

# ∫ Integram

## EMU Mathematical Sciences Department

### Summer 2007

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## Budapest Abroad Experience

Recent graduate Aaron Trimble spent the spring studying in Hungary with the Budapest Semesters in Mathematics program. He lived with a host family that didn't speak English, but was fortunate to have a roommate who could translate. He says, "Despite the language and culture barriers, we had a wonderful time and learned a great deal about each other."

Of the cross-cultural experience he writes, "Many times I walked the streets of Újpest, earnestly trying to experience the neighborhood and living here. Surely this is what EMU makes such a big deal out of, the 'Cultural understanding' bit. [...] But, after some reflection I did realize that I am not going to experience what I want to experience. [...] I have my own life to live. I cannot live someone else's life."

Aaron solved six of the seven problems on his last exam (in number theory) but, "Eventually I ran out of ideas, time, and motivation, and seeing no trivial solution, I simply wrote: 'I do not think any solutions exist, but honestly, I have no idea how to show this.' After writing this, I stood, walked to the front of the room, handed in my work, shook the professor's hand, and left. What a way to end a mathematical career: '... I have no idea...' No doubt, an appropriate end. A humble, admission of the expansive field of unexplored material that I now turn away from."

Entering medical school at the University of Virginia, he says, "I will be God's instrument and He will no doubt save some lives – and hopefully souls – through me."

Aaron recorded much of his experience on his web site, <http://www.aarontrimble.com>. (The recent blog entries are first, so January's are on the third or fourth page by now.)

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## Computing Curriculum Update

EMU's revised Computer Science major completes the consolidation of the previous Computer Science and Computer Information Systems majors begun almost a decade ago by Joe Mast and Nancy Floyd.

Computer Science has traditionally focused on finding new and more effective ways to use computers, but now that computer technology is a part of our everyday lives the field of computing has also grown to include designing, managing, and improving the reliability and efficiency of computing systems. Computing is now viewed as a family of disciplines including Computer Information Systems, Computer Science, and Computer Engineering and the newer Software Engineering and Information Technology. Many larger schools are now offering all of those and other even more specialized programs.

As a small, liberal arts school, EMU is approaching the issue from another perspective. While some employers are looking for the specialists produced at the larger schools, others are seeking generalists who can adapt to the everchanging demands of modern technology. The computing disciplines still have much in common and rather than offering five (or more) computing degrees with significant content overlap, EMU now offers a single program which provides our students with a reasonably strong background in all of the major fields except Computer Engineering.

Based on the Association for Computing Machinery's Computing Curricula 2005 Overview and related program guidelines, EMU's revised CS program has been changed in a few small but important ways to meet the core expectations of multiple degree programs. Each student takes a fixed set of core courses and develops a custom plan of study. Some choices lead to a B.S. degree and others to a B.A. degree. Some could lead to graduate study others prepare students to enter the workforce. The program is divided into four sections, mathematical foundations, computer science fundamental technologies, upper-level courses, and elective courses and you can find more information at <http://www.emu.edu/cs>.

Principles of discrete mathematics, statistics, and calculus provide the foundation for much of CS. Some people have noted the reduced emphasis on calculus. While calculus is important, the traditional deference paid to calculus is just that, tradition based on the historical links between CS and math. We encourage students to take more calculus and even minor or double major in math, but not all computing professionals need two or more semesters of calculus.

Fundamental knowledge of programming, networking, databases, architecture and operating systems provides a practical framework for studying more advanced topics. While some of these topics are viewed as optional in more traditional CS programs, the number of modern computer programs and systems that do not involve network and database technologies is quite small.

The renewed emphasis on students developing their own plan of study also strengthens the program. Whether choosing individual elective courses or helping to select the topic for the year, students learn to share responsibility for their education.

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## Department News

### International Mathematical Contest in Modeling

This year two EMU teams participated in the International Mathematical Contest in Modeling. Lars Åkerson, Nate Benner, and Sara Swarr formed one team and Ben Ruth, Rachel Sims, and Yohannes Yenealem formed the other. Both teams spent the second weekend of February working the problem of political gerrymandering and received the rating of Successful Participant. For more information visit the site,

<http://www.comap.com/undergraduate/contests>.

## Spring and Summer Graduates

Three students, Josh Akers, Mark Risser, and Rachel Sims, graduated from our department this spring. Three others, Francis Johnson, David Troyer, Aaron Wheeler, and Yohannes Yenealem, are completing the last of their degree requirements this summer or next fall.

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## Alumni News

We recently sent a message to CS and CIS alumni who had given their email addresses to the EMU alumni office and we are grateful for the thirty who replied. A fairly large number of messages bounced so we encourage you to verify that EMU has a current email address for you.

Most respondents are working in traditional computing professions. A number of recent alumni are also enrolled in graduate programs. Eight software developers are primarily doing web and database application development. Seven people are doing system administration and support. Two people are working in quality assurance and two are technical consultants and trainers. We also heard from a director and a vice president of information technology.

Other respondents have chosen more unique paths worthy of a liberal arts degree. Our alumni include a liaison to an outsourced IT department, sales manager, patent classifier, carpenter, farmer, mom and home school teacher, author and illustrator, technical editor, and the MCC Country Representative for Brazil.

Eleven live in or near Harrisonburg, eight elsewhere in Virginia, four in Pennsylvania, three in Ohio, and one in each of Georgia, Oregon, Ecuador, and Brazil.

And that's just the CS and CIS alumni who responded. We would love to hear from more of you and make an alumni news section a regular feature of the Integram and profile various alumni on our departmental web site.

### ***What have you been doing since leaving EMU?***

Send your personal and professional updates to Deirdre Smeltzer at [smeltzed@emu.edu](mailto:smeltzed@emu.edu).

You can just give us a quick update so we have a good idea of what our graduates are doing or write a more detailed account that we can publish. In either case we would love to hear from you.

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## Problem Corner

No one submitted a solution to the Winter 2007 Integram match game problem so we give you this hint. The first player should start by taking 13 of the 1000 matches. If there were 100 matches the player should take 11, but if there are a dozen matches take only 1. Think Fibonacci.

### **Problem:**

A game begins with  $n$  matches. Two players take turns removing matches. The first player can remove any number of matches except  $n$ . After the first turn, each player removes one or more matches, but not more than twice as many matches as the preceding player has taken. The player who takes the last match wins. Starting with  $n=1000$ , design a winning strategy for the first player.

Submit solutions to Deirdre Smeltzer: [smeltzed@emu.edu](mailto:smeltzed@emu.edu).

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