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SUMMARY

1. Research/Scholarship:

- Active scholar (h-index of 14) whose research is focused on: VLSI design, embedded systems, robotics, high-speed interfaces for electro-optical instruments, mixed-signal circuit design, and analog/digital integrated circuits, biomedical instrumentation prototyping, machine learning, and digital/continuous microfluidics.
- Currently the Director/PI of the NSF STROBE FLC site, PI of the Quantum Delivered mobile quantum learning lab (EDA Regional Technology and Innovation Hub Program), PI of the Department of Transportation bridge scour monitoring project (CTIPS consortium) at FLC, PI of the EPA P3 grants at FLC, Co-PI of the NSF PEAQS (Partnership for Education and Advancement of Quantum and nano-Sciences) grant, PI and R&D engineer of several industry-funded projects (PAATH Equine Technology LLC etc.), student mentor of the NIH URISE program, former PI of the NSF REU Site and Co-PI of the NSF PREM grant at FLC, and a former postdoc fellow of an NIH R01 (2016 – 2017) project.
- Published 6 peer-reviewed journal articles and 6 IEEE conference proceedings (peer-reviewed) since joined FLC in 2017 as an assistant professor. Filed one patent in 2022 with an external partner.
- Mentor to:

  Approximately 100 graduate and undergraduate students and engineers locally, nationally, and internationally.
  http://yilectronics.com/People.html

2. Teaching:

- Hutchins Teaching Award Nomination (2021, Department of Physics and Engineering, Fort Lewis College).
- Scored above the college average in almost every category in teaching evaluations (2017 – Present).
- Developed 10 Computer Engineering courses since joined FLC in 2017. Courses taught: VLSI Design, Analog Electronics, Circuit I, Embedded Devices, Microcontrollers, Python Programming, Junior Design, Senior Seminar, Engineering MATLAB, Computer Logic Design, and Robotics.
- Delivery of circuit design education to off-campus students/engineers via the Internet.

3. Services:

- FLC Faculty Handbook Committee Chair (2022 – 2024).
- Editorial Board member of the journal of SLAS Technology (2021).
- NSF Bioengineering REU Panel reviewer (2020).
- NSF Future Manufacturing Panel reviewer (2022).
- Coordinator of the ABET Accreditation for the Computer Engineering program at Fort Lewis College (2020 – Present).
- FLC Faculty Handbook Committee (2020 – Present).
- FLC Teaching and Learning Committee (2018 – 2019).
- FLC Electrical Engineering faculty search committee (2019).
- FLC Computer Engineering faculty search committee (2019).
- FLC Computer Engineering faculty search committee (2017-2018).
- FLC Math Department Algebra Prep Course STEM Path interview faculty member (2018).
- NICA State Championship, served at the FLC booth. (10/20/2019).
- 1st FLC Digital Design Contest, Chair, 2018.
- FLC 2017-2018 Teaching Empowerment Project.
- 2020, August, TRIO Talent Search Robotics Workshop for over 30 local middle school students.
- 9/17/2021 – Demonstration to 52 Animas High School students visiting FLC.
- 10/9/2021 – Department faculty representative for the 2021-2022 Admission Event.
- 2018 – Present, on the Advisory Board of Computer Science Education in Durango High School.
- 11/12/2019, Computer Science demonstration to 52 middle school students from St. Columba Middle School.
- 11/5/2019 Invited talk on Computer Engineering / Computer Systems at Durango High School (at Tara Haller's computer science class).
- Summer of 2019, student mentor to 40 high school students in the TRIO Upward Bound Program.
- 3/14/2019 Meeting at Durango High School to 'Help Shape Durango's Future'.
- 1/30/2019 Durango High School Computer Science Career & Technical Education Advisory Council.
- Review Board member for the journal of Micromachines (2019 – present).
- IEEE COMCAS 2019 (6th International IEEE Conference on Microwaves, Communications, Antennas and Electronic Systems, Tel-Aviv, Israel, 4-6 November 2019).
- The 13th IEEE Dallas Circuits and Systems Conference 2018.
- The GRS-AHI'18, Hong Kong, June 2018, Steering Committee.
- IEEE COMCAS 2017 (6th International IEEE Conference on Microwaves, Communications, Antennas and Electronic Systems, Tel-Aviv, Israel, 13-15 November 2017).

- ❖ Texas Symposium on Wireless and Microwave Circuits and Systems, Waco, Texas, 30-31 March 2017.

EDUCATION

- PhD in Electrical Engineering (Major: Microelectronics, Minor: Computer Engineering) from the University of Nevada, Las Vegas (April 2016).
- MS in Biomedical Engineering (Major: Bioelectronics) from Chongqing University, China (January 2012).
- BS in Biomedical Engineering (Major: Bioelectronics) from Henan University of Science and Technology, China (June 2009).

EMPLOYMENT

Associate Professor of Computer Engineering (Full-Time)

Fort Lewis College, Durango, CO | *May 2023 – Present*

PI of NSF STROBE (FLC site), the EDA Quantum Delivered mobile quantum learning lab, the DOT bridge scour monitoring project, and EPA P3. Co-PI of NSF PEAQS. Lead undergraduate research. Computer Engineering ABET coordinator. Teach Embedded Devices, Digital VLSI, Microcontrollers, Robotics, and Senior Seminar projects.

Assistant Professor of Computer Engineering (Full-Time)

Fort Lewis College, Durango, CO | *August 2017 – May 2023*

Lead undergraduate research (PI of an NSF STROBE, PREM, and REU programs and an EPA program), teach Engineering Circuit I, Analog Electronics, Digital Electronics (Digital IC Design), Computer Logic, Python Programming, MATLAB Programming, Robotics, Microcontrollers, Embedded Systems, and Junior/Senior Design.

Postdoc Fellow (Full-Time)

University of California, Irvine, Irvine, CA | *April 2016 – August 2017*

- Project I: The development of a portable and highly sensitive antibiotic resistant bacteria detection system.
- Project II: The development of an ultra-fast droplet sorter for cell isolation.

Teaching/Research Assistant (Part-Time)

University of Nevada, Las Vegas, Las Vegas, NV | *January 2012 – April 2016*

Taught microelectronics, computer engineering fundamentals, signal and systems, communications, and digital integrated circuit design. Mentored student research projects in analog/digital integrated circuit design, computer logic basics, signals and systems, and the corresponding labs with CMOS integrated circuit fabrication, microcontrollers, AD/DA converters, FPGAs, circuit simulations, and system integration on PCBs. Industrial project experiences include interfacing sensors, actuators to the microcontroller and embedded systems. Familiar with I2C, SPI, UART, and USB protocols.

Additional Details on University and Industry Project Experience

Areas of Interest: Integrated circuits and sensors, biomedical equipment, digital electronics, FPGAs, digital microfluidics, biosensors and bioelectronics, electromagnetics computation, neural modulation, semiconductor fabrication, medical instrumentation prototyping, and deep learning.

2024, October – Present, Quantum Delivered: a mobile quantum learning lab (EDA Regional Technology and Innovation Hub Program, $1,250,000)

FLC is collaborating with a quantum tech hub consortium to transform an enclosed trailer into a state-of-the-art mobile learning lab for quantum education and programming. Key enhancements include electrical hardwiring to support advanced equipment and the installation of standing workstations, creating a dynamic, hands-on environment for exploring quantum concepts and applications beyond traditional classroom settings.

2024, April – Present, develop unmanned underwater drones (UUD) for rapid and low-cost bridge scour monitoring (Department of Transportation, $126,591)

Develop a low-cost UUD and sensing system for the rapid assessment of bridge scour, more cost-effective than stationary-mounted sonar systems and more flexible and accurate than current surface vessel systems. Hardware and software are open source and shared on GitHub, with integration into the curriculum on bridge scour monitoring, remote sensing, and data fusion. A novel circular maneuvering controller is being developed and will be published.

2021, November – Present, develop a dual polarity ionizer for motor vehicles, Sony Hayes Inc ($8,000, completed).

Developed the circuitry and printed circuit board for a dual polarity positive/negative ionizer for motor vehicles. The unique dual polarity high voltage ionizer and switch design has been patented. The product was delivered to Sony Hayes Inc in the summer of 2022 for the demonstration to GPS Air Inc.

2021, May – Present, Fort Lewis College and Western Digital Center (in progress)

Developed the design flow of the WDC 6502 microcontroller ASIC using the TSMC 180 nm technology. FLC's role in this project in year 1 is to design a low-power 8-bit SAR ADC using the TSMC 180nm technology in Cadence.

2020, August – November, $20,355, PAATH Equine Technology LLC and Fort Lewis College, Phase I completed

Developed an embedded IMU (Inertial measurement unit) sensors in horseshoes for lameness detection. Two sensor nodes will be developed and installed in the horseshoes to collect the raw data from the IMUs (angular velocity and the acceleration of the hoof). The data will be transmitted to a datacenter that is mounted on the cinch of the horse and stored on an SD card in real-time. The data can be retrieved by the user for post-processing.

2020, January – March, $10,000, Spring Resort and Spa, completed

Temperature Sensing, Displaying, Monitoring, and Analyzing for the Spring Resort and Spa in Pagosa Springs, CO. Project Scope:

- 24 nodes (temperature sensing, displaying, and data logging) for 24 pools.

- The third-party website shows 24 panels with 24 pools' temperature on them in real-time.
- The data analysis script pulls the data from the website and plot the temperature on the local drive (a desktop/laptop Windows computer in their office).

System Specs: Two ATMega 328p chips were used for the system. The Master 328 chip does temperature sensing and communicate with the ESP8266-01 module for sending data to ThingSpeak in real-time. The Slave 328p receives the temperature data from the Master through the embedded I2C protocol and scan four seven segment display units for temperature display. The entire system was sealed by an outdoor waterproof box to keep the vapors/moisture outside of the box to protect the circuits. A PyQt GUI is used for data plotting and downloading at the client end.

2018 – 2021, PI of the NSF REU program at Fort Lewis College ($388,486)

Served 10-15 Native American undergraduates at Fort Lewis College each year for research with their mentors. The research topics are robotics, integrated circuit design, optics, and biomedical engineering.

2019 – Present, serve as PI for the NSF STROBE grant (FLC site, $24M, through 09/2026), Co-PI for the NSF PREM grant ($3.69M, 2019 – 2025), and Co-PI for its successor, NSF PEAQS ($4.2M, 2024 – 2030) at FLC.

Developed a simple 4-layer CNN architecture and use a 30-class bacteria isolate dataset for training and testing. We achieve an identification accuracy of around 86% with identification speeds close to real-time. This optical/biological detection method is promising for applications in the detection of microbes in liquid biopsies and concentrated environmental liquid samples, where fast and accurate detection is crucial. This study uses a recently published dataset of Raman spectra from bacteria samples and an improved CNN model built with TensorFlow. Results show improved identification accuracy and reduced network complexity. The Raman system at CU Boulder (supported by STROBE) is used to collect datasets for the AI models.

2019 – 2022, PI of an EPA P3 grant ($24,864)

Develop a portable and highly sensitive antibiotic resistant bacteria detection. Using a 3D counting technology to pick up single bacteria from a raw blood sample. The system design integrates an electrowetting mixer (wirelessly controlled), a high throughput droplet generator (1000 nozzles on a single chip), and a highly sensitive 3D counting system.

2012 – 2019

- **Design a high throughput digital microfluidic chip.** Including digital microfluidic chip design and fabrication; system design for pico-amps level current sensing; capacitive sensing system and its GUI monitoring system. Wireless controller (WiFi to serial converter) ESP8266 is used for real-time experiment control.
- **Design an ultrafast capacitive to digital converter for droplet sensing in digital microfluidics.** Using GFUS SiGe 8HP (0.13 μm) technology to fabricate an ultrafast capacitive to digital converter for droplet sensing in digital microfluidics.
- **Design a high precision DMF top plate height controller using a PZT actuator.** Including mechatronic design, vibration control, PZT precise positioning, PZT deflection modeling, displacement sensing, 12-bit digital-to-analog converter (DAC) MCP4921, PIC24fJ96 16-bit

MCU, and intelligent DMF control.

- **Develop an on-chip integrated digital color-sensor based droplet PH value measurement system.** Including DMF patterning, TCS34725 RGB sensor, MCU interfaces, PIC24fJ96 16-bit MCU, and serial communications.
- **Investigation of the droplet motion under a beak-like non-parallel DMF device.** Including PZT bimorph actuator positioning, Omron Z4M-W40 laser displacement sensor, amplifier design, feedback control, DAC MCP4921, PIC24fJ96 16-bit MCU, and mechatronics. This work also includes droplet contact angle measurement, c.a. hysteresis evaluation, surface engineering, and dynamic droplet trajectory tracking.
- **Design a capacitance-to-digital sensor-based droplet composition measurement system.** Use a 24-bit capacitive-to-digital converter (CDC) for droplet position monitoring in a DMF system. The system includes AD7745, Altera DE2 FPGA system, PCB design, and real-time monitoring by serial communications.
- **Design an ultra-thin flat lens with metamaterials for wave front shaping.** Electromagnetic numerical computation for a negative index nano-antenna array. The simulation is conducted by moment method, FDTD, and FEM.
- **Investigation on behavioral and pathological effects of transcranial direct current stimulation in a rat model of Alzheimer's disease.** Including design, layout, and fabricate the brain stimulator. Design feedback motor evoked potential monitoring system for the cortex excitability evaluation. Build neural disorder models of Alzheimer's disease. This study includes immunohistochemistry, H&E, silver staining experiments, and tissue engineering-related study.
- **Design an electrowetting DMF chip on a CMOS ASIC chip.** Use high voltage ON's C5 technology, design an electrowetting surface directly on the passivation layer of a CMOS chip. Use the top metal layer as the electrode. Use on-chip decoders to address the electrodes. Use Cadence, ElectricVLSI, LtSpice for circuit design, simulation, and chip layout.
- **Design a continuous time K-Delta-1-Sigma modulator for broadband analog-to-digital conversion.** Design a time-interleaved oversampling delta-sigma modulator with ON's C5 technology. Use Cadence, ElectricVLSI, LtSpice for circuit design, simulation, and chip layout.
- **Design a commercial software for Hunter-Schmidt Meta-Analysis.** This tool is coded with VBA and multimedia Authorware for Meta-Analysis experiments. This work includes algorithm implementation, software development, and on-line promotion.
- **Modeling the long-range ordered, broccoli-like SERS arrays for the detection of endocrine disrupting chemicals.** FDTD modeling for broccoli-like gold particle SERS fields.

2009 – 2012

- **Investigated behavioral and pathological effects of transcranial direct current stimulation in a rat model of Parkinson's disease.** Stimulator circuit design, voltage booster design, skull electrode design, and rat PD model design; rat behavioral experiments and tissue staining.

- **Design an ultra-low power sleep monitoring device.** Use low-power MCU TI MSP430 to monitor and analyze the pulse wave for sleep quality evaluation.
- **Design a portable ECG defibrillation overload recovery testing instrument.** Develop a C8051 controlled, LabView interfaced ECG electrode testing equipment.

2008 – 2009

- **Undergraduate research on a low cost and high resolution intelligent on-line ECG system.** PCB fabrication with in-house drills and copper boards; Circuit design and simulation using Altium PCB designer; ECG monitoring using National Instruments AD converters and LabView based online GUI.

TEACHING EXPERIENCE

Courses Taught at Colorado School of Mines

EENG 281, Introduction to Circuits and Power.
EENG 383, Embedded Systems (PIC18F25k22)
EENG 393, PCB design for Field Experiences.

Courses Taught at Fort Lewis College:

CE 338, Digital VLSI Design
CE 338L, Digital VLSI Design Laboratory
– Highlights: Taught both the Cadence Virtuoso – GDS II flow and the RTL – GDS II flow. Use the TSMC 180nm technology in class.
ENGR 337, Analog Electronics
– Highlights: Allowed students to tape out their op amp design with the GlobalFoundry C5 technology through MOSIS.
ENGR 337L, Analog Electronics Labs
CE 433, Embedded Devices (FPGAs and advanced microcontroller applications)
CE 433, Embedded System Labs
– Highlights: Intense on hands-on projects which helped multiple graduates secured relevant jobs in the summer of 2022.
CE 432, Practical Robot Design and Realtime Systems
– Highlights: Covered hands-on projects including machine learning, wireless robot vehicle, balancing robot car, and a variety of sensors/actuators with microcontrollers.
CE 351, Microcontrollers
– Highlights: Integrated projects from industry contracts to allow students use microcontrollers to solve real-world problems.
CE 315, Computer Engineering Design Practice (Junior Design)
CE 241, Fundamentals of Computer Logic
ENGR 201, Electric Networks I (Circuit I)
ENGR 201L, Electric Networks I Labs
CE 232, Programming with Python
– Highlights: Used Python on embedded devices, like Raspberry PI computers, for system control and data collection.
ENGR 104, Engineering Fundamentals II (data analysis/MATLAB)

CE 496/497, Senior Seminar Projects
– Highlights: will be the 4th institution in the US to allow students tape out TSMC chips in their classroom.

TRIO Program, Computer Programming and Embedded Systems

Courses Taught at University of Nevada, Las Vegas (TA):

EE 221, Circuits II
EE 420L, Engineering Electronics II Lab
EE 421, Digital Integrated Circuit Design
EE 421L, Digital Integrated Circuit Design Laboratory
EE 420, Engineering Electronics II and Analog Integrated Circuit Design
EE 460L, Communications
CPE 200L, Computer Logic Design Lab II
EE 320, Engineering Electronics I
CPE 200L-S2, Computer Logic Design Lab II
CPE 100L-S2, Computer Logic Design Lab
CPE 100-S1, Computer Logic Design
EE 360, Signal and Systems

STUDENT ADVISING

- 2023 – Present, mentored over 30 undergraduate researchers for projects supported by NSF, EPA, DOT, and industry partners.
- 2022 – Present, 16 undergraduates worked in my lab during the summer of 2022 as research assistants. 6 of them are continuing their research in the Fall of 2022. The projects were sponsored by NSF STROBE, NSF PREM, NSF REU, and the FLC Undergraduate Research Fellow Program.
- 2021 – Present, 8 undergraduates funded by NSF REU, EPA, NSF PREM, and NSF STROBE to work on projects focused on integrated circuit design, robotics, and Raman Spectroscopy.
- 2020 – Present, a collaborative project sponsored by PAATH Equine Technology LLC, 1 undergraduate student.
- 2020 Summer Research, 2 Computer Engineering Students and 6 Engineering Students.
- 2020 – Present, NIH MARC, 1 Computer Engineering student.
- 2019 – 2020, EPA P3 (refer to the Research Grant section), 3 Computer Engineering students, and 1 Biology Student.
- 2019 – Present, NSF REU (refer to the Research Grant section), 8 Engineering students and 3 Computer Engineering students.
- 2019 – Present, NSF PREM (refer to the Research Grant section), 7 Engineering students and 1 Computer Engineering Students.
- 2019 – Present, NSF STROBE, 3 Engineering Students and 1 high school student (DHS) who takes 17 concurrent credits at FLC in Fall 2020.
- 2019 – 2020, FLC senior seminar, co-advised 6 Engineering students.
- 2019 Summer, Department of Education, TRIO, 1 computer engineering student.

- 2017 – 2020, NIH MARC, 1 Biochemistry student.
- 2017 – 2018, FLC senior seminar, co-advised 3 Engineering students.
- 2017 – 2019, FLC 1st Digital Design Contest, 1 Engineering student and 1 Computer Engineering student.
- 2015 – 2017, 3 MS students at Chongqing University, 2 Undergraduates at Henan University of Science and Technology, 14 Undergraduates at UC-Irvine, and 2 Undergraduates at UNLV.

GRANTS AND SCHOLARSHIP

Pending:

- 2026 – 2027, Senior/Key Personnel, NSF NNME ($100,000).
  Overall objective: Strengthen the U.S. semiconductor and microelectronics workforce by developing industry-relevant educational modules in semiconductor manufacturing, microelectronics, robotics, and artificial intelligence, and modernizing the curriculum to meet the evolving needs of the semiconductor industry.
- 2025 – 2026, PI, Morris Animal Foundation ($20,000).
  Title: Detecting injuries in the lower legs of horses using IMU sensors implanted in horseshoes and deep learning algorithms

Awarded:

- 2025, November, Faculty Advisor, Senior Capstone Project Team award ($7,000).
  Title: Development of UAV, USV, and UASV systems for bridge safety monitoring.
- 2025 – 2026, PI, USDOT CTIPS Consortium ($51,220).
  Title: Development of UAV, USV, and UASV systems to address challenges in bridge safety monitoring.
- 2025, October, PI, FLC TS/R Grant ($3,000).
  Title: Development of a smart UAV for transportation safety monitoring applications.
- 2025, April, PI, Elevate Quantum Consortium ($411,204).
  Title: Quantum computing and quantum physics education initiatives.
- 2024 – 2030, Co-PI, NSF Partnership for Education and Advancement of Quantum and nano-Sciences (PEAQS) ($4,200,000).
  Title: Partnership for Education and Advancement of Quantum and nano-Sciences (PEAQS), a partnership between Fort Lewis College, Norfolk State University, and the NSF STC IMOD (Integration of Modern Optoelectronic Materials on Demand), continuing and expanding the STROBE education and research partnership.
- 2024 – 2029, PI, EDA FY 2023 Regional Technology and Innovation Hub Program (Elevate Quantum consortium) ($1,250,000).
  Title: Quantum Delivered – a mobile quantum learning lab for workforce development on quantum technologies.
- 2024 – 2026, PI, Department of Transportation (CTIPS Consortium) ($126,591).
  Title: Rapid and Low-Cost Bridge Scour Monitoring Using Unmanned Underwater Drones

(UUD).

- 2024 – 2025, PI, FLC TS/R Grant to Support the DOT Project ($3,000).
- 2024 – 2025, PI, FLC Faculty Development Grant to Support the DOT Project ($3,000).
- 2023 – 2024, Co-PI, Department of Transportation (DOT) ($24,966)
  Title: Enhancing Urban Network Traffic Control through Reinforcement Learning
- 2024 – 2026, PI, EPA P3 ($75,000)
  Title: An Open-Source Droplet Digital PCR (ddPCR) System for the Rapid and Accurate Detection of Bacteria from Environmental Water Samples.
- 2023 – 2024, PI, EPA P3 ($25,000)
  Title: PCR-Free Environmental Waterborne Bacteria Detection Using Raman Spectroscopy and Deep Learning.
- 2022, September, PI, FLC TS/R Faculty Development Funds ($2,000)
  Title: Request for Supplies and Materials for A Pilot Study that Targets the Application for the EPA P3 Grant in December 2022.
- 2021 – 2022, PI, Sony Hayes Inc ($7,000) (the deliverable was patented in October 2022)
  Title: A Switching Polarity, Single-Board Ionizer for Air Cleaning in Motor Vehicles.
- 2019 – 2021, PI, NSF REU (NSF: #1757953, $388,486).
  Title: REU Site: Enriching the Undergraduate Research Experience for Native American Students.
- 2022 – 2026, PI (FLC site), NSF STROBE, renewed Science and Technology Center on Real-Time Functional Imaging, with CU Boulder (NSF: #1548924; $24M for CU Boulder, FLC, UC Berkeley, UC Irvine, and Norfolk State University; center award period 10/2016 – 09/2026).
- 2019 – 2025, Co-PI, NSF PREM for functional nanomaterials (NSF: #1827847, $1,230,000).
  Title: The Partnership in Research and Education for Materials (PREM) project for Functional Nanomaterials
- 2020, Aug – Nov, PI, PAATH Equine Technologies, LLC (PAATH Equine Technology LLC and Fort Lewis College, Phase I) ($20,355).
  Title: Development of A Wearable IMU Network for Wireless Equine Lameness Detection.
- 2019 – 2021, PI, EPA (United States Environmental Protection Agency) P3 (#SU83988001, $24,864).
  Title: A Field-Deployable Droplet Digital PCR System for the Rapid Detection of Waterborne Bacterial Pathogens.
- 2021, February, PI, NIH BLaST equipment grant ($9,344)
  Title: Acquisition of a VWR -80 °C ultra-low temperature freezer for the long-term storage of the bacteria samples.
- 2021, March, PI, FLC Foundation. ($1,997)
  Title: Request for Supplies and Materials for a Pilot Study for an NSF RET Grant.
- 2020, September, PI, FLC TS/R grant. ($1,800)
  Title: A Pilot Study to Provide Preliminary Results for the Biomedical Learning and Student Training (BLaST) Grant Application.

- 2016 – 2021, Senior Personnel, NSF, Science and Technology Center on Real-Time Functional Imaging (STROBE) (NSF: 1548924, $16,386,868)
- 2020, Jan – May, Co-PI, GY6 BLaST Equipment Purchase Proposal ($23,999.5).
  Title: Acquisition of a Raman Spectrometer for Biological Sample Characterization.
- 2020, Aug – Dec, PI, FLC First Year Launch Robotics Design ($1,000).
- 2020 – 2021, PI, Reed Library Open Educational Resources (OER) at FLC ($4,500)
- 2020, Feb – Jun, PI, FLC TS/R (traditional research/scholarship) Foundation (EPA P3 Expo travel fund, $1,640).
- 2019, Dec, PI, FLC Mellon Faculty Development Funds ($1,000).
- 2019 – 2020, PI, FLC TS/R (traditional research/scholarship) Foundation ($2,000).
- 2017 – 2018, PI, FLC Teaching Empowerment Project ($1,500).
  Title: Application-oriented topics in math courses for computer engineering/science students in the early college semesters.
- 2018, Feb – Jun, PI, FLC TS/R (traditional research/scholarship) Foundation ($1,800).
  Title: Mapping the Airborne Radiation Profile of a Large Area Using an Embedded-System-Based Smart Unmanned Aerial Vehicle (UAV).
- 2017 – 2018, Dec – Jun, PI, FLC Foundation ($1,800).
  Title: Fort Lewis College Annual Digital Electronics and Computer Engineering Design Competition.
- 2017 – 2018, PI, Research/development grants from Amberstone Biosciences, LLC ($2,000).
  Title: Development of Optical Detectors for Immune Cell Detecting and Sorting.
- 2016 – 2018, drafted the proposal and awarded, NSF CBET (collaborated with Dr. Susan Daniel at Cornell), an intelligent on-chip electrowetting based microbial fuel cells ($469,988).
  Title: Collaborative Research: Microbial Fuel Cell Optimization through Digital Microfluidic Electrochemistry in Single-Bacterial Drops.
- 2016 – 2017, PI, UNLV FOA research fund ($29,991).
  Title: Microbial Fuel Cell Optimization through Digital Microfluidic Electrochemistry in Single-Bacterium Drops.
- 2016 – 2017, group leader and postdoc fellow, NIH R01, at the Zhao Lab at UC-Irvine ($5,000,000).
- 2016, PI, GPSA Graduate research fund ($1,000).
- 2016, PI, Howard R. Hughes College of Engineering research fund ($990).
- 2015, PI, GPSA Graduate research fund ($1,250).
- 2013, PI, NSF EPSCoR fellowship ($30,000).
- 2011, PI, Chongqing University research fellowship ($5,000).

Submitted and not Awarded:

- 2024 – 2026, PI, Colorado Department of Natural Resources ($99,928)
  Title: Enrich Outdoor Activities for Native American Youth by Hiking and Camping with Science and Technology Hands-On Projects

- 2024 – 2028, Senior Personnel, NSF
  Title: Experiential Learning for Emerging and Novel Technologies (ExLENT)
- 2023 – 2024, Co-PI, DoE ($125,000)
  Title: Innovative, robust optical liquid sodium chemical purity sensor for SFR health monitoring and control.
- 2023 – 2024, PI, Colorado State ($94,110)
  Title: Enrich Outdoor Activities for Native American Youth by Hiking and Camping with Science and Technology Hands-On Projects
- 2021 – 2023, PI, EPA (United States Environmental Protection Agency) P3 ($100,000).
  Phase II: A Field-Deployable Droplet Digital PCR System for the Rapid Detection of Waterborne Bacterial Pathogens.
- 2020, Sep – Dec, NSF MRI ($160,000).
  MRI: Acquisition of a Mask Aligner for the Development of the Next Generation Biological Microelectromechanical Systems and Functional Nanomaterials
- 9/1/2018 – 8/31/2019 (NSF, Requested: $910,981)
  MRI: Acquisition of A Versatile Nano-Fabrication and Characterization Platform for The Development of The Next Generation Microelectromechanical Systems (MEMS).
- 9/2/2019 – 8/31/2020 (NSF, Requested: $453,401)
  MRI: Acquisition of a Thin Film Deposition System and a Mask Aligner for the Development of the Next Generation Biological Microelectromechanical Systems and Functional Nanomaterials.
- 9/1/2016 – 8/31/2019 (Requested: $210,000)
  Cornell Atkinson's Sustainability Postdoc Fellowship: Microbial Fuel Cell Optimization through Digital Microfluidic Electrochemistry in Single-Bacterial Drops.

AWARDS

March 2021, Hutchins Teaching Award Nomination.
January 2023, Fli-Hi award at FLC.
March 2023, SWE award from the P&E department at FLC.

REVIEW ACTIVITIES

- Water Research (2020)
- IEEE Transactions on Circuits and Systems II (2016)
- Sensors and Actuators A: Physical (2016)
- IEEE Solid-State Circuits Magazine (2015)
- Biosensors (3 times)
- Micromachines (Serving on the Review Board and reviewed 8 articles in the past 4 years)
- Sensors (3 times)
- Materials (twice)
- Applied Science (twice)

- Analyst
- Energies (twice)
- Batteries
- Brain, Behavior, and Immunity
- IEEE COMCAS 2017
- IEEE Texas Symposium on Wireless and Microwave Circuits and Systems
- IEEE DCAS 2016
- IEEE EMBC 2011
- IEEE MWSCAS 2014

PROFESSIONAL SERVICES

❖ Service to the college and the department:

- FLC Faculty Handbook Committee (2020 – Present).
- Coordinator of the ABET Accreditation for the Computer Engineering program at Fort Lewis College (2020 – Present).
- NICA State Championship, served at the FLC booth. (10/20/2019).
- FLC Electrical Engineering faculty search committee (2019).
- FLC Computer Engineering faculty search committee (2019).
- FLC Teaching and Learning Committee (2018 – 2019).
- FLC Math Department Algebra Prep Course STEM Path interview faculty member (2018).
- FLC Computer Engineering faculty search committee (2017-2018).
- 1st FLC Digital Design Contest, Chair, 2018.
- FLC 2017-2018 Teaching Empowerment Project.
- 9/17/2021 – Demonstration to 52 Animas High School students visiting FLC.
- 10/9/2021 – Department faculty representative for the 2021-2022 Admission Event.

❖ Service to the community:

- 2020, August, TRIO Talent Search Robotics Workshop for over 30 local middle school students.
- 2018 – Present, on the Advisory Board of Computer Science Education in Durango.
- 11/12/2019, Computer Science demonstration to 52 middle school students from St. Columba Middle School.
- 11/5/2019 Invited talk on Computer Engineering / Computer Systems at Durango High School (at Tara Haller's computer science class).
- Summer of 2019, student mentor to 40 high school students in the TRIO Upward Bound Program.
- 3/14/2019 Meeting at Durango High School to 'Help Shape Durango's Future'.
- 1/30/2019 Durango High School Computer Science Career & Technical Education Advisory Council.

❖ Service to the professional society:

- Editorial Board member of the journal of SLAS Technology (2021).
- NSF Bioengineering REU Site Panel (2020).
- Review Board member for the journal of Micromachines (2019 – present).
- IEEE COMCAS 2019 (6th International IEEE Conference on Microwaves, Communications, Antennas and Electronic Systems, Tel-Aviv, Israel, 4-6 November 2019).
- The 13th IEEE Dallas Circuits and Systems Conference 2018.
- The GRS-AHI'18, Hong Kong, June 2018, Steering Committee.
- IEEE COMCAS 2017 (6th International IEEE Conference on Microwaves, Communications, Antennas and Electronic Systems, Tel-Aviv, Israel, 13-15 November 2017).
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PATENTS

Leo C Hayes and Yiyan Li, Ionizing Air Purification, US Patent filed on September 14, 2022.

PRESENTATIONS

(Only recent ones are listed)

P. Carper, D. Yazzie, S. Eaton, Y. Li. A Smart Maze Solver. FLC P&E 2022 Fall Welcome Poster Symposium.

C. Tucson, Y. Li. Characterization of a Successive-Approximation Analog-to-Digital Converter (SAR ADC). FLC P&E 2022 Fall Welcome Poster Symposium.

C. O'Keefe, Y. Li. Bootloader Circuit Design for Rapid Programming of Microcontrollers. FLC P&E 2022 Fall Welcome Poster Symposium.

I. Van Horn, M. Brady, Y. Li. An Optical/Electrical System for Micro Droplet Screening. FLC P&E 2022 Fall Welcome Poster Symposium.

K. Kukula, D. Ledvina, C. Chatterley, Y. Li. Expansion of Biological Assays for use in Environmental Droplet Digital PCR (ddPCR). FLC P&E 2022 Fall Welcome Poster Symposium.

M. Krauss, D. Lee, Y. Li. Basys3 FPGA Game with Joystick Controls. FLC P&E 2022 Fall Welcome Poster Symposium.

P. Pena, S. Gee, H. Perez, L. Curmano, K. Kukula, Y. Li, C. Chatterley. Who Pooped in the Weminuche?. FLC P&E 2022 Fall Welcome Poster Symposium.

C. Reese, Y. Li. Wireless Temperature Monitoring System for Pagosa Hot Springs. FLC P&E 2022 Fall Welcome Poster Symposium.

A. Benally, T. Bracker. An 8-Bit Successive-Approximation-Register Analog-to-Digital Converter. FLC P&E 2021 Fall Welcome Poster Symposium.

J. Duran, S. Huang, Y. Li. Frequency Resolved Optical Gating (FROG). FLC P&E 2021 Fall Welcome Poster Symposium.

K. Kukula, E. Stevens, C. Chatterley, Y. Li. Waterborne Bacteria Harvesting and Identification using Polymerase Chain Reactions. FLC P&E 2021 Fall Welcome Poster Symposium.

N. Theobald, D. Ledvina, K. Kukula, E. Stevens, J. Crawford, J. Jessing, Y. Li. Raman Spectroscopy for Material Studies. FLC P&E 2021 Fall Welcome Poster Symposium.

K. Kukula, J. Lee, J. Duran, D. Farmer, N. Theobald, K. Harvey, T. Swimmer, R. Redd, D. Ross, J. Jessing, C. Kulesza, C. Chatterley, and Y. Li. Bacteria Identification – Aquatic Bacteria Isolation. FLC P&E 2020 Fall Welcome Poster Symposium.

K. Kukula, D. Farmer, J. Duran, N. Majid, C. Chatterley, J. Jessing, and Y. Li, Rapid Detection of Bacteria Using Raman Spectroscopy and Deep Learning, IEEE CCWC 2021 (Oral presentation).

J. Ferguson, J. Duran, C. Chatterley, and Y. Li. GUI and Calibration of the FLC-PCR. FLC P&E 2020 Fall Welcome Poster Symposium.

J. Duran, T. Swimmer, K. Harvey, P. Owens, A. Sullivan, J. Crawford, J. Jessing, and Y. Li. An Ultra-Low-Power LoRa Mesh Network and A Bare Bone Fluorescent Microscope. FLC P&E 2020 Fall Welcome Poster Symposium.

D. Farmer, K. Kukula, T. Swimmer, J. Jessing, and Y. Li. Bacteria Identification – Neural Network Development. FLC P&E 2020 Fall Welcome Poster Symposium.

N. Theobald, J. Duran, K. Kukula, K. Harvey, T. Swimmer, D. Farmer, D. Ross, J. Jessing, C. Chatterley, and Y. Li. SU-8 Photolithography and PDMS Microfluidics. FLC P&E 2020 Fall Welcome Poster Symposium.

J. Harrison and Y. Li, Rapid Single Bacterium Detection Using a High-Speed Video Processing Algorithm. FLC MARC Scholar Poster Symposium.

Y. Li, H. Cherukury, J. Zimak, J. Harrison, E. Peterson, and W. Zhao. Enumeration of Ampicillin-Resistant E. coli in Blood Using Droplet Microfluidics and High-Speed Image Processing. IEEE ISBI 2020 International Symposium on Biomedical Imaging.