

Christopher Kniss

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EDUCATION

Ph.D. in Electrical Engineering (Direct Ph.D. Program)

Fall 2025

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 | 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)

PUBLICATIONS

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

October 2025

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), IEEE

- Presents temperature-compensated cryogenic CMOS modulators operating from 10 K to 300 K for cryogenic communications
- Addresses limitations of conventional metal-based coax cables and thermal load vs. frequency-dependent attenuation trade-off
- 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
- Supported by Defense Advanced Research Projects Agency (DARPA) Grant D22AP00139

Ceramic Fiber Interconnects Beyond 1000° C Enabled by Automatic Gain

May 2025

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, IEEE

- 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 with automatic gain control to compensate for temperature-related variations
- Achieved data rate of 5 Gb/s at extreme operating conditions for aerospace, avionics, and geothermal applications

RESEARCH EXPERIENCE

Undergraduate Research Assistant, SINE Lab January 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

NIST SURF Program Intern May 2025–August 2025
National Institute of Standards and Technology, Gaithersburg, MD

- 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 in July 2025

Analog Folding Amplifier Operational up to 100 MHz May 2024–Present
Stevens Institute of Technology | Independent Research

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

High-Temperature Alumina Fiber Waveguide September–December 2023
Stevens Institute of Technology

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

TEACHING EXPERIENCE

Teaching Assistant, Electronic Circuits Course September–December 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
- Maintained optional attendance of 20–30 students consistently

TECHNICAL PROJECTS

High-Performance Computing Server Design September 2025
University of Massachusetts Amherst

- 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

Speaker Spine — Smart Home Audio System 2024–2025
Stevens Institute of Technology | Senior Design Project

- Developed brand-agnostic smart home audio system as part of team of 6 students

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

National Institute of Standards and Technology, Gaithersburg, MD | Oral Presentation

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

Folding Amplifier Project Poster Presentation

Spring 2025

Stevens Institute of Technology, Hoboken, NJ | Poster Presentation

- Presented design and development of analog folding amplifier operational up to 100 MHz
- Shared project outcomes with peers and faculty

iCNS Launch Event Demo

Fall 2023

Stevens Institute of Technology, Hoboken, NJ | Demonstration & Poster

- Performed lab demonstration of alumina waveguide experiments at extreme temperatures (up to 1100°C)
- Presented data collection and VNA characterization results to multidisciplinary audience

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)

SELECTED COURSEWORK

Graduate (UMass Amherst): Electromagnetic Field Theory

Undergraduate (Stevens): VLSI Design, Electronic Circuits, Design of Dynamical Systems, Digital System Design, Electromagnetism, Thermodynamics, Quantum Mechanics, Digital & Computer System Architecture, Real-Time & Embedded Systems, Microprocessor Systems, Computational Data Structures and Algorithms