate computational science curricula. He presented a paper entitled "A Modular Approach to Undergraduate Computational Science Education" at the International Conference on Computational Science and Education in Rochester New York.

Unfortunately, Jim will be leaving the department as his retirement takes effect in January. We will certainly miss his presence in the department.

**Al Stickney**

Al Stickney is on sabbatical during the 2006-07 academic year. He is doing research into factors that might be related to students' performance in beginning calculus courses at Wittenberg. In particular, he is considering placement exam scores, previous mathematics coursework, and familiarity with calculator technology. He was invited to give a presentation at the Fall Meeting of the Ohio "New Experiences in Teaching" program in October. In addition, he has been invited to give workshops at two conferences in early 2007: the 19th International Conference on Technology in Collegiate Mathematics to be held in Boston in February, and the Teachers Teaching with Technology International Conference in Chicago in March.

*Al Stickney***Fredrica Devine:**

I retired two years ago from 30 years of teaching public school grades 9-12. My father immediately fell ill and I cared for my mother while she was in an assisted-living apartment. She passed in May, 19 months after my father and I am nearly finished as executor... when the house sells. Thus, I was finally ready to get back into the swing of classroom teaching.

## MAJOR NEWS

This summer **Jonathon Felter (math major '08)** spent his summer in Chicago. He worked at an accounting internship with a construction firm, West Point Builders. He also played in a couple of summer lacrosse leagues and just caught up with good friends.

**Steve Dennett (math major and CS minor '07)** spent his summer working for Ortho-Clinical Diagnostics, a Johnson and Johnson company. He was in one of the engineering departments, focusing his efforts on Maintenance Engineering. The first few weeks of the summer were spent creating a master schedule for the Preventative Maintenance procedures which are to be done on the manufacturing machines. This included analyzing different schedules to determine which schedules caused the least downtime of machines, least variation in hours worked per week, and other critical constraints. The rest of his summer was spent helping to implement parts of a computerized maintenance management system so that they were able to automatically track calibration requirements of the gauges.

**Mitch Fonseca (CS major and math minor Dec '06)** spent his summer working for a company called Terremark World Wide. He worked in the operations department evaluating the company's business processes to see if they were doing things correctly and efficiently. Mitch also helped them find better ways to implement their processes.

For the first part of his summer, **Indraroop Roy Mohanti (CS and math major, COSC minor '08)** worked on a parallel implementation of MATLAB with Neil Ludban at Ohio Supercomputer Center, using MPI to write code that would render fractals on parallel processors. The second part of the summer was spent working with Dr. Eric Stahlberg and Dr. Joe Miller of OSC trying to implement a graph data structure that would be big enough to store plant genome data variations and optimized enough to execute clustering operations in a reasonable time span.

**Alyssa Armstrong (math major '09)** spent her summer in West Chester, Ohio working at Graeter's Ice Cream. She vacationed in Hilton Head, South Carolina, and just generally spent her summer having fun with her family and friends. She missed doing math (other than adding ice cream prices) and did some research on studying abroad in Hungary.

Over the summer, **Kevin Schalnat (math major '07)** moved to New Jersey to live with his brother and work for the Navy. It sounds like it was math related, but actually it was more education related, as he is an education minor. He worked for a summer camp, being a camp counselor, on the Lakehurst Naval base in Lakehurst, NJ and was in charge of roughly 30 kids from ages 8-10. About half were civilian and half were enlisted parents' kids. Kevin took the campers on field trips to various cities in both NJ and NY. This was Kevin's second summer out there. It's a nice place to spend the summer in college as he lived 15 minutes from the beach, and hour from Atlantic City, Philadelphia (aka best cheese steaks one will ever eat), and from NYC, where he went every chance he got. It was a great summer job while he was in college, easy money and was paid to be a ten-year-old again.

### Would you like to get involved with WUDOMACS?

There are many ways that alumnus can participate in our department. Let us know if you are willing to help out with these ideas!

- Help Recruit Recommend WUDOMACS to young men and women from your neighborhood, church, family, ...
- Attend one of our Colloquia. The schedule is on our web page and we always meet for cookies 15 minutes before hand.
- Be a mentor to a current major or minor. We love to get our majors in touch with graduates with similar jobs and interests.
- Employ a major. Let us know if you have openings for either summer or permanent positions.
- Come back for Alumni Career Days. We'd love to see you!

This summer **Adam Jara (CS minor '08)** was afforded the opportunity to work with cutting edge computer systems at Wright-Patterson Air Force Base. Using computer models, his group began to computationally characterize three isomers of C60S. Some of the surveyed characteristics included electron affinities, vibrational frequencies, and unique bond lengths and angles. The hope is that these data can be used to propose a plausible synthesis for this elusive molecule.

### There's more!

You can read more about the department, download papers and talks, and see the colloquium schedule at our web sites:

<http://www.wittenberg.edu/mathematics/>  
[http://www.wittenberg.edu/computer\\_science/](http://www.wittenberg.edu/computer_science/)

### Problem Corner

Do there exist irrational numbers  $\alpha$  and  $\beta$  so that  $\alpha^\beta$  is rational?

**Hint:** Is  $\sqrt{2}^{\sqrt{2}}$  rational?

Send your answers to whiggins@wittenberg.edu by March 2, 2007. We will randomly select one person from all correct entries to win a home-made cheesecake from Dr. Higgins!

**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 fall. We're happy to have you in the department!

**Mathematics Majors:**

- Andrew Bates '09—Lawrenceburg, IN
- Shannon Cooper '09—Vandalia OH
- Amy Criel '09—Albuquerque, NM
- Whitney Hull '09—Atlanta, NY
- Mark Lintern '08—Mansfield, OH
- Daniel Marous '09—Bexley OH
- Hannah Scherger '09—Wapakoneta, OH
- Steve Sexton '09—Springfield, OH
- Marshall Zarecky '09—Enon, OH

**Computer Science Majors:**

- Jonathan Wentz '08—Beavercreek, OH

**Mathematics Minors:**

- Mitch Fonseca Dec '06—Miami ,FL
- Timothy Funke '07—Indianapolis, IN
- Erin Meredith '09—Noblesville, IN
- Slavko Vorkapic '07—Croatia

**Computational Science Minors:**

- Rebecca Atkins '10—Sylvania, OH
- Jason Barkeloo '10—Columbus, OH
- Jason Bosley '10—New Albany, OH
- Emily Daniels '09—Grove City, OH
- Corbin Neike '10—Pickerington, OH
- Molly Tingley '10—Ostrander, OH

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