Husky Innovate Idea Pitch Competition Computer Network and System Administration Student Takes Second Place

GARY TROPP, a student in Computer Network and System Administration program won second place in the first annual Husky Innovate Idea Pitch Competition at Michigan Tech on October 17, 2018. Gary was a winner for “A Better Way to Schedule Classes.” The Competition was hosted by the Innovation Center for Entrepreneurship, a collaboration between the Pavlis Honors College, the School of Business and Economics, and the Vice President for Research Office.

There were more than 30 participants from various majors and disciplines who pitched to a panel of judges comprised of faculty, alumni and community members. Ideas ranged from a Ride Share application to a Hydrogen Supplemental Fuel Generator. Participants had two minutes to pitch their innovative and disruptive ideas. Alumni from Michigan Tech’s 14 Floors initiative joined the judging panel to offer valuable feedback and expert advice to the young entrepreneurs.

2018 and 2019 Program Scholar Awards

THE 2018 AND 2019 PROGRAM SCHOLAR AWARDS were given to the following students (2018 students are pictured):

- Surveying Engineering: Kyle Hiltunen and Steven Smendzuik
- Mechanical Engineering Technology: Frances Luo and Alyssa DePauw; Isai Jonatan Hudy-Velasco
- Construction Management: Brandon Taavola and John Batsikouras
- Computer Network and System Administration: Michael Dabish and Dina Falzarano
- Electrical Engineering Technology: Thomas Prica and Spencer Thompson

Thomas Prica (EET) was also selected from the above program scholars as the nominee for the University’s 2018 Departmental Scholar Award and Isai Jonatan Hudy-Velasco (MET) was nominated for the University’s 2019 Departmental Scholar Award.

Two CNSA Students Inducted into Epsilon Pi Tau Honor Society

NINE STUDENTS were inducted into the Michigan Tech Delta Zeta Chapter of Epsilon Pi Tau Honor Society, Spring 2019. Epsilon Pi Tau is the international honor society for professions in technology, recognizing students and technology professionals for academic excellence. The student chapter of Delta Zeta Epsilon Pi Tau was recently selected as the recipient of the 2019 Warner Chapter Award for Region 3.

Spring 2019 Delta Zeta–Epsilon Pi Tau CNSA Initiates:

- Austin Clark
- Bernard Kluskens

NICHE.COM RATINGS 2019

#6 BEST COLLEGES FOR INFORMATION TECHNOLOGY IN AMERICA (between Cornell University and Pennsylvania State University)

#29 TOP PUBLIC UNIVERSITIES IN AMERICA (just ahead of Indiana University and Florida State University)
CTE CYBER STUDENTS GET AHEAD PLAYING COMPUTER GAMES

STUDENTS IN THE CYBERSECURITY COURSE, run through the Career and Technical Education Center, have been learning about computers, networks and how to protect them since the beginning of the year.

The inaugural class meets at Michigan Technological University (MTU) and was developed with Guy Hembroff, MTU associate professor and director of the medical informatics master’s program.

“Being able to protect systems, networks and devices is paramount,” Hembroff said.

Instructor Aric Asti split the class into teams to test each other’s skills in a lab mimicking an exercise testing a small business network. “It’s called red teaming and blue teaming,” Asti said.

The blue team sets up a network with defenses and monitors it for unexpected, unwanted activity and other “indicators of compromise.”

The red team tests the blue team’s defenses for vulnerabilities with a variety of tactics and tools that the students have been taught to use. “There’s security companies that get paid to infiltrate other companies,” Asti said.

The lab is the end result of several days of learning about network security in lectures and hands-on activities and will take place over multiple days.

Every day the students meet for about 90 minutes for a lecture followed by a related hands-on activity. They get assigned homework done online.

Asti, who has worked on computer networks for companies in the Virgin Islands, for the Army, and for an East-Coast startup company, models much of the students lessons on what he thinks will be most useful to them in the workplace.

“Essentially, they’re building an enterprise or business grade system from scratch,” he said.

Gavin Mackey, a junior at Hancock High School, has played around with computers and basic programming before. Now he is hoping he can leverage what he is learning to get a job working with computer technology.

“I feel like this program is giving students a better chance,” he said.

Seth Francois, a senior at Houghton High School and Mackey’s teammate on the blue team, said he has been interested in computers for a while and has been trying to learn Python, a programming language, at home.

“This class has really set up a strong base for me to work from,” Francois said.

But getting a job today is not just about having the technical skills. Asti is also teaching his students how to communicate what they have been doing in non-technical and explanatory formats.

During an exercise, students documented the tools they used and the actions they took using screenshots and notes. They will be compiling these notes into one-page executive summaries of what happened during the exercise.

Next semester they will be

HOW WE STAND OUT

THE COMPUTER NETWORK AND SYSTEM ADMINISTRATION (CNSA) major has a strong emphasis on hands-on learning. Most CNSA courses come with a lab session where students can apply their classroom learning in a simulated enterprise network. Each semester, the CNSA virtual cluster hosts more than 1,000 virtual machines for students to use.

The CNSA program provides high-quality teaching. Faculty members are in the Michigan Tech Academy of Teaching Excellence which is comprised of finalists or recipients of the annual Distinguished Teaching Awards. Faculty take great pride in the students and make their success the highest priority.

The CNSA program’s faculty are involved in numerous research projects throughout the school year. In 2018, Dr. Yu Cai, Program Chair, was listed amongst those faculty having the top research expenditures at Michigan Tech.
working on other “soft skills” like public speaking and project management, as well as attending an innovation and entrepreneur workshop being planned for spring.

Charles Warren, an MTU sophomore working as a teaching assistant in the class, said in some ways the high school students are ahead of students like him. “We don’t take cybersecurity until our third year at Tech,” he said.

THE IMPACT of the digital health revolution is significant and continues to spread as health data becomes increasingly ubiquitous due to the advancement of digital records, patient generated health devices, mHealth applications, and remote monitoring. Initiatives such as population health management, precision medicine, and patient-centered medical homes also help to drive the need for qualified personnel who are trained in the areas of clinical health, computing, and understand how these two worlds come together. According to the U.S. Bureau of Labor Statistics, the health informatics field is expected to grow by 23% from 2012 to 2022, offers high-paying salaries, and is in need of professionals who are skilled in this area.

Michigan Tech’s Medical Informatics graduate program offers students an excellent education and research opportunities like no other. The program is structured to provide students from different backgrounds an evolutionary path of courses and applied research to gain a unique and well-rounded skill set that is in high-demand of a growing field. Michigan Tech’s Medical Informatics graduate students dive deep into the multidisciplinary field of informatics, artificial intelligence, decision support systems, machine learning, deep learning, telemedicine, ethics, security and privacy of data and devices, imaging informatics, data science and visualization, interoperability, consumer health informatics, and translational research informatics.

Research centers and laboratories serve as critical resources, incubators, and testing grounds for ideas and innovations. Students also have opportunities in our local community’s hospitals and clinics for exposure to a variety of health care settings, such as primary, in-patient, ambulatory, behavioral health, community, and regional initiatives. And since the program is available on campus and online, students work collaboratively with each other and around the world in healthcare.
Students in the Computer Network and System Administration (CNSA) program are heavily involved in design/research projects during their senior year. Projects include cybersecurity game development, ethical hacking, social engineering, and virtualization of school networks.

CNSA Senior Project: A Virtual Machine Cluster Prototype

SENIOR PROJECT STUDENTS in the CNSA program were tasked to develop a working alternative to the previous virtual machine cluster that was decommissioned in spring 2018 due to failing storage and outdated software.

The students are divided into three teams to develop two separate virtual machine cluster prototypes and storage systems. One virtual cluster will be Linux-based, and the other Microsoft-based. Each of the platform teams is also working with a group of students developing storage solutions to support the cluster prototypes. All of the teams are working closely with each other to provide a system to support the instructional and research needs.

Lessons learned from the virtual prototypes will be valuable to guide the purchase of new hardware, software, and storage to support a production quality virtual cluster system for computing faculty and students on campus.

CNSA students were also given undergraduate research opportunities guided by faculty. One such opportunity involved research on the effectiveness of email phishing training sponsored by the MTU URIP and SURF program.

ITOxygen Enterprise

ITOxygen is a cross-disciplinary, student-run Enterprise that specializes in information technology (IT) for student organizations and businesses, with a focus on developing Information Systems and IT solutions. Team members work on real-world projects that foster skill development and business savvy. Areas of interest include systems and information analysis, software development, database design, and web-based application development.

This past year, the ITOxygen Enterprise worked on projects with Microsoft, Canadian National Railway, Little Brothers-Friends of the Elderly, and U.P. Health. The team worked on a vast array of project types including software development to support railway maintenance activities, Google Chrome plugins to support growth of the search engine Bing, development of a medical patient information system, and development of a solution to better visualize data for a large winery.

TEAM LEADERS: Bernard Kluskens and Zachary Metiva, Computer Network and System Administration

ADVISOR: Russell Louks, School of Business and Economics

SPONSORS: Microsoft, Canadian National Railway, Little Brothers-Friends of the Elderly, Porter Family Vineyards, UP Health, Ford Motor Company Fund
**New Research**

**CYBERSECURITY COURSE FOR CAREER TECHNICAL EDUCATION (CTE) PROGRAM**
Dr. Guy Hembroff, PI, Associate Professor, Director of Medical Informatics with a research focus on Computation Data Electronics and Sensing, Education and Outreach
Sponsor: Copper Country Intermediate School District

**THE DEVELOPMENT AND ASSESSMENT OF ADVANCED CYBERSECURITY CURRICULUM**
Dr. Yu Cai, PI, Associate Professor, Program Chair of Computer Network and System Administration; Co-PI: Kedmon Hungwe with a research focus on Computation Data Electronics and Sensing, Education and Outreach
Sponsor: U.S. Department of Defense

**Peggy Gorton Receives “Making a Difference” Legacy Award; Two Other Staff Honored**
PEGGY GORTON (PICTURED, LEFT) has built a legacy within the University, the School of Technology, and Geological and Mining Engineering and Sciences (GMES) over her 40+ years of service. During alumni weekend this last August, an alum returning to GMES worked to track down Peggy because she had been such a positive and encouraging force for him. She has helped students find places to live and provided lunches and snacks out of her own pocket.

In addition to Gorton, two other School of Technology staff members were nominated for awards. Pammi Washuleski, Office Assistant and Nicholas Hendrickson, Operations/Facilities Supervisor of the Machine Shop, were nominated in the categories “Serving Others” and “Above and Beyond” respectively.
DR. GUY C. HEMBROFF, PHD, associate professor and director of the Medical Informatics graduate program at Michigan Tech, research interests include: artificial intelligence, augmented/mixed reality, biometric technology development, clinical decision support systems (CDSS), information security and privacy, human computer interaction, predictive health analytics, and mHealth application development. Recently, his research has included AI and computer vision within the health care domain. Dr. Hembroff has developed algorithms to establish a scalable and secure unique health identifier (UHID) for patients and medical personnel to acquire authorized access to a patient’s longitudinal medical record using touchless fingerprint biometrics as the primary source of authorization and facial recognition as the secondary source, preventing a requirement for usernames and passwords. The solution links a user’s records securely and accurately based upon the established UHID and data interoperability structure that it offers. The name of the application is UMBRELLA (or Unique Medical Biometric Recognition of Large-scale and Legitimate Authentication) and it can be used with any mobile or fixed device that has an 8MP camera. He and his graduate student, Sagda Osman, have also developed an algorithm to accurately infer the ankle joint for markerless gait analysis using the Microsoft Kinect. Using this algorithm, only one sensor (and not multiple sensors which need to be calibrated together) can be utilized for patient gait analysis. This solution is much less expensive, easier to administer, and provides tremendous accuracy. The application is currently being tested in the orthopedic department of Bahiana Medical School in Salvador, Brazil.

Currently, Dr. Hembroff’s research is looking into advancing AI, telemedicine, and integrated digital health data to help overcome barriers of care in rural environments, such as transportation, health literacy, workforce shortages, stigma with health conditions due to lack of anonymity, and isolation. Both geographic and virtual communities can play an important role in the health of their residents and users respectively. While an individual ultimately will decide on whether or not to participate in an unhealthy behavior, research has shown that factors leading to a person’s decision are strongly influenced by their surrounding physical environment. Likewise, research has proven that users are strongly influenced by virtual interaction over Internet, especially in social media. For example, Harvard Medical School conducted

New Additions for Fall 2019: Stackable Certificates and Enhanced Partnership between Henry Ford Hospital and Michigan Tech’s Medical Informatics Graduate Program

THE MEDICAL INFORMATICS PROGRAM at Michigan Tech plans to offer three graduate certificates beginning in the fall of 2019. The certificates offer specialized knowledge in the health informatics domains of imaging informatics, healthcare privacy and security, and healthcare data analytics and visualization. While the specializations have already existed within the curriculum, having defined certificates will help our graduates become even more marketable to employers. The three certificates are “stackable” in the sense that students will earn each of these certificates (forming a stack of health informatics certificates) as they complete courses beyond the curriculum’s core sequence of courses, demonstrating their knowledge in each of these areas. The certificates also serve as a method for graduate students in other majors or students who do not wish to complete a full graduate program, to gain knowledge in specialized areas of health informatics and receive University certification as a result.

The Medical Informatics graduate program’s existing partnership with Henry Ford Hospital continues to strengthen. Beginning in the fall of 2019, the Henry Ford Hospital will provide de-identified electronic health data from the last 20+ years to Michigan Tech for education and research purposes. This includes data such as labs, pathology reports, medical images, medical history, and medications. Providing the Medical Informatics curriculum with this data helps students better understand concepts and applied methodologies associated with this field. Courses such as clinical decision modeling, population health and bio-surveillance, AI in health, and image processing will use this data to define key learning objectives and projects. Students will have hands-on experience in using clinical data to solve challenging problems within industry and continue to develop a comfort-level with a variety of medical data. Collaboration between the two institutions continues to expand and strengthen, resulting in a rich environment of education and research opportunities for Medical Informatics graduate students.
studies showing a high correlation of weight gain and loss of users to their most frequently viewed profiles of social media friends who gained or lost weight, proving ideas and habits that influence health for better or worse can spread through social communities just as physical communities. Due to the significance of effects both physical and virtual communities play in one’s health, Dr. Hembroff’s work has investigated methodologies in providing positive reinforcement within communities and the effects this has on improving personal and population health. To accomplish this, Dr. Hembroff has been developing a transformative digital health model which is capable of providing users with a secure digital personal health library (PHL) of their integrated (physical, behavioral, and patient generated health data) aimed at increasing patients’ self-management of care, engagement in their health tracking, health literacy through customized education, and empowerment to provide users with confidence in managing their health. Virtual societies allow users to securely share health information and to discuss common health conditions with other virtual community members, helping to avoid health stigmas and the feeling of isolation. Providers participate with patients within this model through virtual primary care, helping to diagnose and treat their patients, answer questions, and provide medical assistance through well-timed interventions through the use of AI to accomplish accurate predictive health analytics, education, and care management plans which are customized for the patient. In the physical communities, AI is used to match community resources (e.g. food shelters, notification of health screenings, and subsidized funding mechanisms to help pay for heat within a user’s house) with the patient’s needs. Dr. Hembroff’s goal is to provide a more robust and intelligent network of integrated health which can treat the patient holistically while building a support of resources and expertise which will lead to a healthier resident and community.
Dear Alums, Friends, and Students:

IT IS A PLEASURE to share with you a brief selection of the news and accomplishments from our students and faculty in Computer Network and System Administration and Medical Informatics. As a new Dean, it has been an honor to learn from and become a member of this commUNITY that is so dedicated to the professional, technical, and social development of our students to graduate into the changing needs of industry.

We learned in December that the administrative reporting structure for the Computer Network and System Administration BS program and the Medical Informatics MS program will move to the new Computing College and will be innovating in their expansion to include BS in Cybersecurity degrees. Medical Informatics will likely update to a broader Health Informatics name. This transition will occur over summer 2019 and is being planned to be seamless for the students.

As our program continues to grow and gain prominence, we hope you will partner with us in a way that is highly personal and meaningful to you (scholarships, lab equipment, internship experiences, virtual tours of your facilities, safety modules, etc.) and that has a significant impact on student development.

Feel free to reach out to us. We would love to hear and learn from you!

Best Regards,

Adrienne Minerick
Dean, School of Technology

RELATED ACCREDITED PROGRAMS

CONSTRUCTION MANAGEMENT
American Council for Construction Education (ACCE)

ELECTRICAL ENGINEERING TECHNOLOGY
Engineering Technology Accreditation Commission (ETAC) of ABET

MECHANICAL ENGINEERING TECHNOLOGY
Engineering Technology Accreditation Commission (ETAC) of ABET

SURVEYING ENGINEERING
Engineering Accreditation Commission (EAC) of ABET