Department of Mathematics & Computer Science

2012-13

Newsletter

BSC Math Jeopardy! team wins regional competition

The winning BSC Math Jeopardy! team (with their mascot) were (from left) Ed Faye, Tianran Geng, Steven Carter, and Niño Yu Tiamco.

The Birmingham-Southern Math Jeopardy! team left a five-state regional math competition as champions in early March. The competition was held during the 2012 Mathematical Association of America Southeastern Section Meeting at Clayton State University in Atlanta, Ga., and included 35 teams from colleges and universities across Alabama, Georgia, North Carolina, South Carolina, and Tennessee.

The BSC team was comprised of Steven Carter, Tianran "TR" Geng, Ed Fay, and Niño Yu Tiamco, and was sponsored by Assistant Professor of Mathematics Dr. Anne Yust.

The Birmingham-Southern team came in second place in the first round in a close battle with the University of South Carolina on Friday, March 9. However, BSC earned a spot in the second round due to the large number of points it scored during the first round. The BSC team won the second round to advance to the finals on Saturday.

The final round began slowly, with all four teams, Berry College, Birmingham-Southern, Georgia Southern University, and the University of South Carolina, trading correct and incorrect "questions." Birmingham-Southern ran away with the lead around the midway point of the competition, never looking back.

BSC improved its showing from last year's 3rd place finish while also claiming victory over previous round rivals, University of South Carolina. The first place trophy is proudly being displayed in the Admission Welcome Center on campus where prospective students can see evidence of the strength of the Birmingham-Southern mathematics students.

BSC Birmingham-Southern College

Alum creates successful software technology company

By Jeff Cross '91

Eight years ago, I founded 2B Solutions, a technology services company, to develop and implement mobile software solutions for businesses. One of the initial markets for this emerging technology—long before the invention of the iPhone—was barcode scanning applications for inventory management and asset tracking using industrial-grade handheld scanners. We've since created many custom mobile apps, but one of the most gratifying solutions has been the development of a materials tracking system for the Alabama Math, Science, and Technology Initiative (AMSTI).

AMSTI is an Alabama Department of Education program started over a decade ago to improve math and science education through the use of hands-on learning kits for K-12 students throughout the state. Incorporating hands-on learning better engages the students and results in better test scores. A recently released five-year, $3 million study funded by the U.S. Department of Education "shows that AMSTI is significantly effective in increasing student achievement." For math, "the gains are equivalent to an extra 28 days of classroom instruction" for students that attend an AMSTI school for one year! The study also shows improvement in reading and science scores for students attending an AMSTI school for two years and more. For a link to the results and other information, you can visit http://www.amsti.org.

What the state of Alabama has done in the area of teaching math and science is getting noticed by others in the U.S. too. Since completing our original implementation for Alabama, we have installed the tracking solution for Delaware and Indiana, and we are in discussions with other states and school districts as well.

What is most gratifying to me is knowing our solution helps solve a real problem in math and science education, and knowing that Alabama is leading the charge to equip our children with the skills they need to succeed. Additionally, government officials, corporations, and educators are now more aware of how better results can be achieved. I remember seeing an email signature of an AMSTI employee early in our implementation which read, "Children may be only 20% or our population, but they are 100% of our future." As a parent of a 2nd and 4th grader who both attend an AMSTI school, I think that pretty much says it all.

Mathematics graduate applies skills in the Ethiopian Commodities Exchange

By Michael Johnston '09

To my surprise, mathematics has opened opportunity after opportunity in my life post-BSC. It's been three years or so. Within a few months of graduating, I'd already been on three job interviews that consisted mainly of math questions—for financial firms in NYC and Philly and one for a software company in Wisconsin, Epic (FYI they're hiring like crazy). Frankly, though, none of these jobs was something I was passionate about. Maybe that even counts against math a little.

That's far from the end of the story, though. Three months ago, I moved to Ethiopia, to do something I am truly passionate about: to work at the Ethiopia Commodities Exchange (ECX) to help develop the markets in a country famous for famine, but in which farmers more often complain about lack of good markets to sell their products than they complain about hunger. A few weeks ago, I was asked to use statistical tools to analyze the relationship between the Ethiopian markets and the U.S. market for coffee. Coffee is Ethiopia's most important export, and two days after I started, the COO of ECX told me my next report was due by 5:00 p.m., and that the work was a high priority for the Office of the Prime Minister. I think I want to do my life's work in Ethiopia, so for me that was big!

Some of the details to give you a feel for what it's like: we were mainly concerned with correlations between Ethiopian prices and New York prices. The thing is that Ethiopia, like English classes at BSC, is the kind of place where, when you're looking for just one answer, you hear, "It depends." What's the relationship between our price and New York? It depends on which type of coffee you're talking about. It depends on the season, the news, the weather, the political climate, and on and on. But "it depends" doesn't cut it when the Prime Minister is setting policy. How the dependency works takes a lot of understanding of all the things it depends on, so I'd talk 5-10 times per day, just briefly, with the trading floor manager or people in operations about how the different types of coffee differ, what happened in the news at certain times, and what people are talking about in the countryside, the city, and on the trading floor. His ideas tell me where to look next in the data—sometimes he's right, and sometimes, even with years of experience, the data just doesn't support what he thought he knew. And when I finally find some results, I rush into the COO and start talking about math, and I always I hear two things: "Dumb it down for me," and "So, what does that mean?"

I've also used data analysis frequently for the charity I run here, House of Mary (houseofmary.org). It's pretty much an orphanage. Think financial efficiency and nutrition. And by the way, if you're not sure what to do for your senior math thesis, let me know—michaeljohnston0@gmail.com.

Mathematics alum serves in AmeriCorps

By Brittany Green '08

Green

After my Bachelor's in Mathematics from BSC and a Master's in Industrial and Systems Engineering from Auburn University, I made the next logical move in my career and served a year with AmeriCorps. In case you are unfamiliar, AmeriCorps is basically the domestic version of the Peace Corps with many programs around the country from hurricane relief to tax education. Thus, actually AmeriCorps for me was far from the optimization of complex mathematical models and courses of my previous degrees and not the next logical move in the least.

I can distinctly remember even my fellow AmeriCorps members asking me why I was in AmeriCorps with degrees in engineering. I have asked myself the same question and the best way I can describe my reasoning is after my master's I felt a void in my life. You see, I have always been involved in community service beginning with my days at BSC, and upon graduation with my master's in engineering, I was tired of solving problems for corporations and industries that had no impact on bettering the world. I know this all sounds quite mushy, but I have heard of a few idea generators like the owners of Toms Shoes who do just that, and I wanted to take some time to define what bettering the world meant to me and how I could utilize my skills and background for change. Thus, I signed up for a year in my specific AmeriCorps program, Literacy*AmeriCorps, where I taught basic computer classes and job skills 45-plus hours a week in a disadvantaged neighborhood in Pittsburgh.

How did it go? Well, first of all let's just say I gained a tremendous amount of respect for social workers and those involved in direct service, which I discovered is not for me. I truly missed the mathematical/technical problem-solving of my past. Second, I met and learned so much from my students who had very different life experiences than me; for example, I met people who have worked a steady job for 20 years, then were cut suddenly by their company and could not survive on their retirement. On the other end of the spectrum, I mentored teenagers looking for their first job who live in a neighborhood which most residents in the city consider the worst place in Pittsburgh because of the amount of perceived violence and gangs. I'm not saying that there is not violence and poverty in that neighborhood; I'm saying labeling and avoiding these neighborhoods does nothing to solve the problem.

Thus, in all my confusion and not quite fitting into the social-work realm of AmeriCorps, I finally believe I have found a way to align my passions using my technical background fused with a social service application by getting a Ph.D. in industrial engineering and operations research with humanitarian applications, which will allow me to re-visit neighborhoods like these. Much more information can be found in "Doing Good with Good OR," a section of a nationally recognized journal, the Institute for Operations Research and Management Sciences, which has many examples such as optimizing the supply chain during hurricanes or optimizing the impact and management of volunteers at a large non-profit institution. I will begin a Ph.D. program in Decision Sciences and Engineering Systems at Rennsselaer Polytechnic Institute in Troy, N.Y.

Mathematics majors engage in senior research

By Doug Riley, Chair of the Department of Mathematics and Computer Science

In the fall of 2011, 14 students took the inaugural offering of Seminar in Mathematics, a new course designed to help prepare our majors for completion of their senior research project. Eleven of these students began work during Exploration Term 2012 (formerly called Interim Term) on seven different projects.

Steven Carter '12 presented his work on the decompositions of polynomials into the composition of two rational functions at the Southeastern Regional Mathematical Association of America meeting in March, and also hopes to publish the work. Virginia Seale '12 and Hannah Wirey '12 successfully generalized the Whispering Joker card trick to an even number of reference cards. They demonstrated their new trick at the 10th annual Harriet J. Walton Symposium on Undergraduate Mathematics Research at Morehouse College in April.

Emily Fredericksen '12 and Jessie Mayne '12 also presented at the Morehouse conference, where they discussed winning strategies for the game "to Knot or not to Knot" on a new family of knots. The relationship between the perimeter and area of right triangles interested Melanie Short '13 and Niño Yu Tiamco '13. Short and Yu Tiamco discovered a new result on the exact number of primitive right triangles whose area is n times the perimeter in terms of the prime factorization of n. They presented this result at the Morehouse conference, and plan on submitting the work for publication.

Huda Qureshi '13 solved the easy configurations for the 3x3 lights-out cube game. Qureshi, who also has some interesting conjectures on the nxn cube, also attended the Morehouse conference to discuss her work. Hope Harris '12 and Alicia Plotky '12 studied disentanglement puzzles for their senior research project from a topological perspective. Harris and Plotky proved that for certain puzzles, particular manipulations are necessary in any solution. They solved these puzzles at Morehouse College as part of the presentation of their work. Mike Stonewall '12 worked on producing a topological map of campus by collecting elevation and coordinate data on his iPhone. He presented at Morehouse with his peers.

Certainly BSC was well-represented at the 10th Annual Harriet J. Walton Symposium!

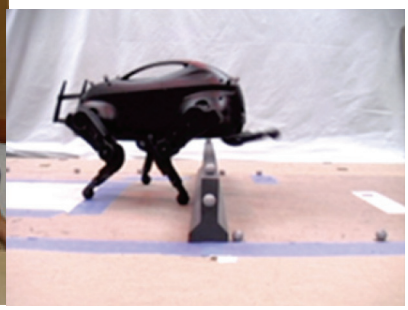
Seminar in Mathematics students were (front row from left) Huda Qureshi, Emily Fredericksen, Jessica Mayne, Melanie Short, Alicia Plotky, and Michael Stonewall; (back row from left) Dr. Doug Riley, Hope Harris, Niño Yu Tiamco, Virginia Seale, and Hannah Wirey.

Powell

Six handshakes away from a president?

Dr. Jeffrey Powell, assistant professor of mathematics at Samford University, was the Kappa Mu Epsilon invited speaker to campus in the fall.

Powell gave an introduction to small-world and scale free networks and described algorithms for generating examples of these networks. He also helped a packed room of students ponder the question "Am I six handshakes away from a president?"



How much mathematics should a robot know?

Dr. Matt Zucker, assistant professor of engineering at Swarthmore College, drew a crowd of students to his spring guest lecture on mathematics and robotics held on campus. Zucker discussed how he programmed the robot pictured above to enable it to negotiate a variety of obstacles including stairs. He also described the undergraduate mathematics courses that students need to master to pursue a career as roboticist.

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