HELLO AND WELCOME!

We are happy to report that Dr. Omar Badreldin joined our team as a tenure-track, assistant professor, after we were able to successfully conquer some visa issues and related delays. He fits our team beautifully. Omar’s research interests are in the areas of healthcare informatics and analytics, UML modeling, programming languages and code generation, Goal and Performance Modeling, compliance and requirement engineering.

The biggest challenge that we faced during the past year was the preparation of our on-site ABET visit last October. As you all may know, our BSCS program is "ABET-accredited", which means that it conforms to the rigorous quality standards that ABET defines. For us, this visit was especially important as it presented the first opportunity to receive detailed feedback on our new, student learning outcomes-centered assessment processes that we created in 2006. Although there is room for improvement, the visit went well and we are optimistic that our accreditation is going to be renewed - the final decision will be made by ABET this upcoming summer.

Our enrollment numbers have gone up - again! Last year we have seen an enrollment growth of close to 20%, the overall growth rate averaged 18% over the last five years. 8% of the latest growth of NAU as a whole comes from our CS programs alone. Currently, we have 328 students in both of our programs. This also means that we are not "small" any more, in comparison to other CS programs nationwide.

Our growth has a direct impact on the class sizes that we see in upper-division classes, especially in our capstone sequence of classes at the senior level. As a consequence, we are in constant demand for challenging capstone projects. If you have an interesting project or product idea that you would like to have taken on by a team of senior CS students for a whole year (for free!), please contact me and we will make it happen.

In order to accommodate bigger student numbers without the need for more teaching capacity, we have refurbished our CS lab to now support 46 students, instead of 32. Along with this extension we have also changed the way we teach our CS labs. We have implemented the pair-programming paradigm, with amazing effects. Students learn to solve problems by learning from each other, rather than depending on the attention of the lab instructor. This is not only more efficient and satisfying for the students; it also frees the lab instructor up to help students with the understanding of conceptual challenges, rather than tracking down syntax errors.

I hope you enjoy our newsletter! If you are ever in the area or passing through Flagstaff, please drop by. We are always happy to reconnect with our friends and alums and our ACM student club is always looking for speakers to share insights.

All the Best,

Dr. Wolf-Dieter Otte, Associate Chair
By Dr. John C. Georgas

The nation faces a critical need for additional computer scientists and software engineers, as well as a broader need for science, technology, engineering, and mathematics professionals. Studies have placed this need at one million additional graduates in the next five years, and the need in the computing sciences is particularly critical given the emergence of data-intensive scientific research. Meeting this daunting challenge is a critical priority for educators, who are ideally positioned to innovate in support of this goal.

An important strategy for workforce development in computer science and software engineering is to increase the enrollment, retention, and graduation of underrepresented students in the discipline, such as women and Native Americans. The potential for dramatic increases in graduating qualified professionals is perhaps best exemplified by looking at the enrollment of women in computer science—based on national data, while women represent roughly 55% of all four-year university students, they represent less than 10% of students in computer science.

While the challenges faced by underrepresented students are many and diverse, one of the key insights is the disconnect between conventional teaching techniques and the learning needs of such students. The faculty in the Computer Science department are working toward dramatically improving the pedagogical techniques being used in our courses by enhancing our practices with such techniques as:

- Collaborative Learning: Collaborative learning techniques describe a family of approaches that focus on fostering learning through group work, and transition the instructor’s role to that of a facilitator. These include group discussions, cluster groups, collaborative surveys, and pair-share.

- Problem-Based Learning: Problem-based learning focuses on the use of open-ended problems and allows learners to chart a self-determined path through a subject matter. This approach also allows for the use of authentic problems drawn from NAU’s areas of strength, such as sustainability technologies and native peoples healthcare.

- Game-Centric Learning: Game-centric learning focuses on the use of immersive games and game-like activities through the use of games as example systems in courses, but also the use of game activities in class like role-playing activities and relay-race programming.

Improving computer science pedagogy is a key strategic direction for our department and is a win-win effort: Not only do these efforts help all students learn better, but they are also especially helpful for underrepresented students and critical to the nation’s workforce development.

“Improving computer science pedagogy is a key strategic direction for our department”

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**WOMEN AT NAU IN COMPUTER SCIENCE**

By Dr. Maggie Vanderberg

Last spring, I received the Outstanding Achievement and Contribution Award from the NAU Commission on the Status of Women. As the only female faculty member in the Computer Science department, I made it clear that increasing the number of female students enrolled in computer science is important.

Although computer science graduates have continued to be one of the most employable groups, the percentage of female graduates is on the decline. In fact, the number of women represented in undergraduate computer science education peaked in 1984 at 37.1% and has been decreasing ever since. A critical step towards improving female enrollment and retention is through communication and support. Some young women have the common misconception that computer scientists are “nerds that just sit in front of their computers all day without talking to anyone”. More realistically, there are many career opportunities that are actually available to computer scientists that may have non-traditional computing interests. Women undergraduates in computer science that are creative and artistic can go on to focus on the front-end design of modern websites, while women that are specifically interested in language and speech can focus on the development of programming languages and the automation of speech processing. Still, other women students that enjoy more traditional engineering design aspects can focus on systems and/or software development, database administration and design, quality assurance, and/or project management. It can be encouraging for women to explore how their personal interests align within the various disciplines of computer science.

In order to help inform and support women undergraduates, I am organizing a Women in Computer Science (WiCS) Chapter at NAU. The group will provide support to current female CS majors and focus on outreach activities to help inform the next generation of female students. This past fall, I worked with CEFNS to send three undergraduate students to the 2013 Grace Hopper Celebration of Women in Computing Conference, which was held at the University of Minnesota. Over 1,900 female students and 2,200 women from industry attended the conference. This year the department hopes to increase student participation, as the conference will be held right down the road at the Phoenix Conference Center.
Q&A WITH DR. OMAR BADRELDIN

Dr. Omar Badreldin has recently joined NAU CS as an assistant professor. He comes from Canada where he used to be a post-doctorate researcher at University of Ottawa. He works in the area of healthcare informatics, care process management, and model driven engineering. His works aim at achieving high performance healthcare by enhancing hospital compliance, governance, and improving patient flow. This involves process modelling, reengineering, performance and goal modelling.

How do you find life in Flagstaff?
Warm, sunny and friendly.

What would you change about Flagstaff?
Better public transportation and more use of reusable energy. Public transportation is more inclusive, brings people closer together, and improves sense of community. It is also a manifestation of democracy, where people collectively contribute to providing transportation for everyone.

Why did you choose to apply (and come) to NAU all the way from Ottawa, Canada?
When I visited NAU back in March 2013, I really liked the campus and everyone in the department. I also had a chance to meet some of the students and I was very encouraged to come and work at NAU. After being here for almost one semester, I have not changed my mind. Everything is as I expected AND better. I look forward to contributing to NAU and the community in every possible way.

Have you noticed any interesting differences in the students in Ottawa vs NAU? Are the educational systems similar or different and why?
I would say the difference between students here and in Canada is subtle. Students at NAU are more aware of the competition and are more eager to join the job market. NAU students work hard and seem to be more willing to be independent and learn on their own.

I also find Canadian students to be more informed about the world. They do not only look for jobs within Canada. They expect and are more comfortable with the idea of working outside of the continent. This may be because the market in Canada is significantly smaller than the U.S. Also, most students in Canada speak 2 or more languages. Canada is bilingual (English/French) and most students speak at least two languages. That is why I find NAU’s Global Science and Engineering Program to be particularly interesting. The world is more connected than ever before, and having an international exposure and speaking multiple languages is a distinctive advantage for any student, and for the science and engineering students in particular.

GLOBAL SCIENCE AND ENGINEERING PROGRAM (GSEP)

The Global Science and Engineering Program is an ambitious, innovative dual-degree curricular track that internationalizes your studies in any science or engineering discipline by adding intensive language study, immersion in our community of international scholars, and a variety of other international curricula and activities. Studies in language and culture are integrated with students’ regular studies in their engineering and science majors, following a set of carefully crafted degree progress plans.

After preparing on-campus for three years, GSEP students spend a year abroad, consolidating their language and professional skills with a semester of study at one of our international partner institutions, followed by a professional internship at with one of our corporate or research partners in Europe, Latin America, China, or Japan. With their language studies completed, GSEP students then spend their final year back on-campus, finishing off the Capstone year of their engineering or science degrees.

On the next page, see what CS’s Dr. Eck Doerry and one of our CS students are doing in GSEP.

For more information, contact Dr. Doerry or please visit: https://nau.edu/CIE/Global-Science-Engineering/
NAU CS GOES GLOBAL: IN INTERVIEW WITH A CS MAJOR ON THE MOVE

By Dr. Eck Doerry, with CS major Lane Fujikado

If you’ve read the past few NAU-CS newsletters, you will know that I’ve been spending a lot of time in the past few years starting up the Global Science and Engineering Program (GSEP), which is aimed at creating a new model for preparing science and engineering majors to be tomorrow’s leaders in global enterprises. In a nutshell, GSEP is available to any science or engineering major at NAU, and extends the usual four-year Bachelor’s program by a year to integrate a second BA degree in a foreign language and a year of study and professional internship abroad. Seeing as I’ve spent the last couple of newsletters telling you about GSEP and how great it’s going to be, I thought it was high time to bring on some results. So I put together a remote interview with CS major Lane Fujikado, who is in GSEP-Spanish and is currently abroad at the University of Alicante. He’s just finished up his internship semester at a company in Alicante, Spain and is taking a few more classes there before coming back for his final year at NAU this fall. Can you think of anything more awesome to put on your resume than an experience like this? Enjoy!

Dr. D: I understand you did your GSEP international internship experience at a computer game development outfit in Alicante. Can you tell us a little more about the company and your project?

Lane: The company I interned for is called Trymedia. The company receives computer games (source code) from other partner companies and then does all the detail work of preparing them for public release. This includes packaging, adding licensing, creating trial versions of the games, handling online purchases and of course testing the games for errors. The main focus of my internship project involved developing software to help the testing department more efficiently run certain tests on games. In particular, the software I developed automates some of the testing processes for making sure a game installs properly, the trial version works, the game has the correct licensing, the game is able to be uninstalled, and so on. The results of these tests are sent to a Trymedia database server and then displayed on a website.

Dr. D: GSEP seems like a neat program, but extending your undergraduate studies to five years for it seems like a big commitment. What was it that motivated you to join GSEP in the first place?

Lane: The thought of taking an extra year of school did give me some pause, as well as the cost and being so far away from home. What motivated me was the excitement of traveling to Spain and doing something new and different; this has been my very first opportunity to travel abroad to Europe. Besides just having the opportunity to travel, GSEP looked like a very unique opportunity; studying, interning and being immersed in a whole new culture was something to really look forward to.

Dr. D: So has it panned out? Has this professional experience abroad been everything you hoped for? More? Less?

Lane: Yes, it has gone extremely well. I would say I owe it mostly to having such a great group of people I worked with. Everyone at Trymedia was extremely friendly and welcoming. They helped me integrate into the company and showed me a lot about the Spanish work ethic. I’d say things couldn’t have gone any better.

Dr. D: Computer Science is already not exactly an easy major. How much harder did the integration of foreign language and cross-cultural training make it for you?

Lane: Taking computer science courses at a Spanish university is pretty difficult. Not necessarily the homework or material itself, but just “comprehending” in a foreign language. As silly as it may seem, there are technical words used in computer science that I know in English, but that translate differently or are completely different words when said in Spanish. Because these words are specific to computer science and not used in everyday conversations, Spanish foreign languages classes in the U.S. never teach us these terms; these are words you just have to learn/ memorize in order to finish projects and assignments.

Dr. D: What would you say is one major insight or skill you’ve gained from your GSEP experience that you think will help you to be more successful in your upcoming career as a computer scientist?

Lane: I’d say one new skill/insight I’ve learned from GSEP is to adapt. This is because sometimes we get very used to our routine back home, we almost become too comfortable in “what we do” and “how we do” things. GSEP has taught me how to adapt my work ethic, priorities and schedules to work in a global context. For example, in Spain there is a very different time schedule at work: 8 hour work days might consist of working from 9 am to 2 pm, taking a 3 hour siesta and then continuing to work 5 pm to 8 pm.

Generally, I think the GSEP experience will help me adapt quickly to whatever work environments I am presented with in my career, whether it be working with a language I am not familiar with, using different development software, working in teams and taking into account a different variety of needs/goals.

Dr. D: Would you recommend GSEP to other CS majors?

Lane: I would most definitely recommend GSEP to anybody considering it. My main piece of advice would be to prepare to “take care of yourself” and to be independent. Living an entire year away from friends and family can sometimes be a bit nerve wracking as well. However, the benefits GSEP offers are great: having an international internship, making new friends, selecting from classes that aren’t taught back home, and planning trips within Europe is an experience that’s hard to top.

NAU sponsors a student chapter of the Association for Computing Machinery, the CS professional society. They have a workroom where research is conducted and informal tutoring takes place. This year, they attended “L.A. Hackathon”, a regional event that is week-end long pro-gramming competition.

Take a look at what NAU CS did this month at UCLA:
http://www.lahacks.com/

Visit the NAU ACM web site at:
http://acm.cecfns.nau.edu/
The NAU First Year Learning Initiative (FYLI) is a unique, locally-developed and faculty-driven program for building academic success in the early college career. There are currently over 50 FYLI-certified courses at NAU, including many of the highest-enrollment, highest-impact gateway courses at NAU.

NAU Computer Science has embraced FYLI as a tool to ensure that our freshman-level classes are a positive, successful learning experience in our freshman classes. Below is a table illustrating the CS work done to date on FYLI certifications.

FYLI is based on the fact that students need – and want – high standards in their lower-division coursework. They also need to have those standards clearly communicated from the first moments of engagement with a course. To be successful, students need support, guidance, highly engaging pedagogy, and clear, frequent feedback. Through the FYLI development process, course coordinators collaboratively reshape their courses in order to meet these needs, focusing on three critical areas:

1) Socializing students for excellence: FYLI courses establish the attitudes, skills, and behaviors that enable students to succeed in the first year and beyond. Critical aspects include increased rigor and excellence and providing effective scaffolding for students to succeed.

2) Design: FYLI courses maximize student engagement through critical design features. These include requiring substantial student engagement beginning in the first week, setting high standards, and effectively using the learning opportunities in both the classroom and in the co-curriculum.

3) Alignment: In FYLI courses, learning outcomes will clearly connect with the course’s learning activities and assessments. Multi-section courses will also have clear coordination plans in place.

Initial results are very positive. FYLI encourages success for our CS students, teaching them the discipline and empowerment to be successful in our rigorous curriculum.

For more information about the program, please visit: http://nau.edu/University-College/Your-First-Year/Learning-Initiative/

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“FYLI encourages success for our CS students, teaching them the discipline and empowerment to be successful in our rigorous curriculum.”

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**CONNECT WITH US**

*Sponsor a capstone project*

If you want to support design and research projects, find out how you can sponsor a capstone project.

*Donate*

Whether you are an alumnus, a parent or an employer and support our efforts to prepare computer science professionals to make a difference, donate to our scholarship fund or to the department.

*Alumni: Network with us*

Share your story

What have you been up to since graduation? Inspire us by sharing your success stories. Contact dieter.otte@nau.edu.

*Employers and Alumni*

Connect and partner with us through our upcoming NAU and College Career Fairs, scholarships, capstone projects, donations, internships, special speakers or membership on our advisory council.

If you would like to hire some students before they graduate, contribute to our Job Opportunities page.
The Computer Science faculty has varying professional specialties, but all are united by a strong commitment to teaching. Among the special interests of the faculty are Groupware Systems and Intelligent Interfaces (Doerry), Graphics and Computational Geometry (Palmer), Distributed Systems and Web Technologies (Otte), Software Engineering and Robotics (Georgas), UML modeling, programming languages and code generation (Badreldin), Software Assurance and databases (Vanderberg), and introduction to software development and user interfaces (Jacobs).

This academic year, we have also invited some additional instructors to help out --- we appreciate their contributions to our successes: Patrick Kelley, Dr. Ronald McFarland, and Ryan Middleton.

Please come see us anytime, make an appointment, ask questions, try our interesting classes, sponsor a project, make a donation, join NAU ACM, tell a friend. There a many ways to get involved. See more about our program at: http://www.nau.edu/cs

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