From the Chair

It has been a busy year for the BGSU Computer Science department, with new programs and developments of which we’re highly proud. It was “all hands on deck” for our faculty and staff to prepare for the on-site visit by the Accreditation Board for Engineering and Technology (ABET) last fall. The evaluation team appeared to have a positive assessment of our department and processes, and their final notes were encouraging. We will receive official notification in July 2017. ABET accreditation will add additional value and stature to the already impressive BGSU Computer Science curricula.

Beginning in fall 2017, BGSU will offer a new undergraduate major in software engineering. This is a natural evolution of our program, and it will provide students with additional credentials for employment in a rapidly growing field. Software engineering uses engineering approaches (planning, analysis, design, implementation, testing, etc.) to develop software systems. Ours will be the second software engineering bachelor’s program among public universities in Ohio.

Our students—past, present, and future—feature prominently in this issue. Alumnus Saranga Komanduri (‘05, ‘07) is technical lead at Civis Analytics in Chicago, and other alumni recently joined the Computer Science Advisory Board. Recent graduate Che Shian Hung (’16) was part of a BGSU team to showcase a new video game at the international South by Southwest in Austin, Texas this spring. In addition, students in BGWIC mentored girls in grades 5 through 8 in computer programming in the Google-supported Code4Her initiative.

We’re now less than two years away from our golden anniversary! In 1969, BGSU established the first Computer Science department in Ohio, and in 2019 we’ll celebrate our 50th year with an event you won’t want to miss. We’re looking forward to seeing many familiar faces of faculty and alumni who have been with us through the years. It has been wonderful to hear from some of you in response to our newsletter and to discover what interesting careers have come out of our program.

Sincerely,

Dr. Joseph Chao, Chair

Code4Her Immerses Girls in Computer Science

BGSU computer science students are coaching the next generation through a program designed to encourage females to study science. Made possible by a $10,000 Google IgniteCS grant and an additional gift from the widow of a former faculty member, the new program—Code4Her—provides free computer science mentoring for girls in grades 5 through 8. The 34 participants came from 18 communities around Northwest Ohio.

Mentors are students in the BG Women in Computing (BGWIC) organization. They are a diverse group in terms of gender, ethnicity, educational level (there is one alum), and various class ranks. Each of the 17 mentors worked with two girls during the five sessions of the program during spring 2017.

“Lego blocks are instantly familiar,” she said, “They provide a comfortable atmosphere where students are open to learning and experimentation. They catch on very quickly to programming concepts this way.

“We taught the girls about the binary numbering system and how it can represent the way computers store data, instructions, and information. They performed some conversions from decimal to binary. In addition they encoded their own first names using binary to represent characters (ASCII code). Then we introduced them to the Lego robots configured as puppy dogs. The girls were ‘training’ their dogs to sit, stand, bark, recognize colors, etc.”

Google IgniteCS provides funding for groups of university students to make a difference in their local communities through computer science mentorship. BGSU’s Code4Her was one of only two programs in Ohio funded by it in the last annual cycle.

“We are incredibly honored to have been selected,” said Rebeccah Knoop, BGWIC president. “Our members are passionate about supporting girls in computer science. We are not a large organization but we believe we can have a great impact on the community and are thankful to IgniteCS for supporting our program.”

Mentor Allison Wurth works with her students
Carlson said that Code4Her benefits not only the girls but also their mentors.

“We hope that the mentors gain self-confidence, practice their communication and leadership skills, and feel involved in computer science education,” Carlson said. “And we hope that through their active engagement they will become better students and that our retention rate of women undergrads will be improved.

“There has been a shortage of women working in computer science for as long as I can remember. In my programming classes I often have one to four girls is a class of 35 students. It’s lonely. Code4Her and BGWIC provide a way for female students to discover that they are not the only ones, that they can form friendships and help each other out.”

Members of BG Women in Computing (BGWIC) and their student mentees

Visually Impaired and Learning to Program

Teens love technology, and Alex Mitov is no exception. The Bowling Green High School student, who is visually impaired, not only navigates fluently with his phone and computer, but he also plans to major in Computer Science at BGSU after graduation. He’s currently working with assistant professor Sankardas Roy to further his programming skills.

Alex’s interest in computer science began about two years ago when a peer challenged him to a game of Minecraft. To play the game effectively, a player needs to know many commands and type them in during the game. For example, there’s a command whose syntax is “/gamemode creative” that lets the player change the game to creative mode, which allows flight, gives more resources, and prevents a mob attack. A command’s syntax is sensitive to details, e.g. a forward slash should be the first character, there is a space between two consecutive words, and so on.

“For any person, it’s hard to memorize the proper commands, but for a blind person, typing them on the keyboard is the only way to play,” said Alex.

Alex uses iPhone with VoiceOver, Windows PC with Narrator, and Braille NoteTaker to assist him on the computer. In their sessions, Dr. Roy assigns the student Java programming tasks by giving him an incomplete version of the program. Alex takes a week or two to complete the code at home with occasional email conversations; then they reconvene to talk about the assignment. Dr. Roy comments on the code, pointing out places where it could be made better, and Alex asks questions to clarify any doubts.

The teen also uses his computer for networking and finding ways to play games, and he has taken a Python programming language class at Carnegie Mellon University in Pittsburgh. His current arrangement at BGSU came about when Alex’s family contacted the Computer Science department to inquire about a possible mentorship, and Dr. Joe Chao, department chair, connected the Mitovs with Dr. Roy.

“Alex has great potential to become successful in the field of computer science,” said Dr. Roy. “I’m often pleasantly surprised to see how quickly he learns new coding patterns which may not be easy even to a typical university student.

“Through this experience, I’ve also observed that some of the current tools for blind programmers have limitations, and I have research interest on how to improve such tools.”

Dr. Sankardas Roy works with Alex Mitov
ADVISORY BOARD MEMBERS PROVIDE Workshops in Digital Forensics

Last summer, members of the Computer Science department visited the headquarters of two Computer Science Advisory Board (CSAB) companies to attend workshops on digital forensics and cybersecurity. The free workshops were developed specifically for BGSU faculty.

Nationwide Insurance in Columbus, Ohio, hosted a two-day security workshop arranged by CSAB member and BGSU alumnus Michael Carrel, who is CIO of Enterprise Applications. Topics included infrastructure and SCC tools, database tools, identity and access management tools, and desktop tools. Also in Columbus, faculty members shadowed professionals at Interhack in a workshop hosted by board member and alumnus Kevin Wohlever. Several case studies, including a high profile, actual court case related to digital forensics, required participants to sign non-disclosure statements.

Both sessions were highly informative and beneficial as we continue to discuss implementing a digital forensics specialization in Computer Science under the B.S. degree program.

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BOARD UPDATES

- Collaboration and Networking subcommittee: Brought in speakers from a variety of corporations including IBM, Amazon, and Nationwide during academic year 2016–17. Developing a list of “hot topics” and potential connections to bring in more speakers. Brainstorming how to publicize departmental research to industry members.
- Student Career Development subcommittee: Working to connect CS alumni with current students for mentorship and network building. Gathering information on how to create a job shadowing program that could potentially help students who are pre-internship.
- Student Recruitment subcommittee: Developing ideas on how the CS department can focus on recruiting from high schools around the region.

DIGITAL FORENSICS: A branch of forensic science that relates to the recovery and investigation of material found in digital devices.

CYBERSECURITY: The protection of information systems from theft or damage to their hardware, software, and data.

Gaming Team Competes at SXSW Conference

A video game created by a team of BGSU students was chosen for the South by Southwest (SXSW) Gaming Pitch Competition in Austin, Texas this spring. Developer Che Shian Hung—a computer science student who graduated in December 2016—along with producer and director Xiao Yang and Jonathan Ampiaw—both digital arts students—and several more students rounded out the team.

In “Come Back Home: The Tale of Anaaya,” a girl must find out why her village has vanished and how she can reunite with her people. Once the narrative concept was decided, the team spent many hours developing the environment, the aesthetic components, and the programming. They had a great experience and received valuable feedback on how to enhance their fledgling game and navigate the competitive gaming industry.

BGSU’s involvement in the international competition was significant. Last year’s attendance to the event was over 76,000 people from around the world. The major players in the field of game development attend the event and the judges are prominent professionals in the field.

The BGSU gaming team stemmed from a collaboration between students in two courses: “Art and Virtual Environments” and “Software Engineering Project.”

Students Che Shian Hung, Xiao Yang, and Jonathan Ampiaw, along with Digital Arts assistant professor Heejoo Kim
DRIVEN BY DATA

Alumnus Uses Analytics to Solve Problems

After Saranga Komanduri earned his bachelor’s (’05) and master’s (’07) degrees in computer science from BGSU, he had internships at Google and Microsoft Research, then went on to get his doctoral degree in computer science from Carnegie Mellon University in Pittsburgh.

Today, Komanduri is technical lead at Civis Analytics in Chicago, helping to build its data-science platform and leading a team of software engineers who build some of the core architecture of the company’s program. The firm uses data science to increase the adoption of clean energy and the awareness of the refugee crisis, for example, and in commercial activities like helping companies determine where to spend their advertising budgets. Essentially, the Civis platform allows organizations to build their own data-science workflows that run entirely in the cloud.

Komanduri illustrates the distinction between simple analytics and data-driven decision making.

“Imagine you’re running a hospital and you use analytics to determine which doctors have the worst patient outcomes,” he said. “You identify the lowest 10 percent and let them go, but then you find that patient outcomes get even worse. How is that possible? It turns out that sometimes the best doctors have poor outcomes because they take on the hardest cases — and now you’ve let some of your best people go. To figure this out, you need more data and a more sophisticated analysis. Civis Analytics helps companies run experiments and gather data from multiple sources to get deeper insights from their information.”

Even though Komanduri finds algorithms fascinating, the end goal—and the most satisfying part of the job—is solving problems.

“Algorithms can be used to solve huge problems, but you have to learn the fundamentals before you can do interesting things,” he said. “Once you make that investment in your future, you reach a point where you can solve problems quickly.”

Komanduri lives near Chicago with his wife and son.

Corporate Membership Program Grows

Agile Software Factory (ASF) is pleased to thank the seven businesses that have signed on to the corporate sponsorship program. Their contributions support many facets of ASF including scholarships, student wages, hardware and software for development projects, professional training and development, and conference attendance and travel. Through collaborations with the information technology industry, Agile is able to cultivate educational and professional relationships that provide opportunities for our talented computer science students.

Also of note: ASF’s new director, Jadwiga Carlson, received her MBA from BGSU in 2016, adding to her MS in computer science (’03). Congratulations, Jadwiga!

To participate in the Agile Software Factory Corporate Program or to engage with ASF staff, visit http://agile.bgsu.edu.

Fulton Award Funds Multi-Stream Data Project

The David and Amy Fulton Endowed Professorship in Computer Science is an ongoing grant for departmental projects. For the 2016–17 academic year, assistant professor Rob Green was awarded the grant to bring in visiting faculty member William Acosta, a senior architect at Dish Network. The two collaborated to develop a scalable and re-deployable framework for intelligent analysis and anomaly detection for multiple streams of high velocity, high volume data. The framework integrates modern technologies like Apache Spark, Apache Kafka, and Docker as well as algorithms from computational intelligence (neural networks and population-based metaheuristics).

As an example, corporations regularly collect data from multiple sources that range in size (bytes to megabytes), velocity (sometimes up to 50,000 samples per second), and source (from debug to usage logs). The problem is that extracting actionable knowledge from this data is difficult due to factors such as concept drift, noise and outliers, recurring concepts, and concept evolution. The new framework could be used to investigate and analyze data at this level.