

COMPUTER GRAPHICS TECHNOLOGY NEWS

Department of



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FROM THE DEPARTMENT HEAD



My best always,
Nate

We are in the middle of our fall semester here in CGT, and things could not be more busy. We have new courses underway in our Games Development program, and exciting new initiatives in digital historical preservation being led by several faculty members, including Professors Cory, Miller, and Byrd. The department has embarked on the creation of a first-year core curriculum for our students, working with our industry advisory council, to emphasize the technology transformations inherent to this new Fourth Industrial Revolution. And as we do that, we are engaging our students in new ways as well, including the creation of a new CGT student council comprised of officers from our 8 (yes, I said 8) student clubs. Our Afternoons with Alumni continue to be a hit, so if you have interest in engaging with our students, please send me a note and I will put you in touch with our student group running that process. As always, if you find yourself on campus or nearby, please drop in to say hello.

P-51 DIGITAL TWIN PROJECT

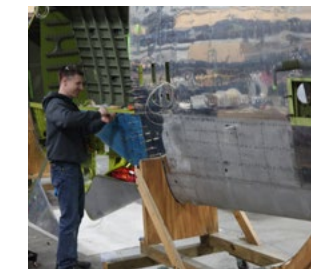


Started by Professor Craig Miller, Purdue University and The Boeing Company's P-51D Project is "the horizontal integration of the humanities" as described by Dr. Miller. This project is focusing on historical research to develop a digital twin of the P-51 Mustang WWII US Army Air Corps pursuit aircraft. The project, titled, "P-51D Digital Restoration and Historical Archival", is currently in the second year of work.

The North American (Boeing) P-51"Mustang" is one of the most iconic and successful military aircraft of the second world war. Periodically, the research group takes trips to Danville, IL, where scans are taken of the physical aircraft using a portable digital scanner. The scans are then used to recreate the aircraft at Purdue using PLM solutions. All the CAD modeling is completed by Purdue University undergraduate & graduate students in the colleges of Liberal Arts, Engineering, and Polytechnic Institute.

A total of six faculty and ten students are involved in the project, including Professor Travis Fuerst, the project technical advisor. Professor Fuerst's experience with The Boeing Company's standard practices and processes allows him to teach the Dassault Systems 3DExperience platform, with which the students construct the P-51D digital twin. The

other faculty help by mentoring the participating students to provide direction for the project.



Besides creating a digital twin, another project goal was set to support students in conducting historical research on the P-51. The aircraft had a historical military and social impact on the United States military. The

Tuskegee Airmen was a group of African-American military pilots who fought in World War II. They were the only black military units that saw combat during the war, and they earned 96 Distinguished Flying Crosses. The Tuskegee Airmen's success with the P-51 led to the integration of the United States military by Executive Order 9981 on July 26, 1948 by President Harry Truman.

This second goal focuses specifically on the recruitment of black students and other minorities to Purdue's technical programs. Partnering with the Purdue Polytechnic High School in Indianapolis, Dr. Miller's intention is to pull interest to Purdue and the P-51 project through spreading the story of the Tuskegee Airmen. By getting high school students interested in the project and in their history, their excitement about technology and innovation will rise. This little-known, yet significant piece of history has the ability to merge technology and black history through work on the P-51.

The student project manager, Ashton Huntzinger, is a junior studying Aeronautical Engineering Technology. His job is to lead the team of students through each step of the process. Huntzinger felt that, "getting the project going and learning the software was the most challenging part. We've been presented with completely new obstacles with this project." Although he considers the technical side of the project his forte, he is also a member of the Airforce Reserves and feels a strong connection to the historical aspect as well. Moving forward, he is excited to continue learning about the aircraft they are working with, both technically and historically.

BYRD DATA VISUALIZATION LAB RESEARCH

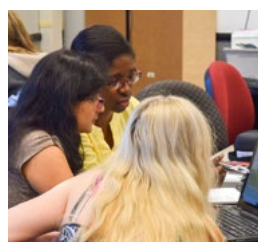


Dr. Byrd is an Assistant Professor in the Computer Graphics Technology Department at Purdue University's Polytechnic Institute, and is the director of the Byrd Visualization Laboratory.

Data visualization provides insight into a data set and what it represents. It is the process of transforming the data set into an understandable visual representation that allows its story to be told. In a world that is full of data on almost anything imaginable, the job of a data visualization specialist is to provide a way for viewers to understand even complex data sets.

The general research interests of the lab include data visualization, visualization capacity building, broadening participation, and high performance visualization.

The Lab works with students and postdoctoral fellows that are interested in being, "Agents of Insight". These are scientists who use data visualization to, "enable scientific discovery, engage in multi-disciplinary collaborations and foster broader participation and inclusion," as described by Dr. Byrd on The Byrd Data Visualization Lab's website. (<https://byrdvislab.wixsite.com/website>).



Each student involved in the lab has a project that they continue to work on each semester. Yash Guagle, a CGT graduate student, is working on a project with Indiana Next Generation Manufacturing Competitiveness Center (NMaC), utilizing data visualization to explore ecosystems in Indiana's education and workforce development to better inform stakeholders of education and workforce development trends in Indiana. Nathan Kanter, a CGT undergraduate student, is working on knowledge discovery, visual display and analysis of heterogeneous lupus data.

Lupus is an autoimmune disease that affects millions of people worldwide, but is often misdiagnosed. Outcomes of this project will help to decrease the time between disease diagnosis and treatment.

FALL DEC SYMPOSIUM



The bi-annual Digital Enterprise Center's Symposium meeting took place on October 16 at the Indiana Manufacturing Institute (IMI). The

goal of the meeting was to talk about baselining and defining the organizational transformation of "Industry 4.0", or the fourth industrial revolution.

Beginning the day was a welcome from Dr. Nathan Hartman, co-executive director of the Indiana Manufacturing Institute. His introduction discussed the importance of industry workers talking through problems to create solutions. In this time where manufacturing is transforming from physical to digital, it is important for those in the industry to evaluate, collaborate, and plan for the future.

In the morning, a panel started the day talking about how companies determine progress in the Industry 4.0 movement. Greg Harris, Jim Strawn, and Dr. Mohamed Abuali answered questions and explained that since digital maturity varies by each company, the goal is how to find and define a baseline that is leading to the success of every company.

Greg Harris, Associate Professor of Industrial Systems Engineering at Auburn University, then took the podium to talk about whether the industry is ready for digital manufacturing. He highlighted that, "industry interviews revealed a significant gap in the believed readiness or capability of suppliers to adopt digital manufacturing processes."

Tom Hedburg, a research mechanical engineer at the National Institute for Standards and Technology, talked to the group about metrics and standards of the digital thread. Hedburg believes that a single system that can move information from other systems between each other would move the industry forward together. His message was that the future needs a digital thread, or a connected flow of information between standard interfaces for activates across the product lifecycle.

Rebekah Kowalski, the Vice President of Manpower Manufacturing at ManpowerGroup, followed that talk to discuss the job market in the industry, what kind of workers are needed, and what to look for in candidates. The talent shortage has grown nationally, from a 14% shortage in 2010 to a 46% shortage in 2018, so the need to create talent within organizations is higher than ever before. Companies

are filtering out candidates based on specific qualifications, which is why the field is vanishingly small. Since the jobs are changing rapidly, the need to hire based on adaptability is now more important. The current system is leaving people behind because of this, ultimately wasting talent. If companies hired based on adaptability and learnability, including those with cognitive or physical disabilities, the workforce would be more prepared for the future changes. On top of this, Kowalski mentioned that the rate of quitting could be reduced by marketing employee longevity at the company, and showing them what their career could look like. "This is the first step to being truly adaptive with Industry 4.0."

Craig Brown and Don Haupt teamed together to talk strategy, decision making, and leadership in the industry. PLM (Product Lifecycle Management) is about products, people, and how they interact. They stressed that it requires every discipline of

the industry to be involved. Dr. Mohamed Abuali, managing partner at loTco LLC, informed the audience on the power of predictive maintenance. The solution, he explained, is premade approaches that can be tweaked for each business but needs to be defined. The last talk of the day was given by Scott Hutcheson, director at Purdue Agile Strategy Lab. Hutcheson wanted to address new ways of thinking and innovation in a non-threatening way through experiments. "Being able to test small changes and know what exactly works, and what doesn't, gives the company control over the transition."

The conference had visitors from a multitude of companies. One guest, Greg Hawkins, is a 4th time attendee of the conference. "I came on behalf of my company to promote and support this forward-thinking movement, and to discover the realm of opportunity for growth and development in digital manufacturing."

CGT SPOTLIGHT - REDESIGN PROJECT FOR ANIMAL SHELTERS

CGT 32600, Graphics Standards for Product Definition, is taught remotely by Professor Rosemary Astheimer. The class is currently working with an animal shelter in Massachusetts to structurally redesign tools that catch stray animals. The idea for the project was something that Astheimer started to pursue 2 years ago in an effort to bridge classroom-learning with the real-life problems that organizations face.

The current poles used to catch stray animals are hard to operate, especially in situations such as a rescuer up in a tree trying to capture a cat. When presented with this problem by the shelter, Professor Astheimer created her course project centered around the redesign process of the poles.

To do this, CAD (Computer Aided Design) software is used to make changes to the original design and students use Aras Innovator PDM (Project Data Management) software to manage the files as they undergo revisions. Another component of the course consists of using Anark Core Workstation software to make instructional 3D PDF documents that are intended to allow the Animal Rescue League to easily follow for the construction and assembly of the modified design. Use of the software gives the students exposure to industry tools that will give them a head start when they enter the workforce.

The first step of the project is for the students to present their design ideas. The presentations took place on October 24 and 25, attended by additional faculty in the CGT department who gave students feedback on their ideas before they go on to the next step of the design process. The project will complete at the end of the semester, on December 6.

NEWS AND NOTES

Data Visualization Challenge

A group of CGT students comprised of sophomore, senior, and graduate students recently presented in the Data Visualization Challenge as part of the 2019 Indy Big Data Conference. The Data Visualization Challenge asked participants to explore open Census Demographic Data and use their visualization skills to pursue creative insights that can benefit the public good. The Purdue CGT team revealed the relation of poverty with education and highly vulnerable groups. Congrats to the team!

STAY CONNECTED

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