# Future EE518 Electric Power Protection Laboratory

## EE462 Senior Design Project

Austin Kurth | Richard Terre | Vincent Tham
Advisor: Dr. Majid Poshtan

Sponsored By

SEL SCHWEITZER ENGINEERING LABORATORIES

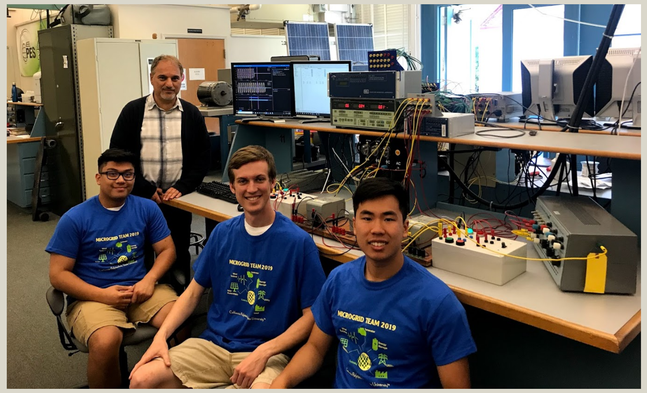
## Project Overview

**Physical System Lab Benches**
- Transmission Line OC Protection
- Transformer OC/Diff Protection

**Digital Simulation Test Stations**
- AcSELerator Relay Settings Manager
- SynchroWave Event Analysis

**SEL-Relay Test System Coursework**
- Relay settings threshold experiments
- System fault simulations

## Physical 3-Phase Power Laboratory



***Focus:*** To protect transformers, transmission lines, and motors with microprocessor-based relays and circuit breakers.

## Digital Relay Testing Stations

***Focus:*** To simulate fault conditions, test relay settings, and analyze event reports within SEL software test environments.

## Background

***Motivation***

California utility equipment sparked more than 2,000 fires in over three years (LATimes,2019).

***Approach***

Create a hands-on protections laboratory illustrating the principles of real-time fault analysis physically and digitally.

***Objective***

Educate. Prevent. Protect.

## Deliverables

- 3 Physical and 8 digital lab benches
- EE518 lab manual
- Textbook of compiled past theses
- YouTube video series

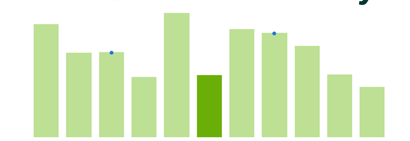
## SEL Protection Devices

**SEL-311L – Line Differential Relay**
- Transmission OC protection
- Distance Protection

**SEL-387E/587 - Current Relay**
- Overcurrent protection
- Differential protection

**SEL-710 – Motor Relay**
- Undervoltage protection
- Thermal protection

### The Value: *Learn by doing = Earn by doing*



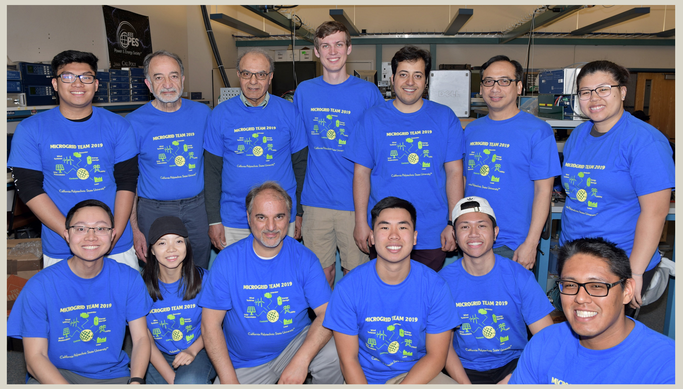

Avg. Salary of Power System Engineer in California


Avg. Salary of Power System Protection Engineer in California

## SEL Relay Test System (RTS)

**Adaptive Multichannel Source (AMS)**
- State-simulation software
- Current/Voltage waveform generation
- Circuit breaker operation simulation

## Cal Poly Microgrid Team 2018-2019



Top: ***Richard Terre***, Dr. Nafisi, Dr. Shaban, ***Austin Kurth***, Dr. Dehghan, Dr. Taufik, Patricia Lui
Bottom: Do Vo, Virginia Yan, ***Dr. Poshtan***, ***Vincent Tham***, JR Racines, Jesus Morales