

SUMMARY

- Currently a Ph.D. student in the third year specializing in millimeter wave circuits and systems, with a focus on electromagnetic design and analysis.
- Multiple design projects in advanced nodes, including two tapeouts in Intel 16 nm process technology.
- Several years of teaching, mentoring, and leading projects. Proficient in time and project management.

EDUCATION

University of California, Berkeley

Ph.D., Electrical Engineering and Computer Science

Minor: Physics

Advisor: Professor Ali Niknejad

Expected May 2027

Berkeley, CA

University of California, Berkeley

Bachelor of Science, Electrical Engineering and Computer Science

High Honors

May 2022

Berkeley, CA

RESEARCH PROJECTS

Higher Efficiency Power Amplifiers at 200 GHz

2022 - present

Graduate Student Researcher

Berkeley Wireless Research Center

- Reported power amplifiers struggle to achieve high linear output power and efficiency above 200 GHz and/or near f_{max} [3].
- This work investigates new low loss power combining topologies and other mixed signal approaches.
- Test cells were taped out in Intel 16 nm technology that include amplifier cores achieving 7 % peak efficiency with 7 dBm peak output power, and passive structures for modelling verification.

Chip-to-Package Transitions for mm-Wave and sub-THz Communication Systems

2022 - 2024

Graduate Student Researcher

Berkeley Wireless Research Center

- Designed a novel chip-to-interposer transition that breaks the requirement for smaller bump pitch as frequency increases, utilizing a 156 μm pitch in low cost 16nm FinFET CMOS & organic substrate interposer technologies [1].
- Transition achieves 0.4 dB of insertion loss and a 3 dB bandwidth from DC to 339 GHz. The return loss is maintained below -10 dB over a 90 GHz bandwidth.

Analysis and Design of Low Power Receivers

2020 - 2022

Undergraduate Student Researcher

Berkeley Wireless Research Center

- Designed a low noise amplifier, passive mixer, and corresponding receiver at 2.4 GHz as part of a BLE & 802.15.4 single-chip micro-mote (SC μ M) [2].
- Analyzed the theoretical optimum performance of receivers with an emphasis on noise measure and noise cancelling.

2D FMCW MIMO-SAR Radar

2020 - 2021

Undergraduate Student Researcher

Berkeley Wireless Research Center

- Analyzed system level 2D FMCW radar and applications of MIMO-SAR.
- Refactored the 2D FMCW radar MIMO-SAR image reconstruction algorithm.

PUBLICATIONS

- [1] N. Baniasadi, **R. Hijab**, and A. Niknejad. *mm-Wave and sub-THz Chip-to-Package Transitions for Communications Systems*. 2024. **(Co-first Author)**.
- [2] D. Lovell, T. Yuan, Y.-C. Lin, M. Bapat, **R. Hijab**, J. Maravilla, N. Ramachandran, E. Krause, N. Patle, S. Chung, Y.-C. Lee, Y. He, A. Khodkumbhe, M. Tran, J. Wang, D. Endraws, Q. Jin, K. Lu, S. Aeron, D. Le, T. Fawal, R. Gonzalez-Serrano, B. Nikolić, A. M. Niknejad, and K. S. Pister. "SC μ M-V23: Towards A Crystal-Free System-On-Chip For IoT In 16nm". In: *2024 IEEE Workshop on Crystal-Free/Less Radio and System-Based Research for IoT (CrystalFreeIoT)*. 2024, pp. 18–23.

- [3] E. Chou, H. Beshary, M. Wei, **R. Hijab**, F. Sheikh, S. Callender, and A. M. Niknejad. “Comparative Performance of 100–200 GHz Wideband Transceivers: CMOS vs Compound Semiconductors”. In: *2023 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)*. 2023, pp. 292–299.

INTERNSHIP EXPERIENCE

Apple Inc. *July 2022 - September 2022*
Intern: RF Cellular Team Cupertino, CA

- Worked on research level designs at mm-Wave frequencies. Details restricted by NDA.
- Created tools and scripts for electromagnetic analysis and simulation. Details restricted by NDA.

Apple Inc. *May 2021 - August 2021*
Intern: Full-Chip Design-Verification Firmware Team Cupertino, CA

- Supported the verification of full-chip power state transitions. Details restricted by NDA.
- Established new systems, methodologies, and tests for the verification environment. Details restricted by NDA.

Bleximo Corp. *May 2019 - August 2020*
Intern Berkeley, CA

- Automated geometry construction and simulation of devices in HFSS for quantum processors.
- Designed RF structures (e.g. through-silicon vias, readout resonators, etc.) in Ansys HFSS, and analyzed dielectric two-level system (TLS) losses in COMSOL.
- Optimized magnetic shielding of noise-sensitive quantum chips in cryo-temperature environments.

TEACHING, VOLUNTEERING, & SERVICE

Bay Area Scientists Inspiring Students *2023 - present*
Program Volunteer East Bay Area, CA

- Presenting interactive science lessons to classrooms of 15-35 students.
- Fostering the scientific curiosity of 3rd to 5th graders in schools without the resources for extensive laboratory programs.

University of California, Berkeley *January 2021 - May 2022*
GSI: EE 142/242A Integrated Circuits for Communications Berkeley, CA

- Developed weekly homework assignments and hosted a discussion for 20 students.
- Covered topics in transmission lines, two-port theory, noise, distortion, amplifiers, and mixers.

University of California, Berkeley *August 2021 - December 2021*
GSI: EE 105 Microelectric Devices and Circuits Lab Berkeley, CA

- Led two 30 student laboratory classes on microelectronic circuits and devices.
- Covered topics in PN junctions, MOS capacitors, and MOSFETs through rectifiers, photodetectors, and amplifiers.

Eta Kappa Nu - Mu Chapter *December 2019 - May 2022*
Tutoring Officer

- Tutored 3-4 students in the EECS community weekly and organized review sessions for course exams 3 times a semester.
- Facilitated the “Going Down the EECS Stack” course, outlining the EECS stack from transistors to GUI.

AWARDS & HONORS

David A. Hodges Fellowship *Awarded Fall 2022*
Inaugural Recipient

IEEE SSCS Next Generation Circuit Designer *Awarded Spring 2022*

Dean’s List College of Engineering UC, Berkeley *Fall 2018 - Spring 2022*
Awarded 8 Semesters

CLASS & EXTRACURRICULAR PROJECTS

Tapeout Class

Spring 2022

- Designed the RF Front-End receiver for BLE & 802.15.4 at 2.4 GHz in Intel 22FFL [2].

Discrete 600 MHz LNA Design in Keysight ADS

April 2021

Custom JPEG GIF Compression Scheme using DCT

April 2021

2nd Place in Student Design Competition

Two-stage, 70 μ W Op-amp for Driving LCD Displays

December 2020

1st place in Apple Student Design Competition

3 stage pipeline RISC-V Processor with Audio and I/O Peripherals

December 2020

Apple Student Design Competition Winner (1 of 3)

NumC: Custom NumPy package in C

Spring 2020

CalSol, Solar Vehicle Team

January 2019 - May 2022

Electrical Lead

- Managed a team of 10 students to design the entire electrical system of a tenth-generation solar vehicle, including battery and battery controllers, motor controllers, solar array maximum power point trackers, and all other vehicle subsystems.

SKILLS

- *Hardware* - Circuit Design, RF Design, Precision Soldering, Verilog, Embedded Systems, CAN Bus
- *Design Tools* - Cadence Virtuoso, Spectre/SpectreRF, SPICE, Ansys HFSS, Keysight ADS, COMSOL Multiphysics, KiCAD
- *Software* - Python, Cadence SKILL, Verilog-A, MatLab, Java, C/C++, CUDA, Git, LaTeX
- *Other* - Teaching, Technical Writing