

# Joey Squillaci

## University of Illinois Chicago — Bachelor's of Science in Computer Engineering

### UNDERGRADUATE RELEVANT STUDIES

#### Robotics & Algorithm Control

##### ECE 452

- Heavy knowledge required in linear algebra to create and manipulate matrices
- Computation of translation, rotational, and exponential of matrices to affect robotic movement
- Final project coding controlling robotic movement using Raspberry Pi

#### Embedded Systems; Computer Architecture

##### ECE 266/366/466

- Knowledge and implementation of ARM/MIPS ISA
- Balanced usage of MIPS and Python to create compilers
- Heavy focus of MIPS assembly to complete low level projects
- Created custom ISA using computer architecture including register files, memory, logic design, input/output management

#### Electronics

##### ECE 340

- Inverters, amplifiers, BJT and CMOS transistors
- Introduction & implementation to digital logic circuits using CMOS transistors
- Lab work focused on creating circuits with amplifiers as well as transistors to analyze and gather desired outputs

#### Discrete & Continuous Signals and Systems Analysis

##### ECE 310

- Analysis of signals, systems, convolution, Fourier series and transforms
- Heavy focus on discrete signals & systems in electrical applications
- Light use of LaPlace transforms; use of time & frequency domains in practice and labs

#### Circuit Analysis

##### ECE 225

- Construction of circuits in series, parallel, and combinations of both to achieve desired outputs
- Analyzed and deconstructed given circuits to gather inputs and outputs
- Use of Ohm's Law, Kirchhoff's laws, Thevenin voltages, equivalent circuits, AC and DC applications

#### Senior Design

##### ECE 396 & 397

- Worked with a team over a period of two semesters to innovate and create a project revolved around restroom management at UIC
- Weekly documentation and close following to IEEE standards in bi-weekly project reports
- Implementation of Raspberry Pi Pico W and 3D design to construct our innovation

#### Calculus I-III, Differential Equations, Applied Linear Algebra MTH 180/181/210/220/310

- Derivation and integration up to three dimensions, computation and analysis of series/convergence, gradients, line integration, (Calculus-Differential Equations)
- Manipulation and calculations involving matrices, systems of equations, eigenvalues/eigenvectors (Applied Linear Algebra)

#### General Physics I, II, & Thermal Physics

##### PHYS 141, 142, 260

- Kinematics, vectors, laws of motion, conservation of energy, linear & rotational motion (Physics I)
- Electrostatics, magnetic fields, induction, construction of circuits with inductors & capacitors, AC/DC circuits (Physics II)
- Introduction to Thermal Physics using calculus, laws of thermodynamics, entropy, thermal applications

#### Computer Programming

##### CS 107

- Access and use of computing resources
- Programming in C and focus in program design; data types; control structures
- Weekly labs & projects allowed for adequate application of programming in C
- Access & efficiency improvements of memory in program design

#### Logic & Digital Systems Design

##### ECE 265 & 465

- Design/usage and analysis of data structures.
- Implementation of logic designs to create circuits; including but not limited to logic gates, flip flops, adders, subtractors, latches

### ADDITIONAL PROJECTS

#### Computer Architecture - Custom ISA

##### ECE 366

- Created custom 8-bit ISA using CircuitVerse.org, with 16-bit sign extension
- Used logic gates and sub-circuits to construct registers, register file, adder, subtractor, ALU, and PC logic
- Implements these sub-circuits in a "main" circuit along with multiplexors and ROM (read only memory) to allow functionality
- Custom ISA with 2-bit ALU functions, 2-bit registers, and 4-bit arguments for immutable/address values

#### Senior Design Project

##### ECE 396 & 397

- Bi-weekly documentation of project, adhering to IEEE standards
- Project: Create a feedback system present in restrooms that allow students to provide feedback about specific restrooms that may need attention to toiletries or other issues; direct notification system from students to UIC restroom faculty.
- Wi-Fi accessible Raspberry Pi Pico W encased in a laser cut enclosure, coded in Python.
- End-of-project expo where we present project and abstract to a panel of judges in the College of Engineering and related fields

# **Purdue University – Master’s of Science in Electrical & Computer Engineering**

## **GRADUATE RELEVANT STUDIES**

### **IP Generation & Management**

#### **ECE 59500**

- Focuses on how reusable hardware IP blocks are created, packaged, and integrated into larger chip designs.
- Covers the lifecycle of IP including documentation, version control, licensing, and system integration.

### **Intro To Compilers: Compilers Basics**

#### **ECE 59500**

- Explores how programming languages are translated into machine code.
- Covers the main stages of a compiler like tokenizing code, parsing syntax, and generating optimized instructions.

### **Hybrid Electric Vehicles**

#### **ECE 51018**

- Looks at how hybrid and electric vehicle powertrains are designed and controlled.
- Understand use of electric motors, batteries, power electronics, and energy management strategies.

### **Lumped System Theory**

#### **ECE 60200**

- Modeling dynamic systems using differential equations.
- Observing system behavior, stability, and response for electrical and mechanical systems.

### **Communication for Engineering Leaders**

#### **ECE 60004**

- Communicating technical ideas clearly in presentations, reports, and meetings.
- Importance of leadership communication, collaboration, and explaining complex ideas to different audiences.

### **Program Management**

#### **GRAD 59000**

- Fundamentals of managing large engineering projects and programs.
- Planning, scheduling, budgeting, and coordinating teams.

### **Statistical Inference**

#### **STAT 51700**

- Apply ability to use graduate-level probability and statistics strategies to draw conclusions from data.
- Focuses on hypothesis testing, estimation, and analyzing uncertainty.

## **MOS VLSI Design**

### **ECE 55900**

- Emphasis of understanding how CMOS transistors are used to build digital integrated circuits.
- Thorough chip-level design considerations like timing, power, and layout.

## **Advanced Applied Math For Engineers I**

### **MA 52700**

- Applies advanced math tools to solve engineering problems.
- Covers topics like differential equations, linear algebra, and mathematical modeling.

## **Computer Network Systems**

### **ECE 50863**

- Analyze how modern computer networks operate and communicate.
- Deep understanding of network protocols, routing, congestion control, and system performance.

## **Artificial Intelligence**

### **ECE 57000**

- Introduces core ideas behind AI and intelligent systems.
- Exposed to different types of search algorithms, reasoning, machine learning, and decision-making models.