

# HENRY BARROW, PH.D.

311 2<sup>nd</sup> St #409, Oakland, CA 94607 | 928.607.4356 | henry@henrybarrow.com

## CURRENT EMPLOYMENT

**Senior Hardware Engineer - CAD**

(Jan. 2016-Present)

Oracle, Processor Design Tools, Santa Clara, CA



Job Duties: Leverage data mining, machine learning and data visualization to develop and deliver software tools that assist Oracle circuit designers and computer architects in making critical engineering decisions that push the boundaries of high performance microprocessor design. Lead the development of several new tools that provide engineers with actionable insight into complex design problems. Collaborate with a talented team to provide significant feature enhancements to well-established and heavily used codebases.

Relevant Skills: Oracle DB, SQL, R, Python, C++, PHP, JavaScript, D3.js, Git, TCAD, FinFET modeling, Machine Learning, Data Mining, Data Visualization, Library Characterization, Project Management

## EDUCATION

**Ph.D. in Electrical Engineering (EECS)**

(2009-2015)

University of California, Berkeley, CA

GPA: 3.77 Advisor: Prof. Clark Nguyen



Thesis Project: Harness the scaling benefits and performance advantages of micromechanical capacitive-gap transduced resonators with high Q-factors to realize tiny clock oscillators and tunable high-order coupled resonator filters. These devices enable reductions in both power and cost of next-generation electronic systems.

Relevant Areas of Knowledge and Interest: MEMS simulation and design, inertial sensing, fabrication process development, FEM techniques, network analysis, transducer modeling, filter design, system engineering, analog design, radio architectures, nanofabrication, advanced IC processing, resonant circuits, electromagnetics, communication systems, wireless sensor networks, solid mechanics, operation of semiconductor devices, thermal circuits, vacuum technology, noise, and microscopy.

Relevant Coursework: Parametric and Optimal Design of MEMS, Oscillations in Linear Systems, RF Integrated Circuits, Applied Electromagnetic Theory, Microfabrication Technology, Advanced IC Processing and Layout, Nanoscale Fabrication, and Design of Basic Electromechanical Devices.

**B.S. in Electrical Engineering**

(2005-2009)

University of Arizona, Tucson, AZ

GPA: Electrical Engineering 4.00, Overall Cumulative 3.93



Undergraduate Research: Worked under Prof. William Ryan to demonstrate advanced channel coding techniques for high noise applications.

Relevant Coursework: Analog Circuit Design, Circuit Theory, Digital Logic, Embedded Microcomputer Systems, Engineering Systems Analysis, Electromagnetics, Device Electronics, Digital Signal Processing, Digital Communications, Microwave Engineering I & II, and Antenna Theory & Design.

## RELEVANT ENGINEERING EXPERIENCE

### Graduate Student Instructor

#### UC Berkeley EECS Department

<u>EE40 – Electronic Circuit Design</u>	w/ Prof. Michel Maharbiz	(Spring 2015)
Led two lab sessions focused on basic analog circuit design and microcontroller programming.		
<u>EE143 – Microfabrication Technology</u>	w/ Prof. Ali Javey	(Spring 2014)
Assisted two lab sessions in fabricating MOS transistors, wrote test questions, and held office hours.		
<u>EE140 – Analog Integrated Circuits</u>	w/ Prof. Clark Nguyen	(Spring 2013)
Created homework, supervised IC test lab, taught discussion sections, and held office hours.		
<u>EE245 – Introduction to MEMS Design</u>	w/ Prof. Clark Nguyen	(Fall 2011)
Created homework problems and solutions, taught discussion sections, and held office hours.		

### MEMS Design Intern

(Summer 2014)

#### Analog Devices, Wilmington, MA

Aided in the design and characterization of next generation commercial MEMS inertial sensors. Applied my experience with MEMS resonators and vacuum probe stations to optimize gyroscope Q vs. pressure measurements.

## TECHNICAL SKILLS

**Programming/Software:** Oracle DB, SQL, R, Python, C++, PHP, JavaScript, Node.js, D3.js, SPICE, Coventorware, ANSYS, Advanced Design System, Cadence, MATLAB, Mathematica, Labview

**Electrical Measurements:** Automated control and data extraction from network analyzers, power supplies, spectrum analyzers, oscilloscopes, and temperature controllers via GPIB. Interfacing with chip scale devices through wire bonding or using a probe station. PCB design and in-house fabrication. Microwave signal routing using BNC and SMA connectors. NWA calibration and impedance testing.

**Clean Room Processing Experience:** Sputtering (AlN, Ni, Al, Mo, W), reactive ion etching (Si, SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub>, diamond, AlN, Mo, W), DRIE, sputter etching, oxidation, annealing, CVD (Si, SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub>), wet etching (HF, piranha, KOH, Si Etch, Ni Etch), metal liftoff, DUV lithography, CPD, profilometry, SEM, confocal microscopy, microspectrophotometry, and wafer cleavage.

**Microscale Testing:** Operation and repair of (vacuum) probe stations and micromanipulators, careful chip handling and storage, bonding devices to packages or circuit boards, in-house PCB design and fabrication, and automated data acquisition and system control.

## PUBLICATIONS

1. H. G. Barrow and C. T.-C. Nguyen, “A Protocol for Automated Passband Correction of High-Order Microelectromechanical Filters,” in Proceedings of the 2014 IEEE International Frequency Control Symposium, Taipei, Taiwan, 2014. [PDF](#)
2. H. G. Barrow, T. L. Naing, R. A. Schneider, T. O. Rocheleau, V. Yeh, Z. Ren, and C. T.-C. Nguyen, “A Real-Time 32.768-kHz Clock Oscillator Using a 0.0154-mm<sup>2</sup> Micromechanical Resonator Frequency-Setting Element,” in Proceedings of the 2012 IEEE International Frequency Control Symposium, Baltimore, MD, 2012. (Best Paper Finalist) [PDF](#)
3. W. C. Li, Y. Jiang, R. A. Schneider, H. G. Barrow, L. Lin, and C. T.-C. Nguyen, “Polysilicon-Filled Carbon Nanotube Grass Structural Material for Micromechanical Resonators,” in Micro Electro Mechanical Systems (MEMS), 2011 IEEE 24th International Conference on, Cancun, Mexico, 2011, pp. 477–480. [PDF](#)

REFERENCES AVAILABLE UPON REQUEST