RYAN WANS

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EDUCATION

Purdue University *2023 - Present*
B.S. Mathematics Honors (Expected 2027) GPA: 3.82/4.0
B.S. Electrical Engineering (Expected 2026)
M.S. Electrical Engineering (Expected 2027)
Chair of IEEE MTT-S Chapter, Founder of IEEE EDS Chapter, Spectral Geometry Direct Reading

Johns Hopkins University *Summer 2024*
Visiting Undergraduate – MATH405 Analysis I GPA: 4.0/4.0

EXPERIENCE

Research Assistant, ION Lab, Purdue University *08/2025 - Present*
Information-theoretic federated machine learning.

Research Assistant, CausalML Group, Purdue University *08/2024 - 01/2025*
Underlying causal structure identification using information theory. PI left Purdue.

Design Engineer Contractor, Alphacore Inc. *05/2024 - 08/2024*
VCSEL driver and SERDES architecture on GF 22FDX FD-SOI. Applied machine learning methods to estimate TID models in Synopsys Custom Compiler via Python interface.

Teaching Assistant, Purdue University *01/2024 - Present*
TA for MA26500 Linear Algebra as a freshman, ECE20875 Data Science

Research Assistant, OpenFASOC Group, University of Michigan *07/2022 - 09/2023*
Inductor Test Structure Characterization on SKY130 with NIST, 20GHz VCO Design, C-V/I-V Characterization, Automated Opamp Layout and Simulation Generator, Published Results

Research Apprentice, Kinget Group, Columbia University *09/2021 - 04/2022*
Automatic Gain Control (AGC) on SkyWater's open-source 130nm CMOS process

PUBLICATIONS

[1] Ali Hammoud, Anhang Li, Ayushman Tripathi, Wen Tian, Harsh Khandeparkar, **Ryan Wans**, *et al.*, "Reinforcement Learning-Enhanced Cloud-Based Open Source Analog Circuit Generator for Standard and Cryogenic Temperatures in 130-nm and 180-nm OpenPDKs," in *IEEE ICCAD 2024 Proceedings*, October, 2024.

[2] **Ryan Wans**, "Open Source 2.4GHz LC-VCO in SKY130," in *ISSCC 2023 Student Notebook Competition*, November, 2022.

GRADUATE COURSEWORK

ECE600 Probability & Stochastics, ECE604 Electromagnetic Field Theory, ECE538 Digital Signal Processing, ECE60420 RF Integrated Circuit Design, MA571 General Topology, MA572 Algebraic Topology, MA595L Lie Algebra

TECHNICAL SKILLS

CMOS PDK	SKY130, GF180MCU, SG13G2, GF22FDX
IC Design	Synopsys Custom Compiler, Cadence ICFB/Virtuoso, AWR Microwave Office, ADS, FOSS Toolchain
PCB Design	Altium, Xpedition
Simulation	Spectre, SPICE, Ansys HFSS, CST Studio, AWR Microwave Office, Keysight ADS, Genesys, ASITIC
Languages	FORTRAN, Verilog, Python, Golang, C, Java, JavaScript
Scripting	MATLAB, UNIX shell, LaTeX, gdsfactory, Tcl, sed & awk

RESEARCH PROJECTS

08/2024 - 01/2025 **Entropic Identifiability:** CausalML Group
Advisor(s): Murat Kocaoglu
Applying probabilistic and information-theoretic approaches to identifying the underlying causal structure between two variables with an entropic but deterministic mapping.

07/2023 - 09/2023 **Automated Opamp Generator:** OpenFASOC Group
Advisor(s): Mehdi Saligane, Ali Hammoud
Assisted in the construction of a large Python- and gdsfactory-based automated generator for opamps of any specification. Utilized reinforcement learning for opamp derivation & selection, gdsfactory for layout, and Python for orchestration and SPICE simulation. PDK-Universal.

09/2022 - 02/2023 **SKY130 Inductor Characterization**: OpenFASOC Group
Advisor(s): Mehdi Saligane
Worked with UMich and NIST to autonomously create and characterize inductor test structures on SKY130. Structures included multiple geometries of planar inductors, baluns, and VCOs. Summarized in ISSCC notebook.

09/2021 - 04/2022 **Baseband, Inductorless AGC:** Kinget Group
Advisor(s): Rui Xu, Peter Kinget
A 800MHz - 1GHz Automatic Gain Control feedback system fully designed, laid out, and tested using MWO and the FOSS ecosystem on SKY130.

05/2021 - 08/2021 **26GHz Automotive FMCW Radar Board:** Self
Created a 6cm $\times$ 6cm antenna-on-board FMCW Ka-band radar on Rogers 4350B substrate. Realized using CST, MWO, and Altium. Operates at 27.5dBm peak output power with a 80m/s max detection speed