Matthew Spencer

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EDUCATION

University of California, Berkeley. Berkeley, CA

Doctor of Philosophy in Electrical Engineering — Aug 2008-Aug 2015

Dissertation: "Design Considerations for Nanoelectromechanical Relay VLSI"

Advisor: Elad Alon

Massachusetts Institute of Technology, Cambridge, MA

Master of Engineering in Electrical Engineering — Jun 2007-Jun 2008

Bachelor of Science in Electrical Engineering with Minor in Materials Science — Sep 2003-Jun 2007

EXPERIENCE

Blue Cheetah Analog Design, Claremont, CA – Senior Design Engineer — Jul 2021-present

Behavioral modeling of a high-speed link PHY in an advanced process node. Wrote software for automating design process in Python. Assisted in delay lock loop, duty cycle correction, and voltage regulator analysis and control. Extensive work in SystemVerilog. Worked in this role full time during a sabbatical, continuing part-time work.

Harvey Mudd College, Claremont, CA – Associate Professor — Jul 2014-present

Taught a total of 27 undergraduate courses, preparing new laboratory experiments for seven of them. Topics included radio frequency circuit design, analog circuit design, microprocessor applications, experimental engineering, and introduction to systems engineering. Advised undergraduate project groups working for external companies. Pursued research on nanomechanical switches, marine electronics, and engineering education.

University of California Berkeley, Berkeley, CA. – Graduate Student Researcher — Aug 2008-Aug 2014

Designed digital circuits comprised of emerging microelectromechanical devices, taping out ten chips each in a different MEMS technology. Developed mixed-physics simulation model of MEMS relays to assist circuit design. Designed a wide variety of digital circuits including adders, memory arrays and novel sequential logic. Led test and characterization to reveal complicated device behaviors that manifested at the circuit level. Designed probe station modifications, probe card interfaces and semiconductor parameter analyzer controls.

Texas Instrument Digital Light Projection, Plano, TX – Digital Light Projection Intern — May 2012-Aug 2012

Wrote circuit-level simulation models for emerging MEMS devices that reduced simulation time from hours to seconds while still capturing complex dynamics. Wrote visualization software for a laser doppler vibrometer to assist in characterization of the devices.

Intel Components Research, Hillsboro, OR – Components Research Intern — May 2011-Aug 2011

Wrote models and simulation scripts to integrate atomistic simulation of tunnel FETS with industrial tool flow. Used modelling results to compare performance of tunnel FET SRAM against CMOS SRAM.

SELECTED PUBLICATIONS

Breakdown and Healing of Tungsten-Oxide Films on Microelectromechanical Relay Contacts

Journal of Microelectromechanical Systems 2022

Ethan Falicov, Jessica Marvin, Alice Ye, Sergio Almeida, Daniel Contreras, Tsu-Jae King-Liu, Matthew Spencer

Low-Cost Underwater Ultrasonic Phased Array Research Platform

International Ultrasound Symposium 2022

Tejus Rao, Alec Vercruysse, Rhea Zaverchand, Matthew Spencer

An Implementation of Competency-Based Learning in a Laboratory Focused Analog Design Course

American Society for Engineering Education Annual Conference 2022

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