



## EngiNews - Spring 2021

Welcome to EngiNews Spring 2021 issue. This is an update from SHU Engineering in the winter and spring. Feel free to reach out to us for any questions, concerns, and comments at ([kayat@sacredheart.edu](mailto:kayat@sacredheart.edu)).

Stay healthy and safe, and enjoy reading.

AND...

Happy Summer! :)

### In This Issue

- First graduating cohort in Computer Engineering
- SHU Drone project with Prof. Ahmed Abdelaziz
- Ground robots research project
- IDEA Lab Week
- Recent Publications and Press Releases

- Student Highlights

## First Graduating Cohort in Computer Engineering



We are very excited to graduate our first cohort of B.S. in Computer Engineering students. Their 4-year hard work paid off and they became the first engineer pioneers!

**Gabe Bitencourt (Gold medalist):** Gabe was involved in our program in every aspect from helping in the IDEA Lab (and its earlier versions), drone program, and as a researcher/teaching assistant. Along with Elijah, his capstone project with Quanser was published at an international conference and his work has also received honorable mention at the university's academic festival.

**Gabe Castro (Silver medalist):** Gabe was the cornerstone on reshaping the electronics classroom and helping many classes as a teaching assistant. His research on Internet of Things (IoT) projects were impactful in the lab.

**Elijah Brown:** Elijah carried a tremendous load of being in the engineering program while being an athlete at the same time. Kudos to him for being able to carry both loads. His capstone project, along

with Gabe, was recognized by the university at the academic festival (honorable mention) and published at an international conference.

Jon Carpenter: Jon worked in the IDEA Lab and also was a part of the university band. His capstone project with a local company was very successful as they delivered a prototype that company will actually use.



*1 - Gabe couldn't help but customize his cap with a laser cut drone!*

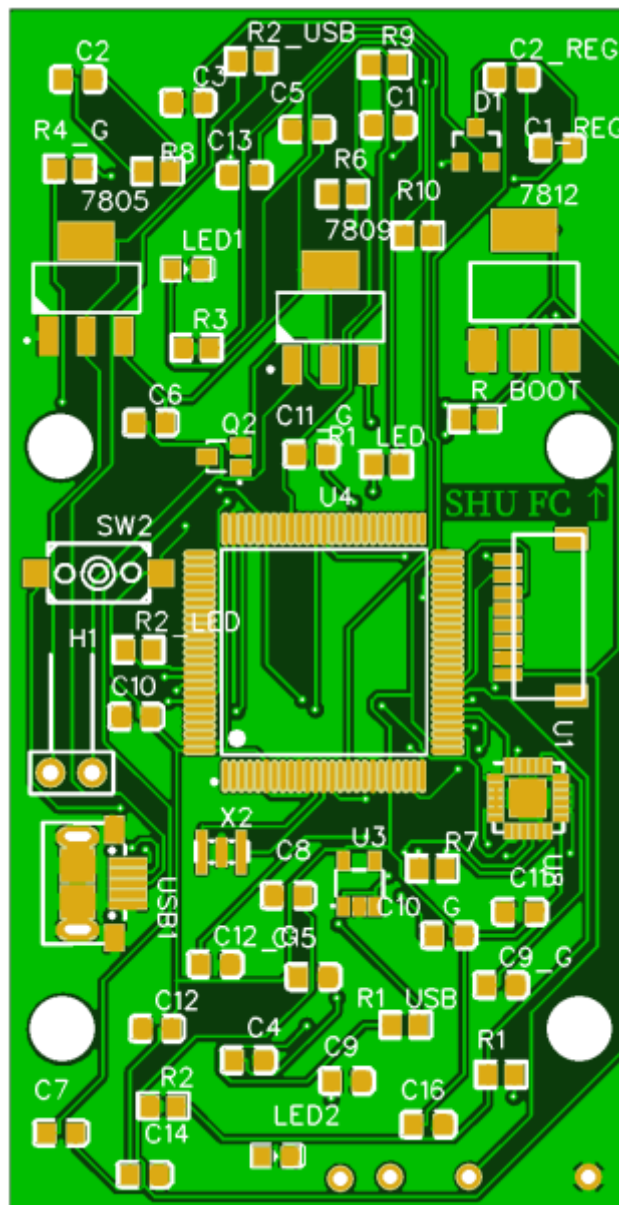
SHU Drone project with Prof. Ahmed Abdelaziz





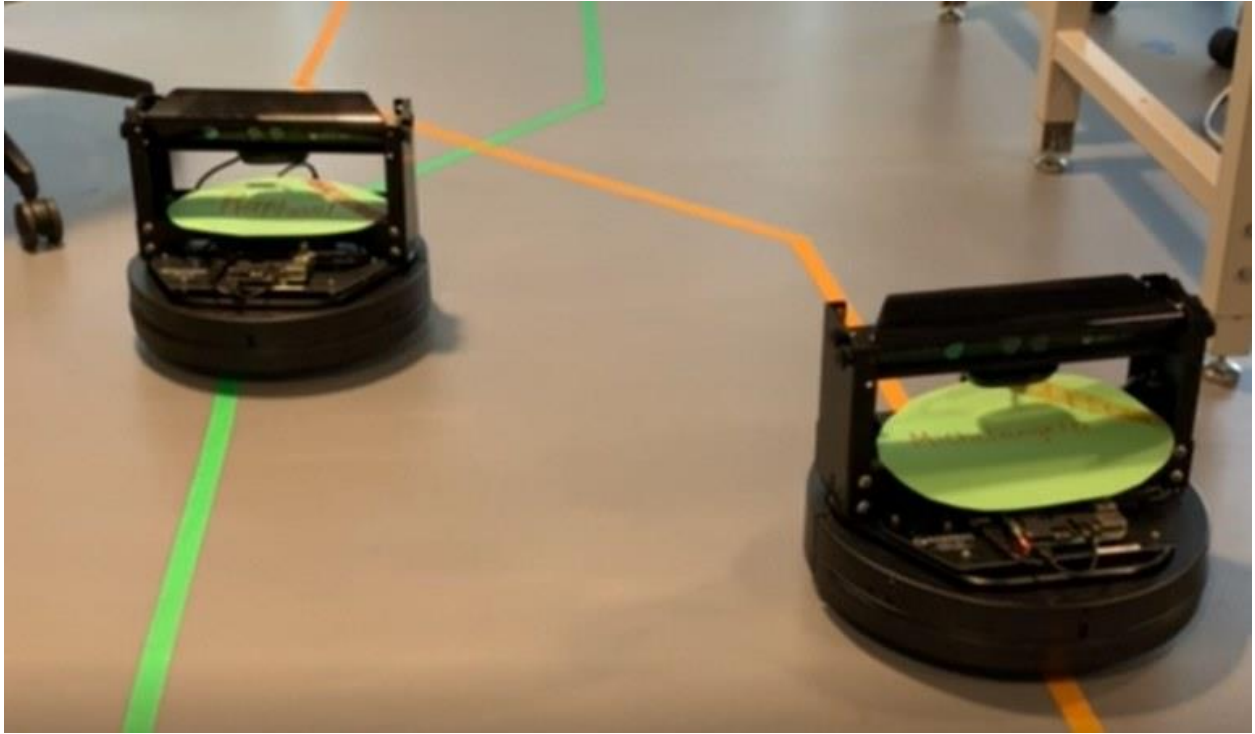
We were very lucky to have secured a grant from Lockheed-Martin/Sikorsky to develop our own drone platform. We truly took advantage of the pandemic last summer and Prof. Tolga Kaya and IDEA Lab manager Cedric Bleimling worked on the initial steps of the project. This past winter and spring semester, Prof. Ahmed Abdelaziz took over the circuit design of the project. With the help of Mike Altis, the manager of Westport Makerspace, our SHU Drone team worked months to develop the first in-house drone flight controller. We are excited that we will be offering this entire experience as a class in the fall; ENGR 350 Sensors and Robotics.

We had a lot of failures during this adventure but one thing we did not anticipate was the chip shortage. Yes, it is real! We were not able to source the circuits we needed (ST Arm processors), which delayed us significantly. We are happy to have our assembled flight controllers finally.



2 - First printed circuit board (PCB) design as the SHU drone flight controller, i.e. the brain of the vehicle.

## Ground Robots Research Project



We have finally gotten to start working on our Quanser ground robots, called Qbots. These Roomba-type, open-source, fully programmable robots will help us excel in smart vehicles concepts, systems engineering, and control systems. We have been very lucky to partner with Quanser on these projects as they support us with training and answering our endless questions. Our student research group of Kaitlyn Mangano, Jeppe Mogensen, Mario Montuori, and Jordan Carlucci will continue working on these projects.

Did you notice the name tags on our turtle-bots? :)

## IDEA Lab Week

COME CELEBRATE  
IDEA LAB-INVOLVED  
OR -SPONSORED  
PROJECTS



**IDEA  
LAB WEEK**  
**April 26-30**

SACRED HEART UNIVERSITY  
**IDEA LAB**  
INNOVATE > DESIGN > ENGINEER > APPLY

IN PERSON OR ZOOM

- Monday, 9-11 a.m.— Industry & Research Projects (W167 or Zoom)
- Monday, 1-2 p.m.— Sensors and Computation (W167 or Zoom)
- Monday, 2-5 p.m.— Freshmen respond to MLK with 3d prints (W167 or Zoom)
- Thursday, 4-6 p.m.— Marketing Innovations - Sustainable Prototype Packaging (W167 or Zoom)
- Friday, 11 a.m.-2 p.m.— Fashion Innovations (W167 or Zoom)

Thursday night (6-11 p.m.) in-person

- 6-7 p.m.— SHU Innovation Challenge (W167 or Zoom)
- 7-8 p.m.— Badge ceremonies
- Workshops
- Show & Tell projects
- Drone activities

Go to [www.sacredheart.edu/idealabweek](http://www.sacredheart.edu/idealabweek) for Zoom links.



We had our first ever IDEA Lab Week in April 2021 where we showcased projects in engineering along with marketing and IDEA-lab projects. It was great to see students from freshmen to senior owning their projects and presenting their semester-long achievements. Kudos to all SHU Engineers.

Also, IDEA Lab hosted the first ever (yet again) SHU Innovation Challenge. This 3-week program started with Richard Guha, Entrepreneur in Residence at Welch College of Business & Technology, covering the basics of business plan development. 8 teams worked with experts in the second week to discuss the feasibility and viability of their projects. Last week, we celebrated their projects with their presentations and awarded the best three. SHU Engineering is proud of Mario Montuouri, a freshmen in Computer Engineering, who won the second prize with his project that he started in one of his engineering classes.





3 - SHU Innovation Challenge in April 2021.

## Recent Publications and Press Releases

### Recent Publications

- **G. Bitencourt, E. Brown, C. Bleimling, G. Lai, A. Molki, and T. Kaya, "Autonomous Aerial Vehicle Vision and Sensor Guided Landing," IEEE International Conference of Electro/Information Technology, Mt. Pleasant, MI 48859, May 2021.**

This research was a collaboration between SHU Engineering and Quanser on our drone system. First international conference paper by our undergraduate students. Congratulations Gabe and Elijah.

- **B. Sahin, A. Acar, and T. Kaya, "Simple and low-cost synthesis of Al-doped ZnO/CuO composite nanowires for highly efficient hydration level sensing," *Ceramics International*, 47(8), 11405-11414, 2021.**
- **B. Sahin and T. Kaya, "Facile preparation and characterization of nanostructured ZnO/CuO composite thin film for sweat concentration sensing applications," *Materials Science in Semiconductor Processing*, 121, 105428, 2021.**

Both papers of Prof. Kaya's above explored the use of ZnO/CuO composite films to improve their sweat sensing performance for wearable devices.

- **K. Bowlyn and S. Hounsinnou, "An Improved Distributed Multiplier-Less Approach for Radix-2 FFT," in *IEEE Letters of the Computer Society*, vol. 3, no. 2, pp. 54-57, 2020.**

Prof. Bowlyn worked with a collaborator in creating an improved multiplier-less structure for computing a radix-2 fast Fourier transform algorithm.

- **S. Dinc, B. Sahin, and T. Kaya, "Improved Sensing Response of Nanostructured CuO Thin Films towards Hydration Level Monitoring: Effect of Cr Doping," *Materials Science in Semiconductor Processing*, 105, 104698, 2020.**

Prof. Kaya worked with his collaborators in Turkey to create nanoscale devices for sweat detection purposes.

- **M. Raval and T. Kaya, “Effect of Multinational Projects on Engineering Students through a Summer Exposure Research Program,” IEEE EDUCON, Global Engineering Education Conference, Porto, Portugal, April 2020.**

Prof. Kaya presented a conference paper on Prof. Raval and his students’ 1-month research visit from India.

## **Press Releases**

### **Turning Zs to Ws<sup>1</sup>**

Prof. Tolga Kaya's research on wearables and sports analytics was featured on the SHU Magazine. This research is a collaboration between School of Computer Science and Engineering (Tolga Kaya, Samah Senbel, Diala Ezzeddine), Exercise Science (Chris Taber), Athletic Training (Julie Nolan), New York Institute of Technology (Sertac Artan), and Ahmedabad University (Mehul Raval, Srishti Sharma). A true multidisciplinary project, it encompasses engineering, data analytics, and health of collegiate athletes who suffer from sleep deprivation.

### **Engineering Seniors to Work with Tech Companies<sup>2</sup>**

Professor Kaya wanted engineering students to do something unique and meaningful for their senior project, so he reached out to companies to see if they needed help with a project. Kubtec, Quanser and ECM PCB Stator Technology all responded anxious to begin working with Sacred Heart seniors. Kubtec worked with students to show them the current design, development and manufacturing opportunity that can assist in the treatment needs of breast cancer. Quanser worked with students to create a new standard for engineering education using drones. ECM PCB Stator Technology wanted to improve motor technology for young individuals. Sacred Heart students helped by working with regenerative motors.

### **Sacred Heart Uses Its Resources to Help During Pandemic<sup>3</sup>**

Sacred Heart invited first responders and health-care workers to stay in residence halls. They also offered to house tents on its campus for hospitals in need of extra space for its COVID-19 patients. In doing so, they were able to provide set-ups for the hospital’s tent. Furthermore, they sent medical supplies to area hospitals.

Professor Tolga Kaya and Cedric Bleimling, IDEA Lab manager, took home 3D printers from the IDEA Lab to manufacture face shields. They also took part in an initiative to create ventilators.

Furthermore, Sacred Heart donated unused computer bandwidth to help researchers find potential cures for COVID-19. The universities IT department downloaded software provided by Folding@Home on computers.

Follow us on Instagram!

---

<sup>1</sup><https://www.sacredheart.edu/news-room/news-listing/turning-zs-to-ws/>

<sup>2</sup><https://www.sacredheart.edu/news-room/news-listing/engineering-seniors-to-work-with-tech-companies-/>

<sup>3</sup><https://www.sacredheart.edu/news-room/news-listing/sacred-heart-uses-its-resources-to-help-during-pandemic/>

@shuengineering