Joseph Young

Assistant Teaching Professor
Director, Professional Master's Program

Electrical & Computer Engineering
Rice University

Research Interests

Digital health, computer vision, RISC-V.

Education

2018-2020 **Ph.D.**, *Rice University*, Houston, TX
Electrical & Computer Engineering (ECE)
GPA: 3.8/4.0
Thesis Title: *Addressing Indirect Functional Connectivity in Neuroscience via Graphical Information Theory: Causality and Coherence*

2015-2018 **M.S.**, *Rice University*, Houston, TX
Electrical & Computer Engineering (ECE)
Thesis Title: *Information Theoretic Analysis of the Neurophysiology Associated with Visual Task Learning*
GPA: 3.74/4.0

2011-2015 **B.S.**, *North Carolina State University*, Raleigh, NC
Electrical Engineering
GPA: 4.0/4.0 – *summa cum laude*

Publications & Posters

2022 **The RISC-V at Rice (RVR) lab: Revamping computer engineering curriculum with RISC-V** (link)
Ray Simar & Joseph Young
RISC-V Summit 2022 (Poster)

2021 **Addressing indirect frequency coupling via partial generalized coherence** (link)
Joseph Young, Ryota Homma, & Behnaam Aazhang
Scientific Reports

2021 **Inferring functional connectivity through graphical directed information** (link)
Joseph Young, Curtis L Neveu, John H Byrne, & Behnaam Aazhang
Journal of Neural Engineering

2020 **Precise measurement of correlations between frequency coupling & visual task performance** (link)
Joseph Young, Valentin Dragoi, & Behnaam Aazhang
Scientific Reports

2019 **Multi-Sensory Stimuli Improve Distinguishability of Cutaneous Haptic Cues** (link)
Jennifer Sullivan, Nathan Dunkelberger, Joshua Bradley, Joseph Young, Ali Israr, Frances Lau, Keith Klumb, Freddy Abnousi, & Marcia O'Malley
IEEE Transactions on Haptics

2017 **Understanding and Controlling Chromaticity Shift in LED Devices** (link)
J. Lynn Davis, Karmann Mills, Michael Lamvik, Curtis Perkins, Georgiy Bobashev, Joseph Young, Robert Yaga, & Cortina Johnson
RTI International
IEEE EuroSimE 2017 Conference in Dresden, Germany

2016 **CALiPER Report 20.5: Chromaticity Shift Modes of LED PAR38 Lamps Operated in Steady-State Conditions** (link)

J. Lynn Davis, Joseph Young, & Michael Royer
RTI International/U.S. Department of Energy/PNNL PNNL-25201

Positions

2021-Pres **Assistant Teaching Professor**
Director, Professional Master's Program
Department of Electrical & Computer Engineering, Rice University

- Perform innovation in the curricular, professional, and social aspects of the master's in electrical and computer engineering (MECE) program.
- Oversee wireless communications & computer engineering capstone projects in the MECE program.
- Provide general advising to MECE students.
- Teach both at the undergraduate & graduate levels.
- Host workshops on Arduinos & printed circuit board design.

Jan-May 2020 **Teaching Assistant (ELEC 220)**, *Rice University*
Supervisor: Ray Simar

- Helped manage ELEC 220, an introductory computer engineering course.
- Led undergraduate TAs during all lab sections, which included interacting with individual students to help them learn computer engineering concepts and debug hardware and software issues.
- Coached students in the development of final projects involving the use of microcontrollers.
- Designed future course content to allow for broader course appeal and accessibility.

May-Aug 2017 **Electrical Engineering Intern**, *Sandia National Laboratories*, Albuquerque, NM

- Designed high performance server architecture, which included selecting processors, motherboards, racks, and networking equipment, as well as determining the layout of the server room to allow for proper equipment ventilation.
- Performed SolidWorks modeling of various prototypes, which included background research on equipment specifications and the design of prototypes that would be compatible with such equipment.
- Researched materials suited for space applications, which included intensive study of a number of NASA research documents and culminated in the writing of a document summarizing my findings and recommendations.

May-Jul 2015 **Electrical Engineering Intern**, *RTI International*, Research Triangle Park, NC

- Conducted tear-down analysis of LED lamps from elevated temperature testing. Efforts included identification of key components & determination of major electrical parameters such as board temperature, power consumption, & power factor at the end of tests. Used problem solving & electrical engineering skills to identify failures & determine root cause.
- Developed summary presentation of findings & participated in presentation of findings to Pacific Northwest National Labs (PNNL) & an industry group.
- The work was later assembled into a joint RTI-PNNL publication as part of DOE's Commercially Available LED Product Evaluation and Reporting (CALiPER) series.

Teaching

Spring 2023 **ELEC 244: Analog circuits laboratory**

- Advanced hands-on circuits class covering diodes, operational amplifiers, and transistors.

ELEC 594: MECE capstone project

- Capstone projects for students in the professional master's in electrical and computer engineering (MECE) program. Projects:
    - Camera-based autonomous drones
    - RISC-V microcontroller printed circuit board (PCB) design
    - Multiple-track phonocardiography (PCG) and artificial intelligence (AI) to detect heart anomalies (project sponsor: HealthSeers)

ELEC 490: Undergraduate electrical & computer engineering research projects

- Research project on functional connectivity within rodent olfactory bulb using calcium recordings.

ELEC 491: Autonomous drones

- Research project on advancing the state of the art in the person re-identification (re-ID) problem within the mobile robotics context.

ELEC 491: RISC-V at Rice (RVR) lab
- Development of a RISC-V microcontroller board and instruction on building a RISC-V microprocessor that can be implemented in an FPGA.

ELEC 698: ECE professional masters seminar series
- Seminars from external speakers on technical topics.

Fall 2022 **ELEC 424/553 / COMP 424: Mobile & embedded system**
- Advanced hands-on software & hardware course focused on mobile & embedded system applications in the space of autonomous systems.

ELEC 594: MECE capstone project
- Capstone projects for students in the professional master's in electrical and computer engineering (MECE) program. Projects:
    - Camera-based autonomous drones
    - Building 4G/LTE mobile networks on software radio systems

ELEC 490: Undergraduate electrical & computer engineering research projects
- Research project on functional connectivity within rodent olfactory bulb using calcium recordings.

ELEC 491: RISC-V at Rice (RVR) lab
- Development of a RISC-V microcontroller board and a RISC-V Linux-capable single-board computer.

ELEC 491: Autonomous drones
- Research project on advancing the state of the art in the person re-identification (re-ID) problem within the mobile robotics context.

ELEC 698: ECE professional masters seminar series
- Seminars from external speakers on technical topics and professional development activities.

Summer 2022 **ELEC 590: Graduate non-thesis research projects**
- Continuation of autonomous drones MECE capstone project specifically focused on drone hardware.

Spring 2022 **ELEC 244: Analog circuits laboratory**
- Advanced hands-on circuits class covering diodes, operational amplifiers, and transistors.

ELEC 594: MECE capstone project
- Capstone projects for students in the professional master's in electrical and computer engineering (MECE) program. Projects:
    - Camera-based autonomous drones
    - RISC-V integrated circuit design
    - Efficient hardware implementation of machine learning
    - Human-assisted robotic system

ELEC 491: Rice electric vehicle
- Vertically Integrated Project (VIP) subteam focused on the development of an autonomous system for an electric vehicle in collaboration with the Rice Electric Vehicle (REV) club.

Summer 2021 **Maker 101 ECE online summer workshop** (link)
- Hosted day-long workshops covering the basics of C, Arduino, breadboards, and printed circuit board (PCB) design targeted to undergraduates of universities around the country.

Fall 2021 **ELEC 424/553 / COMP 424: Mobile & embedded system**
- Advanced hands-on software & hardware course focused on mobile & embedded system applications in the space of autonomous systems.

ELEC 594: MECE capstone project

- Capstone projects for students in the professional master's in electrical and computer engineering (MECE) program. Projects:
    - Printed circuit board design of class D audio amplifier with feedback
    - Human-assisted robotic system

ELEC 491: Rice electric vehicle

- Vertically Integrated Project (VIP) subteam focused on the development of an autonomous system for an electric vehicle in collaboration with the Rice Electric Vehicle (REV) club.

Spring 2021 **ELEC 243: Electronic measurement systems** (co-taught with Dr. Chong Xie)

- Introduction to circuits, signals, systems, and digital signal processing.

ELEC 244: Analog circuits laboratory

- Advanced hands-on circuits class covering diodes, operational amplifiers, and transistors.

ELEC 590: MECE capstone projects

- Capstone projects for students in the professional master's in electrical and computer engineering (MECE) program. Projects:
    - Printed circuit board design of class D audio amplifier with feedback
    - Hardware Accelerator for SHA-3 Cryptography

Skills & Background

Technical Linux kernel including driver development, shell commands and scripting, Python, MATLAB, C, Rust, printed circuit board (PCB) design, LaTeX, VLSI (Xilinx System Generator & Vivado HLS), Verilog, assembly language, R

Cultural Lived in Italy, Puerto Rico, and Ireland

Honors & Activities

2022	Invited to and attended Will Rice College's Favorite Professor Dinner
2022-Pres	Divisional advisor (DA) for Will Rice College (engineering division)
2022-Pres	Faculty mentor for Rice ELEC 494 senior design team AUTOPARK: Autonomous parking golf cart
2022	Faculty mentor for ENGI 120/FWIS 188 project PCB Stencil Jig
2022	Oversaw four summer REU (research experiences for undergraduates) students working on the person re-identification (re-ID) problem in computer vision
2022	Member of panel on robotics, autonomy, and intelligent systems curriculum at Electrical and Computer Engineering Department Head Association (ECEDHA) Annual Conference
2021-Pres	Member of ECE's diversity, equity, & inclusion committee
2021-Pres	Faculty mentor for autonomous team of Rice Electric Vehicle (REV) club
2021-2022	Member of ECEDHA Lab Pros
2021-2022	Faculty mentor for Rice ELEC 494 senior design team AUTOV: Development of a small-scale low-cost autonomous ground vehicle using cameras and low-power computing
2021	Invited to and attended Will Rice College's Favorite Professor Dinner
2021	Member of Innovation in Online Collaboration panel at ECE Lab Pros & ECE Makers Summit (link)
2021	Faculty mentor for ENGI 120/FWIS 188 project Dismount Alert Device
2020-2021	Member of Rice University Committee on Teaching
2018-2020	Graduate Student Liaison for ECE on Center for Teaching Excellence's (CTE) Graduate Advisory Board
2019-2020	VP of Administration for Rice Graduate Student Association
2017-2019	NSF Integrative Graduate Education and Research Traineeship (IGERT) awardee
2017	Rice ECE Distinguished Student Service Award
2009	Eagle Scout Award