Greetings from the Dean

Dear friends of the School of Science & Technology

Welcome to the Spring/Summer 2016 edition of EUREKA! A Newsletter of the School of Science and Technology at Georgia Gwinnett College. This has been another great semester for SST. We have started a new major in Environmental Science. One of the special things about GGC is that we are not encumbered by the normal disciplinary silos that are created at most colleges and universities. This major is a perfect example of this. The Environmental Science major is an interdisciplinary major that was designed by faculty in the Schools of Science and Technology and Liberal Arts. This is because environmental issues are solved by understanding the natural sciences as well as ethics, public policy, and social sciences. Students in this major will take courses in all these areas but will be able to concentrate more in the natural sciences or the social sciences. This is a Game Changing approach to education.

SST is also heavily involved in outreach to Gwinnett County and the greater Atlanta area. One effort I would like to highlight is our STEM Academy. STEM Academy is our summer camps for middle and high school boys and girls in the area. We offer one week camps for boys and girls interested in technology and science. We call these weeks Tech Camp. We also offer one week camps for boys and girls interested in Math. We call these Math in Action. Research has shown that children that engage in STEM activities are more likely to major in STEM fields when they attend college. This summer we hosted about 130 boys and girls on the GGC campus for STEM Academy. These camps were full and we are looking to expand next year. We would like to offer camps specifically for science and are seeking additional funding to do that.

I hope that in a small way this newsletter will help you see all the great things happening in SST. If you have suggestions for content or alumni updates or have any questions for us you can email us at scienceandtech@ggc.edu.

Enjoy our celebration of discovery,

Tom Mundie
Dean
Follow me on Twitter (@tommundieSST)
Awards and Recognitions

GGC Wins Third National Championship in Database Design

At the 2016 Association of Information Technology Professionals (AITP) National Collegiate Conference, held this year in Chicago, GGC earned its third national championship in database design. The winning team included graduating seniors Matt Berger of Loganville and Alejandro Guzman of Sugar Hill. GGC previously won in 2013 and 2015.

Berger and Raquel Lawrence, ‘16, of Lawrenceville won the fourth-place trophy in Java Development. Katherine Copas, ‘17, of Bogart won second in graphic design.

Twelve GGC competitors participated in the competitions at the conference. They faced about 61 students AITP chapters with more than 530 student members representing colleges and universities throughout the US and Canada.

“We compete against the top IT programs in the nation, and so far, our students have established an amazing competition record over the past few years,” said Dr. Evelyn Brannock, Assistant Professor of Information Technology. “This is something you’d expect from major universities and technical colleges, not a program as young as ours. This speaks to the high quality of our IT program and our students’ hard work and competitive spirits.”

Brannock, Dr. Lissa Pollacia, Professor of Information Technology, and Dr. Shuting Xu, Associate Professor of Information Technology, all co-advisers to AITP, prepared the students for weeks before the competition, often after hours and on weekends. The competitions are designed for students planning careers in IT or related fields. In addition to the competitions, student conference attendees may also earn various IT certifications, many required by employers for whom the students may work after graduation.

“We have a trophy case already filled with multiple awards in the IT field. In addition to our ‘three-peat’ national championships in database design, previous AITP teams won national championships in Java programming and mobile application, and placed for several other national trophies,” said Dr. Thomas Mundie, Dean of the School of Science and Technology. “We have quickly built a program of excellence in IT, and I could not be more proud of our students and faculty.”

In addition to the AITP competition, students also won recognition at the Consortium for Computing Sciences in Colleges (CCSC) Central Plains conference, held at Missouri Western University in St. Joseph. CCSC conferences are held in cooperation with the Association of Computing Machinery, the world’s largest educational and scientific computing society. Competitions are held in a variety of computer science areas.
Brannock and Dr. Robert Lutz, Assistant Professor of Information Technology, advised four students who participated in the conference. As part of a multi-semester research experience, the students had won acceptance of a research project in the conference’s competition. They took first place honors in the Student Research Poster Contest for their work, “The Zeroth Person: Building an Immersive 3D Audio and Visual Experience.” The team included Timothy Kyle Brooks, ’17, of Monroe; Joshua Broughton, ’17, of Tucker; Aaron Knobloch, ’17, of Lawrenceville and Estephanie Gonzalez, ’19, of West Paterson, New Jersey. Brooks and Knobloch also placed second in the Programming Contest. In these two competitions, the GGC students were up against almost 50 teams, many representing major universities. “External recognition of GGC’s IT students in multiple areas, such as database, research, digital media and programming/software development in multiple competitions against much larger and older institutions is awe inspiring,” Brannock said. “We are so very proud of our students. These experiences will help them go far in their careers.”
Awards and Recognitions

American Chemical Society (ACS) receives outstanding award

The American Chemical Society (ACS) student chapter at Georgia Gwinnett College received an Outstanding award for its activities conducted during the 2014-2015 academic year.

For the 2014-2015 academic year, over 400 chapter activity reports were submitted and The Society Committee on Education presented 58 outstanding, 96 commendable, and 160 honorable mention awards. The award winning chapters were honored at the 251st ACS National Meeting in San Diego, CA, on Sunday, March 13, 2016.

“Professors Gillian Rudd and Rebecca Kalman, faculty advisors of the chapter, deserve special commendation. Few faculty members are willing to make the great commitment of time and energy that a successful chapter requires. Professors Rudd and Kalman’s efforts certainly represent the best in undergraduate science education and mentoring around the country. We extend our warmest congratulations to the students and Professors Rudd and Kalman for setting such a fine example for other chapters and being exemplary chemistry ambassadors!” said Diana Grob Schmidt, Ph.D., ACS 2015 President.

“My sincere congratulations on GGC’s American Chemical Society student chapter receiving an Outstanding award from the ACS for its activities during the 2014-2015 academic year. With great pride and on behalf of all faculty, students and staff, I thank all of you for your efforts that bring GGC’s vision and mission to fruition.” stated GGC’s President Stas Preczewski.
ITEC Senior Kamilah Kiser wins $5,000 scholarship

GC Student and Information Technology’s senior Kamilah Kiser was awarded with $5,000 scholarship from Women In Technology (WIT) and Edge Solutions. Kamilah Kiser attends Georgia Gwinnett College, where she has made both the Dean’s List and the President’s List in past semesters, as well as winning the 2015 Outstanding Student Creativity Award. Kamilah serves as the WIT at GGC President. She also has a web design internship with LYFE Marketing, and she is a proud Google Grizzlies Member.

At the end of this year, Kamilah will be graduating with a Bachelor’s of Science in Information Technology with a concentration in Digital Media. She aspires to be accepted into the Disney College Program (DCP), to study Disney Marketing and Sales - where she one day hopes to be a Senior Designer for Disney Parks & Resort.

Kamilah says that her participation in the WIT Campus program has inspired her to go for it. “Before WIT Campus, I wasn’t very confident in my abilities as a female in Information Technology. After seeing powerful women excelling in the STEM world, I knew that I had a chance at being one of them.”

Celebrating 25 years as a Certified Hazardous Materials Manager (CHMM)!

Janet Whelan, CHMM, M. Ed. – our Environmental Health Safety Officer – is celebrating 25 years as a Certified Hazardous Materials Manager (CHMM)!

The Certified Hazardous Materials Manager (CHMM) is a voluntary certification offered by the Institute of Hazardous Materials Management. The CHMM credential is accredited in the United States as an engineering-related program by the Council of Engineering and Scientific Specialty Boards (CESB), and by the American National Standards Institute (ANSI) under ISO/IEC Standard 17024 (Personnel Certifications).

A CHMM handles, manages, or advises others on hazardous materials or situations associated with or potentially including such items. A CHMM may perform management and/or compliance duties for a corporation, business, government, or some other organization in this capacity, or work in a related field associated with hazardous materials such as environmental protection, safety, hazmat transportation, or security. Any time hazardous materials are involved, a CHMM professional can advise on proper handling and management for ensuring safety and compliance.
Dr. Seungjin Lee publishes environmental research paper

On January 2016, Dr. Seungjin Lee, Assistant Professor of Chemistry, published his work in the Journal of Membrane Science and Technology (Journal of Membrane Science 497 (2016) 387 - 393; DOI: 10.1016/j.memsci.2015.09.055). His article, titled “Restoring the virus removal capability of damaged hollow fiber membranes via chitosan-based in situ healing,” conducted in collaboration with Yale University, investigated the efficacy of this chitosan-based in situ healing procedure to repair damaged hollow fiber membranes and restore near 6 log removal value of viruses. The results of this study collectively suggest high likelihood of success in real world systems, which will allow membrane filtration processes to be more durable, sustainable and cost-effective.

Low-pressure filtration processes employing microfiltration and ultrafiltration membranes are increasingly becoming an essential unit operation for water treatment throughout the world. Membrane damages or defects, however, is often listed as one of the key restraints of the membrane technology, and the implications of deterioration in product water quality are of particular concern in direct and indirect wastewater recycling for potable water production, where effective virus removal is critical. The proposed methodology has the distinct advantage of not requiring knowledge of the damage location nor filtration unit disassembly for the performance restoration while using materials that are benign and environmentally friendly, and has the potential to be applied to filtration beyond water treatment, including the pharmaceutical, biotechnology, and food and beverages industries where membranes are extensively used for separation and purification purposes and compromise in integrity would be equally of concern.

Dr. Lee has been conducting research on various chemical and environmental systems to benefit the public and the Earth. Membrane processes have been intensively utilized as a tool to demonstrate and teach the state-of-the-art separation process enabling the filtration, separation or concentration of nanomaterials, contaminants, and even various salts (monovalent or multi-valent ions) and to increase the efficiency of chemical and environmental processes. Modeling and instrumental analysis accompanied the research to optimize the performance of such processes and achieve cost-effectiveness. His academic interests include chemical and environmental education, environmental chemistry, physicochemical processes, and sustainable and renewable energy.

Math faculty publish article for the American Mathematical Association of Two-Year Colleges

Dr. Angela Lively, Alvina Atkinson, Lee Ann Roberts, and Sarah Park published an article entitled, “Creating a Community for All Math Faculty”, article in the September 2015 edition of MathAMATYC Educator (a refereed publication of the American Mathematical Association of Two-Year Colleges). The article describes the support that is given to part-time Mathematics faculty at GGC. The article discusses the divide in the teaching culture that often exists when higher-education institutions have part-time, or adjunct faculty as part of their instructional team. The team considered that these faculty are sometimes on campus during non-traditional times and they may even have other full-time employment. Since this can sometimes lead to a sense of disconnect from the full-time faculty and even from the institution, the article addresses initiatives that can be implemented in order
to bridge the gap and form a community. The mathematics faculty at Georgia Gwinnett College (GGC) has implemented some practices that foster a culture of inclusion of the part-time instructors within the full faculty instructional team. These practices are highlighted in the article and demonstrate how a community for all math faculty can effectively be created.

Dr. Alvina Atkinson installed as president of Georgia Mathematical Association of Two-Year Colleges

Assistant Dean and Professor of Mathematics, Dr. Alvina Atkinson was installed as the new president of the Georgia Mathematical Association of Two-Year Colleges (GMATYC) at its annual meeting in February 2016. GMATYC is a division of the American Mathematical Association of Two-Year Colleges (AMATYC). AMATYC has an overarching mission to promote and increase awareness of the role of two-year colleges in mathematics education.

AMATYC is divided into eight regions which contain forty-four AMATYC affiliates. The Southeast region covers the states of Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. GMATYC, an AMATYC affiliate, is a non-profit, educational association that was founded in 1987.

The GMATYC website notes that their goals include: ensure the preparation of scientifically and technologically literate citizens who are capable of making educated decisions, who have skills needed by business and industry, and who will continue to educate themselves by encouraging the development of effective mathematics programs; afford a state forum for interchange of ideas by serving as a network for communications and actions among faculty across the state of Georgia; develop and improve the mathematics education and the mathematics-related experience of students in their first two-years of college mathematics; promote the professional welfare and development of its members; as well as to promote support for and involvement in the America Mathematical Association of Two-Year Colleges (AMATYC), and to disseminate information from AMATYC.

GMATYC membership is culled from faculties at two-and four-year colleges, both public and private, technical schools, and universities throughout Georgia. Dr. Atkinson has previously served this organization as President-elect and as the Publications Coordinator. She looks forward to her new duties within this organization and increased opportunities to promote excellence in the teaching of mathematics.

Dr. Alvina Atkinson, Assistant Dean and Professor of Mathematics

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Dr. Alvina Atkinson, Assistant Dean and Professor of Mathematics
Student Accomplishments

GGC Alumnus Matt Foley to Attend University of Georgia College of Veterinary Medicine

Matt Foley graduated from GGC in May 2015 with a B.S. in Biology. This fall Foley will begin his graduate studies at The University of Georgia College of Veterinary Medicine. “Ever since I was a little kid I’ve been saying I wanted to be a vet,” Foley said. Today, Matt is motivated to educate pet owners about keeping their furry companions healthy. “I grew up not knowing a whole lot about veterinary medicine. I now know what it takes to keep your pet in great health. It’s my goal to educate all of my future clients the best I can so that they are knowledgeable of the diseases, parasites, and health concerns of their pet.”

While at GGC Foley participated in an internship at Russell Ridge Animal Hospital as part of his graduation requirements. At Russell Ridge, Foley was able to learn directly from Dr. Brad Miller, a Veterinary Orthopedic Surgeon. Foley was able to see first hand how to perform routine dental exams, neuters and spays, and even complex orthopedic surgeries. “I felt like I was getting a glimpse into the future of what I would be doing. I could see myself gownned up with a scalpel in my hand doing what I’ve dreamed of doing my entire life. It was a very rewarding experience and I enjoyed every minute of my time there.”

Foley also commented on the strengths of GGC for students who would like to eventually attend Veterinary School. “Having the one-on-one attention truly helped me understand the subjects better, which led to better grades, which ultimately helped me get into Vet School.” He also credits the enthusiasm and motivation he received from many of his Biology and Chemistry Professors who he said “were all geared to making sure the learning environment was as productive as possible and aided in the many early (and late) classes I took over my four years at GGC.”

Over 1300 people applied to the College of Veterinary Medicine at UGA and Matt Foley was one of 114 students accepted. Foley had a lot of advice for current students who would like to take a similar path. “Start early with everything. Get a job at a local vet’s office and keep track of your hours. Be sure to get a well-rounded arsenal of experience.” Foley logged 1,700 hours working with animals at kennels, 2,500 hours in veterinary clinics, and 50 hours volunteering at PetSmart’s Adoption Center. In addition to getting experience, Foley stressed the importance of having a good relationship with the doctors who supervise potential veterinary students because doctors write letters of recommendation that are necessary for applying to Vet School. Foley submitted his application with five reference letters from Veterinarians he worked under as well as a letter from a GGC Professor. An application to Veterinary School requires standard items like college transcripts, GRE scores, and recommendation letters, but Foley added, “the admission committee also likes to see that you can handle a lot at once, which means do extra-curricular activities and volunteer on the weekends. Other than that, keep your grades up and focus on your dream!”

GGC Alumnus Patrick Smallwood to pursue doctoral degree at University of Georgia School of Plant Sciences

Georgia Gwinnett College’s alumnus Patrick Smallwood graduated from GGC in May 2014 with a B.S. in Biology. This fall Patrick will begin his graduate studies at The University of Georgia School of Plant Sciences. Like many college students, Patrick did not know immediately what he wanted to focus on for his degree. Ironically, Patrick made his de-
cision to study Biology while enrolled in a course for non-majors. “My first class at GGC was actually Biol 1102 with Dr. James Russell, which is not a course that even counts towards any of the biology degrees,” Smallwood said. After taking Dr. Russell’s course, Patrick said he had a rekindled interest in Biology.

Patrick credits his research experience at GGC as one of the most important components of his graduate school application. While at GGC Patrick participated in multiple independent research projects, some for STEC 4500 credit and some as a volunteer. His first research project was done under the advisement of Dr. Rebecca Higgins for which he investigated the defensive abilities of the plant species Moringa oleifera against herbivorous attack. In a second project, Patrick continued his work with plants under the supervision of Dr. Melissa Caspary. Caspary and Smallwood were looking at the level of gene flow going on between populations of the Louisiana Blue Star within the state of Georgia, given its restricted range of occurrence and highly specific environmental requirements within the state. “Research has given me a set of skills that will be invaluable in grad school,” Patrick said. He added that he gained “the ability to effectively search through the literature and apply methodologies from it, as well as problem solving skills since every turn in research always seems to have some problem attached to it.”

Dr. Caspary enjoyed working with Patrick and believes he has a lot of potential as a Scientist. “He possesses a strong personal motivation and drive that will enable his success in graduate school,” Caspary said.

Dr. James Russell also worked closely with Patrick in the classroom and on independent research and he came to think of Patrick as a colleague. “You can discuss ideas with him,” said Russell. “His comments and questions often extend the conversation into areas I consider appropriate for a graduate class or research colleague.”

In addition to research, Patrick also served as one of GGC’s first lab peer mentors. In this role Patrick helped prep the lab sections for Introductory Biology courses and worked directly with students to help them grasp course material. As the program grew, Patrick passed on his knowledge by mentoring new student lab assistants. “He was really great as a peer mentor and continued to do this for his entire time here at GGC,” said Dr. Judy Awong-Taylor. After he graduated Dr. Awong-Taylor offered Patrick a part-time position to help with data analysis for the School of Science and Technology’s STEM Initiative Grant. Patrick was also able to continue his independent research as a lab assistant after graduation. For any students interested in attending Graduate School, Patrick has great advice. “If there is someone out there doing research which is of interest to you, shoot them an email, see if they are taking on new graduate students. Also, interact with your professors in class. Ultimately those individuals will be your first professional contacts. They will be the ones to write letters of recommendation, and if your professors have never interacted with you within the classroom then they will not have much to say.” Patrick is excited about his transition to graduate school this fall as he builds upon what he learned while at GGC. “I enjoy learning about how organisms work and interact with their environment as well as how they develop ingenious solutions to complex problems, especially plants,” Patrick said.
IT students present poster and place first at Consortium for Computer Sciences in Colleges (CCSC)

An Information Technology (IT) team of 4 students presented a poster at the Consortium for Computer Sciences in Colleges (http://www.ccsc.org/centralplains/) and obtained first place for their research. The team consisted of Aaron Knobloch, Kyle Brooks, Estephanie Gonzalez, Joshua Broughton and was mentored by IT faculty Dr. Robert Lutz and Dr. Evelyn Brannock.

The team’s research consisted in the study of binaural audio and stereoscopic video, and how they might be combined to create a compelling virtual reality experience for handheld VR systems such as Google Cardboard or ViewMaster VR. In addition, it analyzed how Virtual Reality (VR) experiences are created, as well as some of the minimum specifications and technicalities of creating a compelling VR experience. The team also developed hardware-independent software and algorithms that handled the synchronization of both the binaural audio as well as the video feeds. The researchers also studied various mediums of capture for the video and audio, most notably the differences between a high-end, professional grade binaural capture device made by Neumann and much cheaper alternatives. They found that the difference between the two was negligible and, at times, indistinguishable.

Biology students takes fourth place at Research Conference

GC Senior Aubrey Hernandez, who has been working with Dr. Robert Haining, attended the 48th annual Southeast Undergraduate Research Conference in February at Georgia State University where she took a 4th place poster prize.

They have been probing the role of neuromelanin (NM) in Parkinson’s disease. Briefly, Parkinson’s disease can be characterized by the death of dopaminergic neurons as well as the depletion of NM-containing cells in the substantia nigra. It is still largely unknown how NM plays a part in neurodegeneration. Their work centers on (1) the possibility that the melanin in these NM-containing cells creates a highly reducing atmosphere that is ideal for stabilizing active dopamine, and (2) that xenobiotics able to bind to NM more tightly diminish the binding of dopamine to melanin, causing subsequent neurodegeneration.
Montana Quick attended Georgia Perimeter College before coming to GGC in 2012. At GGC, he pursued the biology major with gusto and the personal interaction with faculty in class, in lab, and outside of class convinced him that through hard work, he could become a top student and enter the STEM profession upon graduation. He completed two semesters of undergraduate research in the environmental chemistry and biology areas under the guidance of Dr. David Pursell. In the Pursell research group, he worked on developing methods to quantify heavy metals in tissue samples using atomic absorption spectroscopy and inductively coupled plasma mass spectrometry. In addition to working on these projects at GGC, Montana also completed some of the mass spectrometry experts at the Perkin Elmer instrument center in Johns Creek.

Montana graduated in the summer of 2014 with a Bachelor’s of Science in Biology. He leveraged his GGC research experiences with mass spectrometry to win a Graduate School Mentoring Fellowship (covering full tuition, health insurance, plus a monthly stipend) in the Ph.D. graduate program at the University of Texas in Austin. At U.T., Montana is pursuing a Ph.D. in chemistry with research in the Broadbelt research group, a group dedicated to the development and application of mass spectrometry as a tool for investigating biological problems. With the nature of the systems he studies, Montana’s GGC experience as a biology major uniquely qualifies him to work in a chemistry graduate group with a focus on biological problems. In June 2016, Montana will be presenting his first year work, Chemical Derivatization to Enhance 266 nm Ultraviolet Photodissociation for Proteomics, at the annual American Society for Mass Spectrometry conference in San Antonio, Texas. In his first year of graduate school, he has already published two scientific journal papers as a contributing author.

After graduate school Montana plans to find a faculty position at a college or university. When asked about this career choice Montana replied, “I’ve been very fortunate to have had so many influential educators during my academic career. They have driven me to become a better student and a better person and I want to pay my gratitude forward. The best way I can display my appreciation for my mentors is by mirroring the patience, encouragement, and knowledge that they have shown me.”
Preparatory videos as aids to Flipping the Classroom

A ssociate Professor Richard Pennington, recipient of the 2013 University System of Georgia (USG) Board of Regents’ Teaching Excellence Award, published an article this year: Pennington, R; Echo 360 Preparatory Videos as Aids to ‘Flipping the Classroom’, International Journal for the Scholarship of Technology Enhanced Learning, 1, 135-144, 2016.

Richard Pennington has been supplementing chemistry classes at GGC with self-prepared videos since 2010, with plans to keep doing so for all future semesters of students. These videos have aided in pre-class preparation of the students who choose to use them, enabling class time to be spent much more efficiently. “Gone are the days when I need to lecture for large portions of every class, now students working together in groups and solving problems is the predominant activity that takes place.”

Describing the inception of his video work, Pennington says, “[it] came when I noticed that my Fall 2009 organic chemistry II students were not preparing for class as effectively as I thought they could be. For those students who genuinely were trying to prepare, in their eyes the problem came from the lack of depth provided by the textbook we were using at the time. I knew that if I wanted more effective class preparation to occur, I was going to have to provide some method by which that could happen. Around that time I was introduced to a tablet and software that would allow me to generate my own video content (which I planned to target towards my students’ class preparatory needs), and so I started trying some things out and seeing what I could come up with.”

His video repertoire has expanded to SurveyClass of Chemistry 1 and 2 (CHEM 1151 and 1152), Principles of Chemistry 1 and 2 (CHEM 1211 and 1212), and both semesters of Organic Chemistry (CHEM 2211 and 2212); they are available to all students – here at GGC and all over the world.

Videos are available for CHEM 1211K/1212K (Principles of Chemistry I/II), CHEM 2211K/2212K (Organic Chemistry I/II) and CHEM 1151K/1152K (Survey of Chemistry I/II); across all 6 of these classes, I have created 205 videos, which have an average length of around 12 minutes. One of the coolest things here is that it is not just my students who can use these videos, but every student in every section of chemistry at GGC. In fact, as of February 2013, these videos had been accessed over 14,000 times from their location on an internal GGC server. In 2015, Pennington moved the content to YouTube and, as of April of this year, videos on the Pennington YouTube channel have been viewed almost 29,000 times.

The reception to these videos has been overwhelmingly positive. From the students:

Comment #1:
I love the videos for several reasons:
1. They are extremely informative and explain the material better than the textbook.
2. I can view them at anytime, like having a professor “on call”.
3. I use them as learning tool. First I watch the video in its entirety, then I watch it again using the “pause”
mechanism to see if I can perform the “next step” myself so I have an immediate confirmation (or not) that I understand the material.

4. They are also entertaining which makes learning Organic Chemistry “fun”.

Comment #2:
The prep videos do an awesome job at putting the fundamentals of the material into perspective. The reactions with the stepwise mechanisms are thoroughly explained and make me feel like I am one on one with my professor. Taking notes while watching the videos makes matters even more beneficial. I use the video notes to help me get through the assigned problems more often now, instead of peeking in the solutions manual. The prep videos rock!

From Theory to Application: Dr. Sairam Tangirala’s Physics Class Visited a Fiber Optics Manufacturing Facility

Georgia Gwinnett College’s students from Introduction to Physics – II class had an amazing experience during their educational tour to a fiber optics manufacturing company located in Norcross, GA. The field trip was planned by Dr. Tangirala and coordinated by working closely with Mr. David Bein, a Manufacturing Engineer at OFS Fitel LLC. OFS is a premier provider of optical fiber solutions with global presence. The plan for organizing this trip got initiated in Fall 2015 during a talk between Dr. Tangirala and Mr. Bein about their mutual interests in providing a real-time application based educational experiences to GGC students. In addition to being an OFS employee, Mr. Bein is also working as a part-time faculty at GGC and is an instructor of record for physical science courses. On 02/26/2016, the students were welcomed to the OFS facility and were given a guided tour that consisted of observing various manufacturing stages involved in drawing (producing) fiber optic cables. The tour supplemented student’s educational experience as it was timed after the students had learned the relevant physics concepts of ray-optics and its applications. According to a student Ms. Jessica Coover, “David, our tour guide was perfect for the job because he was able to connect our physics education to real world physics applications.” Another student Ms. LaTedra Tucker commented that “On the tour we found out that the equation used to find the frequency of a wave on a string is very important to move on to the next step in the process.”

It was a heartening experience for Mr. Bein and Dr. Tangirala to observe that GGC students were able to appreciate the relevance of physics and the its equations in a real-world setting.
Several faculty members of Georgia Gwinnett College volunteered as judges at the Gwinnett Science, Engineering + Innovation Fair held on 2/26/2016 at Infinite Energy Center, Duluth, GA. This fair is an annual event that has been organized from over 38 years. The fair was aimed at promoting science-literate citizens and skilled, knowledgeable engineers and researchers to meet the needs of the economy and to compete in a global economy. According to the organizing and planning team’s website: “We’ve seen firsthand how successful students can be when challenged to inquire, design, and investigate scientific and engineering concepts through experimentation. Participation in science fairs helps students to improve their problem-solving and communication skills, while inspiring them to consider careers in science and engineering.” According to the organizer’s website, this year’s fair highlighted career opportunities for students in the fields of science and engineering. Additionally, one of their goals is to promote the awareness of post-secondary scientific and engineering opportunities in research and industry and to identify avenues that can lead students to exciting positions in sciences and engineering.

According to the organizers, the students who are awarded 1st place in their local school science fair are eligible to participate in the Gwinnett Regional Science, Engineering + Innovation Fair. From there, first place high and middle school winners from the Regional Fair will advance and be eligible to participate in the Georgia State Science & Engineering Fair held at UGA in Athens, GA. In addition, three select projects will directly advance to the prestigious Intel® International Science Fair in Phoenix, AZ.

For more information, please visit: http://www.gwinnettsciencefair.com

To celebrate the centenary of General Relativity (announced on November 25, 1915) about 85 students, faculty, and friends gathered at the CISCO auditorium on Albert Einstein’s birthday, 3/14/2016, for a viewing of the movie Interstellar. The event was sponsored by the Student Government Association’s Astronomy Club (faculty advisor: Dr. Amy Battles). Generous financial support from the Office of Student Involvement allowed the organizers to pay the copyright fees for screening the movie publicly, and to get pizza pies and dessert pies (after all, it was also Pi Day!) and beverages. The organizers are thankful to Mr. Rontai Walker for his support. After opening words by Mr. Josh Sims of the Astronomy Club, Dr. Lior Burko gave an opening talk about general relativity and gravitational waves, including their recent breakthrough discovery on 9/14/2015 by the Laser Interferometer Gravitational wave Observatory (LIGO), and about the science of the movie Interstellar. There were so many questions asked by students after this talk that we actually had to stop them to be able to start the movie! At the suggestion of the students, we even sang Happy Birthday to Albert Einstein. He would be 137 years old. For a physicist, 137 is a very special and important number: It is (the inverse of) the coupling constant of quantum electrodynamics, i.e., it says how strong electrons interact with photons. (Chemists may recognize it as the fraction of the speed of light with which electrons in the ground state of the hydrogen atom move in the Bohr model). After the movie we had a Q&A ses-
sion, where many good questions were asked about mind-boggling topics such as extra dimensions, bulk creatures, black holes, wormholes, spacetime singularities, etc. The organizers were excited with the interest of so many students in physics and in General Relativity, and are hopeful to create a new tradition, holding similar events annually or even semesterly.

Complete College Georgia STEM Innovation Grant: Launching a Peer Supplemental Instruction program for STEM Majors

Last summer, Drs. Latanya Hammonds-Odie, Chantelle Anfuso, Benjamin Shepler and Cindy Achat-Mendes were awarded an incubator grant from the University System of Georgia’s Board of Regents to launch a Peer Supplemental Instruction program for BIOL 1107K and CHEM 1211K courses. These gateway STEM courses traditionally have high DFW rates (i.e. high numbers of students earning a “D”, failing, or withdrawing from the course). “By targeting students in these STEM gateway courses, we hope to impact students who need assistance with transitioning to the higher demands of tertiary level education,” Dr. Achat-Mendes said.

Peer Supplemental Instruction is a learning support model that uses peer-assisted study sessions to review course material. These regularly scheduled sessions occur independently of the course’s instructor. Peer leaders are trained to facilitate sessions in the spirit of collaborative learning. Students discuss the textbook chapters, compare notes and assignments, predict exam questions and develop tools for effective studying. In particular, they learn to build STEM competencies (e.g. problem solving, building concept maps, drawing to learn, linking concepts in a course, critical thinking, analyzing questions).

In Fall 2015 and Spring 2016, a team of eleven PSI leaders was hired to facilitate PSI sessions. Those students who were selected to be PSI leaders excelled in STEM courses and are passionate about learning and discussing science. One PSI leader, Brittany Xiong, attended PSI sessions as a student and enjoyed the experience so much that she decided to become a PSI leader. “I was a Bio 1107k student last year and I had attended PSI religiously. I love the purpose of PSI and the mission it carries out. I saw results, my test grades had gotten higher and on my final I had gotten a 95, that’s when I realized that PSI had contributed a lot to my success in 1107,” Brittany said. “PSI gave me the confidence I thought I could never obtain. I became a PSI leader because I wanted to give students the same confidence.
and experience.”

PSI leader Jonathan Mwizerwa noticed that teaching the material helped him to understand the concepts better for himself. “One challenge of being a PSI leader is you have to constantly sharpen your understanding of the content at hand, because it is hard to help someone else while you’re still fumbling with the concepts,” Mwizerwa said.

To PSI leader Éowyn Holley the benefit of offering PSI for introductory freshman classes is clear. “(Freshman year) is the best time to solidify your study skills, before you hit advanced classes and start floundering,” Holley said. “You cannot ‘breeze through’ classes such as microbiology, genetics, or organic chemistry. They take hard work and a wealth of study methods, and PSI leaders are pros at that.”

The PSI program originated from a STEM mini-grant in Fall 2014 and has been successful because of the hard work of several SST faculty including Drs. Jennifer Hurst-Kennedy, Elisabeth Javazon, Allison D’Costa, Rashad Simmons, Rebekah Ward and Judy Awong-Taylor. In December, Drs. Latanya Hammonds-Odie, Cindy Achat Mendes, and Jennifer Hurst-Kennedy travelled with two PSI leaders, Janyne Musso and Victoria Burgess, to present their research at the annual conference of the American Society for Cell Biology. Next year, the group hopes to expand the program to additionally support BIOL 1108K, CHEM 1212K, MATH 1111 and MATH 1113.

### Sports Analytics: The Fusion of Mathematics and Sports

With the huge amounts of data available regarding professional and collegiate sports, mathematics is playing an increasing important role in the sports industry. This is evidenced by movies such as MoneyBall that chronicles the role of analytics in the 2002 season of the Oakland A’s in constructing a high performing team despite limited financial resources. Academia is using student’s interest in sports to demonstrate the application of mathematics, science and computer science.

One of the major events in the world of academia regarding sports analytics is the Massachusetts Institute of Technology (MIT) Sloan Sports Analytics Conference held each March (http://www.sloansportsconference.com/). The conference celebrated it’s 10th anniversary this March, and the growth of the conference speaks to the interest in sports analytics. MIT hosted the first conference in 2007 with approximately 150 people in a classroom at MIT. This year’s conference was attended by approximately 4000 participants at Boston Convention Center. One such participant was Dr. Marty Thomas, Associate Professor of Mathematics at GGC.

Dr. Thomas has formed a sports analytics interest group at GGC for students and faculty that want to discuss ideas and innovation in this growing field. This group has included faculty research talks regarding topics such as baseball analytics regarding the impact of interleague play (Dr. Jeff Hildrebrand), cricket analytics to predict winners in games that are rained out
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(Dr. Mohammed Jamaloodeen) and hockey analytics to determine how the manner in which the number of players on ice influences win probabilities (Dr. Marty Thomas).

The group takes an active interest in the Carolina Sports Analytics Meeting (CSAM) held each April at Furman University (http://math.furman.edu/csam/index.html). Keynote presentations at the 2016 event were Peter Keating (writer for ESPN Magazine) and David Kaplan (analyst for the Charlotte Hornets). GGC’s participation in the 2016 CSAM included a presentation by Dr. Marty Thomas and a poster presentation by mathematics student, Heather McAfee (under the direction of Dr. Keith Erickson).

The National Hockey League has made several changes to increase fan interest during overtime periods of games. One such change was to decrease the number of players on the ice during overtime periods in an effort to create more space for quick player and puck movement. Dr. Thomas’ research considered the impact of these changes both numerically and graphically.

Dr. Thomas made use of the National Hockey League Real Time Scoring System that tracks events (e.g., shots on goal, missed shots, puck turnovers) in conjunction with R Software. His research compared 5 on 5 skaters (traditional) to 3 on 3 skaters (the new overtime setup) in terms of the mean rate per minute of eight events: face offs, missed shots, blocked shots, hits, shots on goal, line changes, take aways and goals. His findings included that 3 on 3 play results in more face offs, shots on goal, take aways and goals per minute while having fewer hits per minute than 5 on 5 play. Dr. Thomas’ spatial analysis revealed differences in locations of hits (fewer along the sides for 3 on 3 play) and shots on goal (greater concentration near the goal for 3 on 3 play).

In addition to being a mathematics major at GGC, Heather McAfee is also the coach of a softball team. As such, she was interested in applying mathematics to the treatment of a research question in softball. Her poster (“A Random Walk Through Pitch Selection”) made use of computer simulation based on the gambler’s ruin problem. The idea behind the gambler’s ruin problem is a person wins a $1 or loses a $1 with certain probabilities with the ruin occurring when the gambler runs out of money.

Using this analogy, the pitcher and batter represent the players betting on the outcome of a series of pitches where the count is the score and “ruin” occurs when either the batter gets a hit or the pitcher gets an out. Pitch selection is a crucial factor in softball that can alter the outcome of a single at-bat and thus the overall game. In Heather’s simulation, the pitch, either a fastball, change up, or dropball, is selected based on the count. The outcome of the pitch, either a ball, strike, hit, out (caught fly ball or ground out), or no change, is selected at random with unequal probabilities of each outcome and used to update the count following the standard rules of softball. The results of Heather’s research demonstrated that the majority of outs come from fly balls or ground outs resulting from a fastball.
Heather intends to expand upon her work in the fall in STEC 4500 by enhancing the simulation to more accurately reflect the range of options and outcomes for pitch selection using statistics from actual games.

GGC Faculty present at the 29th annual Georgia Perimeter College Mathematics Conference

Georgia Gwinnett College faculty were plentiful in representing at the twenty-ninth annual Georgia Perimeter College Mathematics Conference in February 2016. Several GGC mathematics faculty presented under this year’s theme, “Active Learning – Engagement and Struggle”. The conference was held at the Clarkston campus of the newly named, Perimeter College of Georgia State University on February 19, 2016.

The GPC Mathematics Conference allows mathematics educators to renew their commitment to be life-long learners and to enhance their teaching pedagogy in order to better prepare students for success.

Among the GGC faculty presenters, Dr. Terry (Tee) Barron spoke on “Engaging the Introverted Learner”. Dr. Barron and Dr. Mary Saunders of Georgia Gwinnett College were inspired by their observations that introverted learners do not often actively participate in traditional lectures while extroverted, gregarious students typically answer most questions even when engaging teachers try everything possible to actively involve introverted learners. The presentation emphasized methods of identifying and engaging introverted learners. Dr. Barron noted methods that focus on introverted personality traits, which directly contribute to higher achievement. In addition, she also presented a mini-session sharing resources that worked for her and her students in an appealing session entitled, “Progress Counseling: Resources for Engaging Students in Student Success Mathematics Courses”. Since Student Success mathematics courses present unique challenges across many levels that even transcend the classroom, Dr. Barron noted the many opportunities that engaged teachers have to interact with students and positively hold them accountable for their learning and success.

Drs. Gerald Agbegha and Anthony (Marty) Thomas presented on their work with Joshua Roberts in a session entitled, “Using Simulation Experiments on TI calculators and Excel to Teach Sampling Distributions”. Noting that simulation is a useful tool for understanding sampling distributions, in their presentation, Dr. Agbegha and Dr. Thomas showed how the concept of fanout distributions along with simulation is used to enable students to see that results hold true for any population. The active learning initiative is supported by this work in that students are enabled to do the exploratory exercises using easily accessible technologies.

Drs. Lee Ann Roberts, Alvina Atkinson, Sarah Park, Angela Lively, and Aris Winger studied the new “ACCESS Math” course that was designed to “fast-track” students through developmental math and college algebra over the course of its implementation in Spring 2012 to the present. Since the course has been modified and expanded to include two co-requisite courses (one for College Algebra and another for Quantitative Reasoning), Lee Ann Roberts and Sarah Park were able to share the model and results for those courses and their design in a presentation entitled, “Accelerating College Completion by Enhancing Student Success”.

Drs. Alvina Atkinson, Angela Lively, Lee Ann Roberts, Sharron Jenkins, and Aris Winger have incorporated the use of real world laboratories into their co-requisite college algebra sections to engage students in active learning laboratories in STEM fields. The courses are taught in a physics lab/ computer lab environment using lab experiments designed by GGC Chemistry faculty member, Dr. Jenkins, which demonstrate mathematical applications. Angela Lively and Dr. Alvina Atkinson presented the course model and results in an engaging session entitled, “Engaging Corequisite College Algebra Students Using MiA (Mathematics in Action) Labs”.

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Tim Tolbert, Ph.D. has been part of GGC’s Exercise Science Discipline for almost 4 years. He came from Marshall University in West Virginia. While at Marshall for 3 years he specialized in Athletic Training. Prior to that he earned his doctorate in Human Performance from Middle Tennessee State in Murfreesboro. In addition he has a Master’s from Berry College in Secondary Education and double majors from West Alabama University in Athletic Training and History.

His expertise has helped tremendously in developing a successful internship program for Exercise Science students at GGC. In the past two years under Dr. Tolbert’s pervue the program has steadily grown and the relationships with area institutions have strengthened. In fall 2014 there were 7 students enrolled. This spring (2016) 21 students are enrolled. This summer, Dr. Tolbert expects to enroll 15 students. There are a variety of institutions involved including, but not limited to, Gwinnett Medical Center, Competitive Edge Sports, GGC’s Wellness Center, and Crossroads Hospice.

Students who are interested in the program should be approaching their last year of school at GGC and should have taken three Exercise Science courses in addition to Exercise Physiology Lab and Lecture course. Ideally, the student will participate in the internship in their last semester. This ensures a higher degree of readiness and professionalism. Many students don’t realize the relative level of commitment the program requires. For instance, a minimum of 150 hours on site time is required over a semester or summer. That means about 10 hours per week. Still, Tim makes sure students aren’t overcommitted (e.g., more than 250 hours). Students earn 3 hours of credit after a successful end-of-semester presentation regarding their experience.

Dr. Tolbert has a number of suggestions for students wanting to succeed in an internship. At the top of his list is developing your own internship. He suggests building a working relationship with an institution and charting your own plan with them. Still, if you are unable to do this, he has a number of options at the ready in number of areas such as athletic training, fitness training, occupational therapy, elderly care, and cardiac rehabilitation to name several. Successful students will have weighed their options and have identified the career they want to enter prior to a commitment. In addition, successful interns will have already “shadowed” — basically observing a person for days, if not weeks, in their chosen field.

Students should note that in Exercise Science internships are unpaid. They are learning opportunities. Institutions recognize this, and are typically helpful because it gives them an objective chance to learn something about their own program. Though there appears to be a chance for institutions to mistreat interns, Tolbert says unequivocally he has never had to intervene. This is because of careful planning, thorough MOUs (memorandums of understanding) and weekly reports from both students and institutions. Weekly reports come with goals for the week.

GGC’s student Brittany Lovett took on internship at Crossroads Hospice in Tucker. She will graduate this spring with a 3.3 GPA. At hospice, Brittany reports to Jessica Miller and Monica Laguaithe and is deeply involved in co-
ordinating volunteer orientation, managing patient needs, bereavement support as well as patient visitation. She said that this opportunity was an extension of a survey work for the Exercise Science intro course EXSC 3000. She had a heavy hand developing the internship and is very glad for it. She has learned to look at death in a more positive light, as much as that is possible. She says that her course work, especially General Medical Conditions and Epidemiology & Physical Activity really helped her prepare for the opportunity. Brittany also stated that when she is done with the internship she would like to continue to work at the hospice.

Another successful story is GGC ‘s student Mellissa Lay, who will graduate this spring with a 3.3 GPA. This past spring 2016 semester, she has been at CES (Competitive Edge Sports). CES works with all kinds of athletes from professionals to children. Melissa has been working with children and helping to build more personal and tailored programs to the needs of the various aged and talents of the kids. She has been learning that evidenced-based methods work much better than those built on a whim. Her advice to others seeking an internship is to be as specific as possible about what you want to do and where you want to go – echoing Dr. Tolbert’s advice.
The idea of educating students in four specific disciplines — science, technology, engineering and mathematics, commonly known as STEM— utilizing integrated, interdisciplinary, and applied methods, was brought to life with real world applications for middle school and high school students during June 2016 right on GGC’s campus. Managed and staffed by faculty from various disciplines within the School of Science and Technology, the Summer STEM Academy camp experiences were paramount enrichment experiences for the young participants.

At GGC we have a Summer STEM Academy which offers two programs: GGC Tech Camp and GCC Mathematics in Action Scholars Program. Each program offers weekly sessions that recruit a specific age group. Each camp session is four days (Monday-Thursday). Tech Camp has three sessions over a 3-week period during the first three weeks in June. Tech Camp has one 4-day session for high school students (grades 9-11) as well as two 4-day sessions for middle school students (grades 6-8). One middle school session is only for boys, and the other middle school session is only for girls. The MiA Scholars Program has two 4-day sessions for rising middle school and current middle school students in grades 5-8. The MiA Scholars Program has two sessions over a 2-week period during the first two weeks in June. This summer, Tech Camp served 25 high school students, 31 middle school boys, and 28 middle school girls, for a total of 84 students. The MiA Scholars Program served 42 scholars.
Behind the Scenes

There are a lot of people that help keep the School of Science and Technology on track. In this edition of Behind the Scenes, we take a more personal look into the lives of our Associate Deans, Dr. David Kerven and Dr. Joseph Ametepe.

Dr. David Kerven was born and raised in New Jersey. He attended Johns Hopkins University where he received a B.S. in Electrical Engineering. He then attended the New Jersey Institute of Technology where he earned a master’s degree in Computer Information Systems. From there he went on to the University of Louisiana – Lafayette to obtain a second master’s degree in Computer Engineering and a Ph.D. in Computer Science. Dr. Kerven’s next move was to Atlanta where he taught at Clark Atlanta University 1993-1999. While teaching, he took night classes at Georgia State University’s College of Law. After earning his J.D. he practiced Intellectual Property Law in Atlanta from 1999 to 2011. Dr. Kerven joined GGC in 2011 and today he serves as Associate Dean and Associate Professor of Information Technology. An ardent reader of science fiction, Dr. Kerven also considers himself an avid board gamer. He is also involved with The Boy Scouts of America, where he mentors scouts in variety merit badges including Game Design, Animation, and Robotics; he was also a member of the team that developed the Programming merit badge. A huge fan of all things Disney, Dr. Kerven visits Disney World often with his family. His wife, Jenny, is an instructor at GGC in Mathematics, and they have 3 children; Rachel (18), Aviva (16), and Gabe (13).

Dr. Kerven sites his favorite part of the job as the “problem solving; not so much the solving, but the satisfaction of knowing that it is solved. Whether it is with a faculty member or a student, it’s knowing I was able to accomplish something.”

Dr. Joseph Ametepe, originally from Ghana, moved to the United States 34 years ago. He attended Hampton University in Virginia where he received his first master’s degree in Applied Mathematics. He then moved to Williamsburg, Virginia to attend College of William and Mary and to complete a master’s degree and Ph.D. in Applied Science and Physics. His next stop was Hollins University, where he served as a Physics Professor from 1999-2000 and spent 7 years as the department chair. In 2011 Dr. Ametepe made the move to GGC and he now serves as Associate Dean and Associate Professor of Physics.

In his spare time Dr. Ametepe enjoys playing soccer and working in his garden. His passion for soccer has been passed down to his son Junior, who he considers his best friend. Junior currently attends GGC and plays on the Grizzly Men’s Soccer team. Dr. Ametepe also has a third degree black belt in taekwondo.

When asked about the best part of his job, Dr. Ametepe quoted “the services that my team from the SST Dean’s office and I provide to faculty and students and coordinating our efforts with other campus offices for the effective management of SST administrative duties.”

SST’s Associate Deans Dr. Devid Kerven and Dr. Joseph Ametepe
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