Erick Moen, EIT

Ming Hsieh Department of Electrical Engineering – Electrophysics
University of Southern California
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Education:

UNIVERSITY OF SOUTHERN CALIFORNIA — **Los Angeles, CA**
Ph.D., Electrical Engineering - Electrophysics — *May 2017 (Estimated)*
M.S., Computer Science — *May 2017 (Estimated)*
M.S., Electrical Engineering — *May 2014*

TEXAS CHRISTIAN UNIVERSITY — **Fort Worth, TX**
B.S. (with Honors) — *Graduated Cum Laude, December 2009*
Major: Electrical Engineering — Minors: Mathematics and News-Editorial Journalism

Fellowships, Honors and Awards:

ORISE Graduate Student Research Fellowship — Jan 2014 to Present
ARCS Foundation Fellowship – John and Edie Leonis Named Scholar — Aug 2013 to Present
AFRL Repperger Intern Program — Summers 2012, 2013, 2014
USC Viterbi School of Engineering Merit Award — Aug 2011 to Aug 2015

Relevant Work Experience:

University of Southern California — **Los Angeles, CA**
PhD Candidate — *Aug 2011 – Present*
Ming Hsieh Department of Electrical Engineering — Advisor: Professor Andrea M. Armani

- Leverage nonlinear optical techniques to create new devices and detection methodologies
  - Observed nano-scale disturbances in the membrane of live cells using second harmonic generation
- Investigate and develop virtual reality platforms for immersive simulation and data visualization
  - Built a VR framework for immersive visualization of electron transfer dynamics and pore formation
- Research and design pulse generators for applications ranging from vinecology to cancer therapies
- Investigate changes in biological cells as a result of exposure to electrical and mechanical pulses
- Invited to Ft. Sam Houston as a visiting researcher to quantify nanoporation associated with nsPEF exposure
- Heavily involved in mentorship, teaching and lab oversight

Additional Projects Pursued During this Period

- ❖ Nevermind Video Game: Developed a measurement system and algorithms to determine the user's stress level. The gameplay mechanics of this psychological horror puzzle game reward the user for staying calm in the face of challenging and foreboding scenarios, thereby encouraging the player to manage their fear and stress levels.
- ❖ Entertainment Technology Center @USC: Consultant and Reporter for ETC@USC, a think tank and research center for leaders across the entertainment industry. I provide analysis of the current and future state of the entertainment industry as it relates to the effect of new technology on the current content creation, distribution and consumption infrastructure.

Solare Engineering Unlimited — **Fort Worth, TX**
Principal/Electrical Engineer — *Mar 2010 – Oct 2011*

- Offered an ownership stake with company after six months of employment
- Helped the firm reach $300,000 in sales and turn its first profit in only its second year of existence
- Designed all electrical, technology, and fire alarm systems for new buildings, renovations, and additions
- Managed the marketing strategies for the company and issued partnership proposals to architects

Texas Christian University – College of Science and Engineering **Fort Worth, TX**
Research Assistant *Sept 2007 – Dec 2009*

- Served as Electrical Lead for TCU's Electric Vehicle Research Team
- Designed and built a rolling test-bed for future students to explore the advancement of electric vehicles
- Primary system responsibilities included: motor, motor controller, battery layout, and charging circuitry

University of North Texas Health Science Center **Fort Worth, TX**
Research Assistant *Summer 2009*

- Acted as a computational neuroscientist modeling the autonomic nervous system
- Adapted and refined a program to model whole cell current of NTS neurons
- Developed a GUI for a program simulating multiple neuron populations

Publications:

1. "Investigating Membrane Nanoporation Induced by Bipolar Pulsed Electric Fields via Second Harmonic Generation," *Appl. Phys. Lett.*, 109 (12): TBD (2016*)*.*
2. "Quantifying Pulsed Electric Field-Induced Membrane Nanoporation in Single Cells," *BBA-Biomembranes*, 1858 (11): 2795-2803 (2016).*
3. "Evaluation of the Genetic Response of U937 and Jurkat Cells to 10-Nanosecond Electrical Pulses (nsEP)," *PLoS ONE*, 11(5): e0154555 (2016).
4. "iBET: Immersive Visualization of Biological Electron-Transfer Dynamics," *J Mol Graph Model,* 65, 94-99 (2016).
5. "Detecting Subtle Plasma Membrane Perturbation in Living Cells Using Second Harmonic Generation Imaging," *Biophys J*, 106 (10): L37-L40 (2014).*

Conference Proceedings and Presentations:

1. "The Role of Membrane Dynamics in Electrical and Infrared Neural Stimulation," Proceedings of SPIE (Feb 2016).*
2. "Nonlinear Imaging of Lipid Membrane Alterations Elicited by Nanosecond Pulsed Electric Fields," Proceedings of SPIE Volume 9326 (Mar 2015).*
3. "Cells Exposed to Nanosecond Electrical Pulses Exhibit Biomarkers of Mechanical Stress," Proceedings of SPIE Volume 9326 (Mar 2015).
4. "Quantitative Analysis of Nanoscale Lipid Bilayer Modifications via Second Harmonic Generating Probes," Biophysical Society 59th Annual Meeting, Volume 108, Issue 2, Supplement 1, p359a–360a (Jan 2015).*
5. "Nonlinear Imaging Techniques for the Observation of Cell Membrane Perturbation Due to Pulsed Electric Field Exposure," Proceedings of SPIE Volume 8941 (Feb 2014).*
6. "Changes in Protein Expression of U937 and Jurkat Cells Exposed to Nanosecond Pulsed Electric Fields," Proceedings of SPIE Volume 8585 (Feb 2013).*
7. "Converting a Porsche 914 to an Electric Vehicle," Conference Proceedings of the 2009 ASEE GSW (Mar 2009).*

*First Author

Skills:

Engineering and Laboratory -

- Pulse generator design and application
- Optical system design and analysis
- Circuit design and analysis
- Signal processing
- MEMS design
- Statistical analysis
- Cell culture
- Microscopy

Computer -

- AutoCAD, Inventor, MatLab, LabVIEW, ImageJ, ExpressPCB, and PSpice
- Cisco Systems Networking experience
- Unity game engine experience
- Artificial Intelligence techniques
- Database design (SQL and NoSQL)
- Perl, Python, C, and C++
- Adobe Creative suite
- Digital geometry processing
- Designing virtual reality experiences