Jesse Lu – Curriculum Vitae

jesselu@stanford.edu
66 Newell Rd. Apt. O
East Palo Alto, CA
(408) 568-9356

Education

Stanford University, PhD, Electrical Engineering, June 2013
Stanford University, Masters of Science, Electrical Engineering, May 2012
University of California Los Angeles, Bachelor of Science, Electrical Engineering, June 2006

Honors

Stanford Graduate Fellowship, Stanford University, 2007
Dean's Honors List, University of California Los Angeles, five quarters

PhD Research: Nanophotonic Computational Design and Optimization

- Nanophotonic design and optimization was a brute force, trial-and-error process which took *weeks to months* to improve a single structure—even with a good initial guess.
- I had to build a system to design structures within a day, solely based on the performance specification of the desired device, and without good initial guesses.
- I applied methods from the field of convex optimization to the physical problem of linear nanophotonic design. I sped up computation by implementing my method on GPUs, and achieved scale by leveraging the cloud (Amazon EC2).
- This resulted in the design of nanophotonic devices that were either more compact, more robust, or more efficient than all previous designs. Critically, these designs only required a day (or two) of computation, and a specification for the intended performance (no good initial guess).

Publications

"Objective-first design of high-efficiency, small-footprint couplers between arbitrary nanophotonic waveguide modes" Jesse Lu, Jelena Vuckovic (Optics Express, 2012).
"Inverse design of a three-dimensional nanophotonic resonator" Jesse Lu, Stephen Boyd, Jelena Vuckovic (Optics Express, 2011).
"Inverse design of nanophotonic structures using complementary convex optimization" Jesse Lu, Jelena Vuckovic (Optics Express, 2010).
"Numerical optimization of a grating coupler for the efficient excitation of surface plasmons at an Ag-SiO2 interface" Jesse Lu, Csaba Petre, Josh Conway, Eli Yablonovitch (JOSA B, 2007).

Programming

Fluent in Python, CUDA, and Matlab.
Implemented cloud-based simulation service on Amazon EC2.
Developed hardware-accelerated time- and frequency-domain electromagnetic solvers.
Developed Matlab library for the design of arbitrary linear nanophotonic components.

Research Experience

Graduate Researcher	Jelena Vuckovic Group Stanford University	2007-Present
Undergraduate Researcher	Eli Yablonovitch Group University of California, Los Angeles	2005-2006