

Christopher Kniss

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EDUCATION

Ph.D. in Electrical Engineering (Direct Ph.D. Program) **Fall 2025 – Present**

University of Massachusetts Amherst

Advisor: Dr. Rod Kim | Research Assistantship

B.E. in Computer Engineering (with Highest Honors) **May 2025**

Stevens Institute of Technology, Hoboken, NJ

Concentration: Electronics & Embedded Systems | Minor: Physics

Cumulative GPA: 3.959

AWARDS & HONORS

- Dean's List – Stevens Institute of Technology
- Edwin A. Stevens Scholarship – Stevens Institute of Technology
- Provost's Office Undergraduate Research Fund – Stevens Institute of Technology

PROFESSIONAL MEMBERSHIPS

- Tau Beta Pi – Alpha Chapter
- IEEE Eta Kappa Nu (HKN)

WORK EXPERIENCE

NIST SURF Program Intern **May 2025 – August 2025**

Gaithersburg Campus, Maryland

- Developed PCBs in Altium Designer to be mounted in cryogenic chambers
- Gained experience with probing stations, VNAs, oscilloscopes, and signal generators
- Enhanced lab skills for use in cryogenic and non-cryogenic environments
- Presented research at NIST SURF Colloquium (July 2025)

Undergraduate Research Assistant, SINE Lab **Jan 2024 – May 2025**

Stevens Institute of Technology (Provost's Office of Undergraduate Research)

- Contributed approximately 15 hours/week in-person lab work and weekly meetings
- Studied economic implications in RFIC design, fabrication, and implementation

Teaching Assistant, Electronic Circuits Course **Sep 2023 – Dec 2023**

Stevens Institute of Technology

- Hosted optional recitations, graded, and proctored exams for a class of 44 students
- Crafted practice problems and planned recitations that reviewed important course content
- Achieved consistent attendance of 20–30 students at optional sessions

RESEARCH ACTIVITY

Analog Folding Amplifier Operational up to 100 MHz

May 2024 – Present

Stevens Institute of Technology & University of Massachusetts Amherst

- Designed amplifier prototype and simulated in Cadence
- Applied device physics to debugging and transistor sizing
- Improved independent study, circuit design, and project management skills
- Frequent meetings with Dr. Rod Kim; delegated tasks to peers for progress acceleration
- Presented poster at Spring 2025 event, Stevens Institute of Technology

High-Temperature Alumina Fiber Waveguide

Sep 2023 – Dec 2023

Stevens Institute of Technology

- Conducted extreme temperature experiments up to 1100°C
- Characterized S-parameters using a vector network analyzer
- Performed lab demos and presentations at iCNS Launch Event (Fall 2023)

TECHNICAL PROJECTS

High-Performance Computing Server Design

September 2025

- Designed and optimized component selection for a \$42K lab server
- Configured to support 3 concurrent users running HFSS and Cadence workflows
- Increased lab productivity and enabled large-scale simulations

PUBLICATIONS

Temperature-Compensated Multi-Level CMOS Modulators Operating from 10 K to 300 K for Cryogenic Interconnects

Christopher Kniss, Abhishek Sharma, Ratanak Phon, Gregory Shimonov, Eran Socher, Pragya R. Shrestha, Karthick Ramu, Jason P. Campbell, Amin Pourvali Kakhki, Richard Al Hadi, Rod Kim
IEEE Journal of Microwaves (JMW), October 2025

- Presented temperature-compensated cryogenic CMOS modulators operating from 10 K to 300 K
- Implemented current-steering 2-bit modulator in 65 nm bulk CMOS achieving 13 Gb/s at 10 K with 15.4 mW power and 1.18 pJ/b energy efficiency
- Demonstrated 150 GHz transmitter in 28 nm CMOS and established contactless connections between 10 K and 300 K systems, achieving 8 Gb/s
- Addressed scalability challenges for cryogenic interconnects in high-performance and quantum computing

Ceramic Fiber Interconnects Beyond 1000° C Enabled by Automatic Gain Compensated Millimeter-Wave CMOS Transceivers

Abhishek Sharma, Christopher Kniss, Ratanak Phon, Rod Kim

2025 IEEE International Symposium on Circuits and Systems (ISCAS), pp. 1–5, May 2025

- Investigated hollow-core ceramic (alumina) fiber for millimeter-wave communications at temperatures up to 1100 °C

- Measured EM wave propagation through alumina fiber across 50–75 GHz range at high temperatures
- Paired fiber with 57 GHz CMOS transceiver implementing automatic gain control
- Achieved data rate of 5 Gb/s at extreme operating conditions for aerospace and geothermal applications

CONFERENCES & PRESENTATIONS

Inaugural Riccio College of Engineering Innovation Day **November 2025**
University of Massachusetts Amherst – Poster Presentation

- Presented recent research paper during student poster and networking session

NIST SURF Colloquium Presentation **July 2025**
Gaithersburg, MD – Oral Presentation

- Presented research on cryogenic PCB design and lab instrumentation
- Practiced technical communication with a broad scientific audience

Poster Presentation – Folding Amplifier Project **Spring 2025**
Stevens Institute of Technology, Hoboken, NJ – Poster Presentation

- Presented design and development of analog folding amplifier operational up to 100 MHz

iCNS Launch Event Demo – High-Temperature Alumina Fiber Waveguide **Fall 2023**
Stevens Institute of Technology, Hoboken, NJ – Demonstration / Poster Presentation

- Performed lab demonstration of alumina waveguide experiments at extreme temperatures

COURSEWORK

Graduate Core (UMass Amherst):

- E&C-ENG 606 Electromagnetic Field Theory: Electromagnetic fields in dielectric and lossy media, transmission lines, antennas and resonators, boundary and initial value problems

Undergraduate Core (Stevens):

- **Senior Design Project:** Speaker Spine, a brand-agnostic smart home audio system (team of 6)
- **Electronics Design:** Intro. VLSI Design, Electronic Circuits, Design of Dynamical Systems, Digital System Design
- **Device Physics:** Electromagnetism, Gen. Chem. II, Thermodynamics, Design with Materials, Quantum Mechanics w.E.A.
- **Embedded Systems:** Digital & Comp. Sys. Architecture, Real-Time & Embedded Sys., Microprocessor Systems, Computational Data Structures and Algorithms, Information Sys. Engineering I

SKILLS

Software: Cadence, Git, Altium Designer, Renesas E2 Studio, MATLAB, Vivado, Arduino, SolidWorks, MS Office

Programming: C and C++ (Experienced), Linux CLI, VHDL, x86 and ARMv8 Assembly, Java (Proficient)