

EDUCATION

Stanford University

PH.D - ELECTRICAL ENGINEERING

GPA: 3.97/4.0

Expected June 2024

University of Illinois at Urbana-Champaign

DUAL B.S. - ELECTRICAL ENGINEERING AND ENGINEERING PHYSICS

GPA: 4.0/4.0

Conferred May 2019 with Highest Honors

RESEARCH EXPERIENCE

Robust Systems Group

Stanford University, May 2019 - Present

- Automated IC power and thermal analysis flow with McPAT, 3D-ICE, COMSOL, Cadence Celsius, Python, and more
- Developed new physical design methods leading to over 50% 3DIC junction temperature reduction
- Performed LabView workbench IC characterization of 1.4Mb phase-change memory arrays to investigate new write strategies

Innovative Compound Semiconductor Lab

University of Illinois, October 2015 - March 2019

- Led lab members to develop new CMOS fabrication processes
- Programmed MATLAB analysis tool with user interface for theoretical stress-induced cracking calculations
- Fabricated and characterized semiconductor devices with e-beam, profilometry, and more in cleanroom environment

Silicon Labs, Inc.

Nashua, NH (Timing Division), May 2017 - August 2017

- Designed new splitting techniques for preserving signal integrity in PCB-based transmission lines
- Analyzed and diagnosed circuitry and layout deficiencies in phase-locked loop designs

Patankar Research Group

Northwestern University, May 2014 - August 2014

- Collected and analyzed molecular data of waterproof system with C++

Mesoscopic Physics Group

Northwestern University, May 2013 - August 2013

- Synthesized and analyzed carbon nanotube MEMS devices with CVD, AFM, and chemical analysis

SKILLS

Software

Python: pandas, seaborn, multi-threading • tcsh • MATLAB • Some Tcl, Perl

Electronic Systems

Celsius • Virtuoso • McPAT • Autodesk Inventor

Electronic Devices

COMSOL Heat Transfer • Lumerical

Laboratory

Fabrication: E-beam, photolithography, masked wet etching, electroplating, mechanical thin-film separation

Characterization: Testbench, AFM, SEM, Profilometry, Raman spectroscopy, Nomarski microscopy

AWARDS AND HONORS

Edward J. McCluskey Graduate Fellowship - Awarded to Ph.D students in computer architectures	2019-2020
Goldwater Scholarship - Nationally competitive award of \$7,500 per year to 240 promising researchers	2017-2019
SPIE BACUS Scholarship - \$5,000 awarded to one promising graduate student in optics and photonics	2019
Bardeen Undergraduate Award - One outstanding senior selected for excellence in semiconductor research	2019
Robert C. MacClinchie Scholarship - \$30,000 awarded to one senior for leadership and academic merit	2018
Campus Honors Program Outstanding Senior - Awarded to 16 members of highest honors program at UIUC	2018
Michael E. Napier Memorial Award - One junior selected annually for excellence while working	2018

PUBLICATIONS AND PRESENTATIONS

Published	<i>Heterogeneous 3D Nano-systems: The N3XT Approach?</i> Dennis Rich et. al. in <i>NANO-CHIPS 2030: On-Chip AI for an Efficient Data-Driven World</i> , B. Murmann, Springer (2020)
	<i>The Thermodynamics of Restoring Underwater Superhydrophobicity</i> Paul Jones, Adrian Kirn, Y. David Ma, Dennis Rich, and Neelesh Patankar. <i>Langmuir</i> (2017) 33 (11)
Expected	<i>Fixing Monolithic 3D's Thermal BEOL Bottleneck with Scaffolding</i> Dennis Rich, Mehdi Ashegi, Subhasish Mitra et al. Expected March 2022.
Presentations	<i>N3XT Heterogeneous Integration: From Lab to Fab</i> Dennis Rich, Robert Radway, Subhasish Mitra et al. <i>SystemX November Conference</i> 2019
	<i>Controlling Phase Change: Drying-Up Under Water or Staying Wet During Boiling</i> Paul Jones, Adrian Kirn, Dennis Rich, Ashley Elliot, Neelesh Patankar. <i>Bull. Am. Phys. Soc.</i> (2014) 59