

MATTHEW DUK-YING LEW

233 Ayrshire Farm Lane, Apt. 201 • Stanford, CA 94305 • mlew@stanford.edu • 650.384.9135

EDUCATION

M.S. / Ph.D. in Electrical Engineering, 3.9 GPA 2008 – Present
Stanford University, Stanford, CA
Research Advisor: Professor W. E. Moerner

B.S. with Honor in Electrical Engineering, 4.0 GPA 2008
California Institute of Technology, Pasadena, CA
Research Advisor: Professor Changhui Yang
Thesis Title: “Quantitative differential phase imaging and phase reconstruction based on the interference pattern of a four-hole aperture”

PROFESSIONAL EXPERIENCE

Stanford University, Stanford, CA
Graduate Student, Moerner Lab 2008 – Present
Currently analyzing methods of three-dimensional superresolution microscopy of single molecules. Applying information theory towards the design of new point spread functions for three-dimensional superresolution microscopy.

California Institute of Technology, Pasadena, CA
Undergraduate Student, Caltech Biophotonics Laboratory 2006 – 2008
Simulated, characterized, and optimized the design of a novel lensless chip-based device to perform two-dimensional quantitative differential phase imaging. Measured the differential phase profiles of a Gaussian beam, an optical vortex, starfish embryos, and potato starch granules.

Teaching Assistant 2006 – 2008
Served as teaching assistant for EE 20 and EE 113, both circuits courses at Caltech. Courses taught topics ranging from passive elements such as RC and crystal filters to active elements like voltage controlled oscillators, transistor amplifiers, mixers, voltage regulators, and phase-lock loops. Held office hours, assisting students with both theoretical and lab-related questions.

Southwest Research Institute, San Antonio, TX
Student Engineer 2004 – 2005
Designed FPGA-based data collection hardware to serve as intermediary between a scientific sensor and the CPU on the Interstellar Boundary Explorer spacecraft. Simulated design using computer-based tools, and fabricated prototype board to facilitate ground-based testing of design.

REFEREED JOURNAL PUBLICATIONS

1. Cui, X., **Lew, M.** & Yang, C. Quantitative differential interference contrast microscopy based on structured-aperture interference. *Appl. Phys. Lett.* **93**, 091113 (2008).
2. **Lew, M.**, Cui, X., Heng, X. & Yang, C. Interference of a four-hole aperture for on-chip quantitative two-dimensional differential phase imaging. *Opt. Lett.* **32**, 2963-2965 (2007).

OTHER PUBLICATIONS

1. **Lew, M.**, Cui, X., Heng, X. & Yang, C. Two-dimensional differential interference contrast microscopy based on four-hole variation of Young's interference. *Proc. SPIE* **6859**, 685916 (2008).
2. Cui, X., **Lew, M.**, Heng, X. & Yang, C. On-chip differential interference contrast (DIC) phase imager and beam profiler based on Young's interference. *Proc. SPIE* **6441**, 64411F (2007).
3. **Lew, M.**, Cui, X. & Yang, C. Measuring the phase of light. *CURJ* **6**, 18-25 (2007).

AWARDS AND RECOGNITIONS

<i>National Science Foundation Graduate Research Fellowship</i>	2008
<i>Stanford Graduate Fellowship, 3Com Corporation Fellow</i>	2008
<i>Tau Beta Pi Fellowship</i>	2008
<i>Caltech Carnation Merit Award</i>	2007
<i>Caltech Summer Undergraduate Research Fellowship</i>	2006, 2007
<i>Caremark Rx Scholarship</i>	2006, 2007
<i>Newport-Spectra Physics Research Excellence Award</i>	2007
<i>Tau Beta Pi Scholarship</i>	2007
<i>Caltech Perpall Speaking Competition Finalist</i>	2006
<i>National Merit Scholarship</i>	2004

SKILLS AND TECHNIQUES

Computer Programming and Software

Scalar diffraction simulations, FDTD simulations, image processing, and digital signal processing using MATLAB. Symbolic manipulation using Mathematica. Computer programming in C++, Java, and Visual Basic. Proficient with Microsoft Office suite (all versions). Familiarity with Microsoft Windows (all versions), Linux (Ubuntu), and Mac OS X.

Embedded Systems Programming and Design

Embedded systems programming in C, Intel x86 assembly and Altera NIOS assembly. FPGA design via schematic capture and Verilog.

Microfabrication

Spin-coating, exposing, and developing photoresist. Metal evaporation.

Optical Laboratory Techniques

Fiber optic connectorization and polishing. Coupling laser beams into optical fibers and laser beam collimation. Recording and playback of holograms. Experience using spatial light modulators. Superresolution fluorescence microscopy of single molecules.

HONOR AND PROFESSIONAL SOCIETY MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE), Optical Society of America (OSA), SPIE, Tau Beta Pi (TBP)

REFERENCES

Professor Changhui Yang

Assistant Professor of Electrical Engineering and Bioengineering
California Institute of Technology
MC 136-93
Pasadena, CA 91125
(626) 395-8922

Professor Jehoshua Bruck

Gordon and Betty Moore Professor of Computation and Neural Systems and Electrical Engineering
California Institute of Technology
MC 136-93
Pasadena, CA 91125
(626) 395-4852

Dr. Dimitrios Antsos

Lecturer in Electrical Engineering
California Institute of Technology
MC 136-93
Pasadena, CA 91125
(818) 354-6343