Kyle M. Douglass

Curriculum Vitae

The Laboratory for Experimental Biophysics, EPFL
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EDUCATION

Doctor of Philosophy in Optics
University of Central Florida, Orlando, FL, USA — Fall 2013
Dissertation: *Mesoscale Light-Matter Interactions*

- Advisor: Prof. Aristide Dogariu
- Committee: Prof. Ayman Abouraddy, Prof. David Hagan, and Prof. Kiminobu Sugaya

Master of Science in Optics
University of Central Florida, Orlando, FL, USA — Spring 2011

- GPA: 3.99/4.00

Bachelor of Science in Engineering Physics
Rose-Hulman Institute of Technology, Terre Haute, IN, USA — Spring 2007

- GPA: 3.97/4.00
- Minor: German
- Certificate: Semiconductor Materials

RESEARCH EXPERIENCE

Post-doctoral Researcher
École polytechnique fédérale de Lausanne, Lausanne, Switzerland — Fall 2013–present

- Designed novel optical setups for imaging biological systems using single molecule fluoresence microsopy (STORM and PALM).
- Maintained and supervised multiple different systems for STORM and PALM imaging.

Graduate Research Assistant
University of Central Florida, Orlando, FL, USA — Fall 2007–Fall 2013

- Advisor: Prof. Aristide Dogariu
- Solved outstanding experimental problems in light transport through random media, such as disordered photonic crystals, colloidal suspensions, and tissues.
- Built microscopes and imaging systems for live cell observations, including modalities for phase contrast, dark field, and polarized light microscopy.
- Wrote Brownian dynamics code for simulating the mechanical interactions between colloids and coherent light.
- Authored or co-authored several publications for peer-reviewed journals in optics.
- Presented research at multiple conferences in the United States and abroad.
- Participated in an OSA incubator meeting (Mesoscale Photonics) for defining a new field of research within optics.

(Research Experience, continued)

Research Experience for Undergraduates
University of Colorado, Boulder, CO, USA Summer, 2006

- Advisor: Prof. Margaret Murnane
- Tuned a table-top source of coherent, extreme ultra violet light from high harmonic generation in plasmas for nanoscale imaging.
- Designed and built a visible light spectrometer from spare lab parts for operation in a vacuum system.
- Machined various parts for the lab, including a vacuum chamber and a vibration sensor.

TEACHING EXPERIENCE

Tutor in Math, Physics, and Chemistry
The Learning Center, Rose-Hulman Institute of Technology, Terre Haute, IN, USA 2004-2007

- Provided one-on-one tutoring in general math, science and advanced physics to college students in engineering and science degrees.
- Wrote practice tests for the freshmen-level physics classes at Rose-Hulman Institute of Technology.
- Designed and lectured at end-of-quarter review sessions for freshmen-level physics classes.

PUBLICATONS

1. J. R. Guzman-Sepulveda, **K. M. Douglass**, S. Amin, N. E. Lewis, and A. Dogariu, "Passive optical mapping of structural evolution in complex fluids," RSC Adv. **5**, 5357 (2015).

2. S. Sukhov, **K. M. Douglass**, and A. Dogariu, "Pair interaction of dipoles in random electromagnetic fields," Opt. Lett. **38**, 2385 (2013).

3. **K. M. Douglass**, S. Sukhov, and A. Dogariu, "Superdiffusion in optically controlled active media," Nature Photon. **6**, 834 (2012).

4. **K. M. Douglass**, N. A. Sparrow, M. Bott, C. Fernandez-Valle, and A. Dogariu, "Measuring anisotropic cell motility on curved substrates," J. Biophoton. doi: 10.1002/jbio.201200089 (2012).

5. **K. M. Douglass**, S. John, T. Suezaki, G. A. Ozin, and A. Dogariu, "Anomalous flow of light near a photonic crystal pseudo-gap," Opt. Express **19**, 25320 (2011).

6. **K. M. Douglass**, J. Ellis, C. Toma, A. Mahalanobis, and A. Dogariu, "Expanding the field of view by polarization multiplexing," Appl. Opt. **49**, H40-H46 (2010).

7. **K. M. Douglass** and A. Dogariu, "Measuring diffusion coefficients independently of boundary conditions," Opt. Lett. **34**, 3379-3381 (2009).

8. J. Broky, **K. M. Douglass**, J. Ellis, and A. Dogariu, "Fluctuations of scattered waves: going beyond the ensemble average," Opt. Express **17**, 10466-10471 (2009).

CONFERENCE PRESENTATIONS

1. **K. M. Douglass**, S. Sukhov, and A. Dogariu, "Forces in Random Electromagnetic Fields," in *Quantum Electronics and Laser Science Conference*, OSA Technical Digest (online), (Optical Society of America, 2013), paper QTh4A.

2. **K. M. Douglass**, S. Sukhov, and A. Dogariu, "Optically-Controlled Active Media: Superdiffusion in Random Fields," in *Frontiers in Optics Conference*, OSA Technical Digest (online) (Optical Society of America, 2012), paper FTh3D.7.

3. **K. M. Douglass**, A. Fears, L. Denney, and A. Dogariu, "Passive Optical Measurements of Local Viscoelastic Properties of Pluronics Systems," *in Biological and Pharmaceutical Complex Fluids*, (Engineering Conferences International, New York, NY, 2012).

4. **K. M. Douglass**, L. Denney, C. Toma, and A. Dogariu, "Real-time optical monitoring of blood viscoelasticity," *in Biological and Pharmaceutical Complex Fluids*, (Engineering Conferences International, New York, NY, 2012).

5. K. Kasunic, M. Bagnell, J. D'Archangel, A. W. Dillard, **K. M. Douglass**, M. S. Mills, D. Ott, V. Relina, B. Webb, "Research-centric project-based learning of optomechanical design," in *Optics and Photonics*, (SPIE, Bellingham, WA, 2012), paper 8481-10.

6. **K. M. Douglass**, N. A. Sparrow, M. Bott, C. Fernandez-Valle, and A. Dogariu, "Measuring anisotropic cell motility on curved substrates," in *Frontiers in Optics (FiO)/Laser Science (LS)* (Optical Society of America, Washington, DC, 2011), poster JTuA23.

7. **K. M. Douglass**, T. Suezaki, G. A. Ozin, S. John, and A. Dogariu, "Reflection of Subdiffusive Light from 3-D Disordered Photonic Crystals," in *Quantum Electronics and Laser Science Conference*, OSA Technical Digest (CD) (Optical Society of America, 2010), paper QME3.

8. **K. M. Douglass**, G. Biener, S. Sukhov, and A. Dogariu, "Rotational Stochastic Resonance," *in Quantum Electronics and Laser Science Conference*, OSA Technical Digest (CD), (Optical Society of America, 2010), paper QMC5.

9. **K. M. Douglass**, T. Kohlgraf-Owens, J. Ellis, C. Toma, A. Mahalanobis, and A. Dogariu, "Expanded Field of View Using Polarization Multiplexing," in *Computational Optical Sensing and Imaging*, OSA Technical Digest (CD) (Optical Society of America, 2009), paper CWA5

10. J. Broky, J. Ellis, **K. Douglass**, and A. Dogariu, "Statistical Fluctuations: Going Beyond the Ensemble Average," in *Frontiers in Optics*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper FWV5

AWARDS AND FELLOWSHIPS

SystemsX.ch Transition Post-doc Fellowship
Two years salary, SystemsX.ch, 2015–2017

APS Division of Laser Science Travel Grant
$500, APS, 2013

(Awards and Fellowships, continued)

SPIE Scholarship in Optics & Photonics
$2000, SPIE, 2012

GSA Graduate Travel Award
$300, University of Central Florida, 2012

SGA Student Travel Award
$250, University of Central Florida, 2012

GSA Graduate Travel Award
$300, University of Central Florida, 2011

SGA Student Travel Award
$250, University of Central Florida, 2011

GSA Graduate Travel Award
$300, University of Central Florida, 2009

SGA Student Travel Award
$250, University of Central Florida, 2009

IGERT Fellowship
$30,000 + tuition, University of Central Florida, 2008-2009

Provost Fellowship
$10,000, University of Central Florida, 2007-2008

TECHNICAL SKILLS

Laboratory Experience

Proficient: Fiber optics, microscopy (bright field, dark field, phase contrast, DIC, fluorescence, polarization, STORM and PALM), polarization optics (photoelastic modulators, variable retarders, etc.), spatial light modulators, general optics and imaging systems

Competent: Photon counting hardware, data acquisition (DAQ) devices, solid state lasers, laser diodes, superluminescent diodes, diffractive optical elements, autocorrelators, oscilloscopes

Familiar: Semiconductor materials cleanroom procedures (patterning photoresist, etching, metalizing, device testing)

Software

Proficient: Matlab

Competent: Scheme, MIT Photonic-Bands (Photonic crystal solver), Labview, Python, Latex, Linux/Unix operating systems

Familiar: Zemax, C/C++