COMPUTER GRAPHICS TECHNOLOGY NEWS

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FROM THE DEPARTMENT HEAD

As we begin the new semester, and launch into the beginning of a new decade, CGT is doing wonderful things as a department. Our student enrollment is up, our faculty ranks are growing, and our research funding is solid. With a firm foundation, we have turned our attention towards the examination our curriculum and its structures as the world moves into the Fourth Industrial Revolution. You have heard me mention the formation of a CGT first-year core, whose development is well underway. In addition to that effort, we are also looking at the creation of a new area in mixed reality technologies, and the tighter curricular integration between UX, web design and development, and games design and development. We are also exploring an area that would bring together data visualization with data analytics and high-performance computing. More on that in the future. As always, if you find yourself near campus, please stop in to say hello. Boiler Up and Hammer Down!
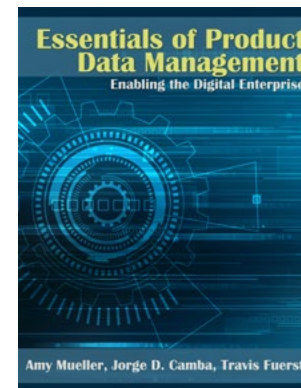
My very best always,

Nate

UPDATED CGT CURRICULUM

Recently, multiple professors in the Computer Graphics Technology Department have started implementing PDM (Product Data Management) technology, like Aras Innovator and 3D Experience, into their classes and curriculum.

Under the direction of CGT Professor Travis Fuerst the Fall 208 CGT 514 PLM students including CGT graduate students Kevin Del Re, Eric Kozikowski, Soho Yun, and Dixuan Cui, completed a semester long project to implement PDM technology into curriculum in CGT Virtual Product Integration (VPI) curriculum as part of the classes workflows. The project yielded positive results and was presented at the 2019 ASEE conference. Although first piloted in Professor Fuerst's CGT 103 Geometric Modeling Applications class in Spring of 2019, the PDM implementation has become more prevalent in other courses since. As of now, the content has been taught for four semesters in multiple classes, reaching over 700 students each semester.

Aras innovator is professional-grade technology, and is the industry standard that students are not typically introduced to until the latter years of their college career or post-graduation. It allows students to store and collaborate in the same type of environment they will find themselves in during an internship or a full-time position. Instead of using a Learning Management System (LMS) students submit assignments through an standard engineering release process. Teachers are now using it to assign and mark-up student work, communicate with students, and grade projects.

"Exposing freshmen to the PDM technology that is used in industry, including how CAD data is stored, managed and configured, allows them to become more comfortable with it," explained CGT Professor Travis Fuerst.

Professors in the department feel as though they are teaching relevant technology while being able to assign work, mark-up, and grade projects, all from the same tool. At Purdue, this new way of teaching has caught on with all VPI professors. In the past, tools like Aras Innovator and Siemens Teamcenter have been the subject of an entire class, but never really used to facilitate a class. Facilitating an entire course from the application allows students to learn through classroom experience as actual users before they become professionals, and are expected to use it daily.

CGT Professor Rosemary Astheimer explained how she is able to use its functions in a classroom setting. "Just as in industry, they follow a workflow that has been setup. They create an entry with their files and then "Release" them for me to view. I'm like their

supervisor giving the file an ok to go to the next step in the process. While I'm looking at their files, I can markup their work to include feedback right in Aras. This is giving students a real-world experience that isn't done in most other universities."

CGT Professors Travis Fuerst, Jorge Camba, and Amy Mueller recently collaborated to write a book "Essentials of Product Data Management: Enabling the Digital Enterprise." The book covers everything teachers and students need to know about PDM technology from a user's perspective. The book was published and used in courses for the first-time last semester.

DR. WHITTINGHILL — THE GAMES INNOVATION LAB

Dr. David Wittinghill, an Assistant Professor in the Department of Computer Graphics Technology, has focused on gaming, virtual reality, simulation and computer programming education and research for the past ten years that he has been at Purdue.

Before joined Purdue CGT, Whittinghill was a software engineer in the research industry. The last time that he worked for a company was in 2007, during the financial crisis. The experience of being in the industry during this time was extremely influential towards the way Whittinghill teaches his classes. It showed him how easily companies can come and go, which taught him how important it was to keep up on new skills and continuously learn. He tries hard to instill this wisdom in his students.

This also ties into his mentality of having a habit of excellence. "If you are always working for you, not a boss or a company, then you'll push yourself harder. Don't just work for the rubric and develop what you need for the grade. Not much comes from bare minimums. Things come from home runs."

Dr. Whittinghill is also the Area Lead for the Game Development and Design major. The area of study has been a part of the department for about five years.

Along with teaching, Dr. Whittinghill is the director of the Games Innovation Laboratory (www.gamesinnovation.org). "Part of my labs mission is to do good and contribute to the well-being of society," explained Whittinghill. The people in the lab just look for places where they can apply their skills to a problem, no matter the area.

They study what makes for a more engaging gaming experience by using a proxy for emotional arousal, called Galvanic Skin Response, that is attached to skin while playing game. This technology allows

the researcher to tell how much of an emotional response the game is triggering.

The lab has 12 graduate students and 10-15 undergraduate students at a time.

GRADUATE STUDENTS WORK TO MODERNIZE MANUFACTURING

Indiana Manufacturing Institute graduate students Eric Kozikowski and Soho Yun having been working on designing, researching, and creating an application for augmented reality model-based work instructions. The project, started in May of 2018, aims to be used for the assembly of products in a manufacturing setting.

"Soho and I are working on a model-based work instruction AR application to guide users through the assembly process of products," detailed Kozikowski, one of the project leads.

Using augmented reality headsets, Kozikowski and Yun want to be able to clearly convey necessary information for the assembly of various products. Using animations, the visualizations will show the assembly process with holograms to ensure the correct assembly order.

The team is working towards the development of a functional app that uses a geographic marker to understand the users position in the physical world compared to the virtual environment. Based on the user's location, the app displays an animation on a head mounted display (HMD) showing how to assemble the product at that workstation, and which bins the parts are retrieved from.

The app is programmed on a head mounted display (HMD) that resembles goggles, called Microsoft Hololens. This optimization of model and user interaction allows the operator to have product information on -demand and within their sight. The cloud-based application also allows for easy application modifications.

Kozikowski and Yun's goals of the project are to increase accuracy and decrease mistakes, accidents, and malfunctions in the manufacturing industry. Their project has the potential to improve the quality of the product being made.

"This technology can help users access important product information and assembly instructions more readily and help identify key components in

an assembly that need more attention or work," Kozikowski said.

Along with the app, Kozikowski and Yun have designed the process to using the application in the intended setting. First, using the Hololens, the work cell is scanned in 3D and a spatial map is generated. Then, the designer will place assembly animations and models according to the spatial map generated earlier. Calibration targets are also placed, allowing for future calibration. The user wearing the headset scans a single calibration point in their work cell. This point allows the headset to know what work cell the user is working at, the work cell layout, and what parts are assembled at the workstation. User selects play and assembly animations and guidance begins.

The team presented their current research at CAD2019 conference in Singapore in June of 2019. Once the project is completed, Kozikowski and Yun will also present data from usability studies and improvements to the application at more conferences.

"This technology has made an impact and will continue to make an impact in design, review, product assembly, and maintenance of products and machinery in a manufacturing environment," said Kozikowski.

CGT SPOTLIGHT - NEW CGT PROFESSOR, NASHEET ZAMAN

Professor Nasheet Zaman is one of Computer Graphics Technology's newest faculty members. As a continuing lecturer, Zaman is teaching CGT 340, Digital Lighting and Rendering for Computer Animation, and CGT 341, Motion for Computer Animation. She is also teaching CGT 246, Compositing I, and CGT 346, Digital Video and Audio. Her areas of focus include 3D Animation, Lighting, Rendering, Compositing, Shading, and Visual Effects.

A 3D animation and visual effects professional prior to teaching, Zaman has experience working for multiple studios, including Disney Animation where she worked on popular movies like Frozen and Tangled, among others. She also worked on the VFX Oscar-winning film Life of Pi.

Zaman learned many lessons in the industry that she feels passionately about passing on to her

students. Her best advice to them is to never forget what they're passionate about it. She grew up loving animated movies, which led her to create one herself. Previously, Zaman teamed up with Purdue alum Jac Piette to co-direct an award-winning independent animated short film, One Per Person. This project was a six-year process that left her with years of experience in filmmaking.

Zaman wants to emphasize to her classes the importance of being prepared for their industry, including the comfortability of working in teams. "In the animation industry things are very specialized, meaning that you have to work with many others to finish a project. Being able to work on team and collaborate with team members is a necessary skill for the industry."

In the future, she looks forward to talking more with her classes about creating compelling, well-acted and visually appealing animated content from start to finish.

NEWS AND NOTES

Fledgling Games, a new studio-based environment for CGT students in the entertainment spaces, had a soft launch in January 2020, with two CGT students gaining full-time positions and 20 student interns. Currently, it is partnered with Crisis Response Leader Training (CRTL), which is a local company specializing in the development of digital training content for first responders. Tod Langley, owner of CRTL, made a very generous gift to CGT to support the development of professional work experience for students.

CGT will be hiring two new tenure-track faculty for next year: 1 in the area of User Experience, and the other in the area of Games Design. They will be great additions to our programs.

CGT has welcomed a third academic advisor for our students. Aimee Griggs comes to us from the Office of Professional Practice, and she started on January 27, 2020.

STAY CONNECTED

 Purdue Computer Graphics Technology

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