

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 Abnoui, & 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](#))

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

PATHS-UP Young scholars 2022 program

- Developed & co-instructed a 6-week program focused on empowering underrepresented minorities in the area of digital health.
- Students built a DIY smart watch involving a pulse oximeter, pedometer, GPS, and machine learning.
- Students were also taught about printed circuit board (PCB) design, basic programming, and Arduinos.

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