

Senior Design Projects

- SD1** **Project title:** Color Acquisition Device (CAD)
Project description: We present a novel device for determining the reflectance or transmittance of different objects at three different discrete wavelengths and reporting them to the user with a wireless Bluetooth LCD screen. Using a 100m long polarization-maintaining silica fiber as a single-pass stimulated Raman scattering source when pumped by 1kW peak-power, 5ns wide, 1064nm wavelength laser pulses at a repetition rate of 20kHz, two wavelengths at 1120nm and 1178nm are generated (when polarization is not aligned to fast or slow fiber axes). These generated wavelengths and the pump acquire distinct temporal shapes whose linear combination makes up the exiting gaussian pulses that, with proper signal analysis and software tuning, are used to analyze and extract the spectral content of the target that is reported to the user; all is done without the need of additional laser cavities, diffractive optics, and by using a single high-speed detector.
Students: Cesar Lopez-Zelaya, Noah Richter
Advisors: C. Kyle Renshaw, Guifang Li
Sponsor: Air Force Research Laboratory (AFRL)
- SD2** **Project title:** Standard Small Satellite Research Platform for Life Sciences
Project description: A dissolved oxygen sensor and salinity sensor are designed and integrated into a system alongside a camera to characterize the health of an aquatic ecosystem and report the resulting data long distances via wireless transmission.
Students: John Semmen, Brandon Triplett
Advisor: David Hagan
- SD3** **Project title:** The Smart Window
Project description: The Smart Window aims to solve problems with inaccurate weather predictions using its set of onboard sensors. The Smart Window also supports meaningful engagement with users of a wide range of technical ability, because of its integration of new and exciting technologies like PDLC films, transparent displays, and assistive technology like proximity sensors, easy to read GUI and accompanying mobile application.
Students: Jake Pivnik, Pablo Calzada, James Brunner (EE), Shaneal Findley (CS)
Advisor: Shin-Tson Wu
- SD4** **Project title:** Optical Harp
Project description: A laser style harp with MIDI functionality
Students: Matthew Kalinowski, Mohamed Jabbar, Kyle Kaple, Christian Chang
Advisors: Patrick LiKamWa, Kyu Young Han, Zhishan Guo