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) Completed 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 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
- Optional attendance was consistently 20–30 students

RESEARCH ACTIVITY

Analog Folding Amplifier Operational up to 100 MHz May 2024 – Present
Stevens Institute of Technology
- Designed amplifier prototype and simulated in Cadence
- 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 Stevens Institute of Technology event

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 Completed Sept 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

C. Kniss, A. Sharma, R. Phon, G. Shimonov, E. Socher, P. R. Shrestha, K. Ramu, J. P. Campbell, A. P. Kakhki, R. Al Hadi, R. Kim, "Temperature-Compensated Multi-Level CMOS Modulators Operating from 10 K to 300 K for Cryogenic Interconnects," *IEEE Journal of Microwaves (JMW)*, IEEE, October 2025.
- Presents 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
- Demonstrated 150 GHz transmitter in 28 nm CMOS with same modulator scheme
- Established contactless connections between 10 K and 300 K systems, achieving 8 Gb/s
- Supported by Defense Advanced Research Projects Agency (DARPA) Grant D22AP00139

A. Sharma, **C. Kniss**, R. Phon, R. Kim, "Ceramic Fiber Interconnects Beyond 1000° C Enabled by Automatic Gain Compensated Millimeter-Wave CMOS Transceivers," *2025 IEEE International Symposium on Circuits and Systems (ISCAS)*, pp. 1–5, IEEE, May 25, 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 demonstrating high-speed communication link
- Implemented automatic gain control loop to compensate for temperature-related variations
- Achieved data rate of 5 Gb/s at extreme operating conditions

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 broad scientific audience

Poster Presentation — Folding Amplifier Project Spring 2025
Stevens Institute of Technology, Hoboken, NJ
- 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
- Performed lab demonstration of alumina waveguide experiments at extreme temperatures (up to 1100°C)
- Presented data collection and VNA characterization results to multidisciplinary audience

COURSEWORK

Graduate Core (UMass Amherst):
- E&C-ENG 606 Electromagnetic Field Theory

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)