

Curriculum Vitæ

Jonathan D. Ellis, PhD

Academic Vision

Precision technology permeates daily life in the form of smartphones, automobiles, consumer electronics, computing technology, healthcare imaging, and airplanes, to name a few. These products incorporate many precision engineering concepts in the design, manufacture, assembly, and quality control steps to bring them to fruition. These precision engineering concepts are: 1) design for manufacturing and mass production; 2) precision systems to perform automated manufacturing and assembly process; and 3) sensing systems, methodologies, and metrology to ensure specifications are met.

My vision is to build a world-class *Precision Instrumentation Group* at the University of Rochester where we design, create, and demonstrate novel precision systems to usher in the next generation of technology. Research in the Precision Instrumentation Group focuses on real-world challenges where we can offer novel solutions, particularly in areas like standards-level metrology, high precision positioning systems, biological scanners, optical metrology, and advanced manufacturing. My goal is to see technology we pioneer permeate precision systems in commercial industries. We will focus on performing the multidisciplinary system design, build prototype systems, qualify our technology, and, finally, seek to spin off our technology so that it can be commercialized and launched into industry.

Student mentorship is fundamental backbone of academia, both by nurturing the student's curiosity and by shaping the student's future career. Research in an exciting, stimulating, and challenging environment can provide opportunities for students to learn from a multitude of sources, including their fellow peers, senior students, their faculty advisor, and the community at large. My vision is to build a strong, synergistic community in precision engineering, where students research high-impact fields, create novel solutions to today's multidisciplinary challenges, produce professional, technologically relevant results, and communicate effectively when disseminating their work.

Employment

Assistant Professor of Mechanical Engineering and of Optics University of Rochester; Rochester, NY, USA Hajim School of Engineering & Applied Sciences Jointly between the Department of Mechanical Engineering & The Institute of Optics <i>Center for Freeform Optics</i> affiliated faculty <i>R.E. Hopkins Center for Optical Design & Engineering</i> affiliated faculty	7/2011 – Present
PhD Researcher Delft University of Technology; Delft, The Netherlands Precision & Microsystems Engineering, Mechatronic System Design	2/2007 – 5/2011
Research Assistant University of North Carolina at Charlotte; Charlotte, NC, USA Center for Precision Metrology	8/2005 – 2/2007
Instrumentation Engineer Undergraduate Research Assistant InSituTec Incorporated; Concord, NC, USA	5/2005 – 8/2005 8/2004 – 5/2005

Education

Doctorate of Philosophy , Mechanical Engineering Delft University of Technology Dissertation: <i>Optical Metrology Techniques for Dimensional Stability Measurements</i> Advisors: Prof. Robert H. Munnig Schmidt & Ir. Jo W. Spronck	12/2010
Master of Science , Mechanical Engineering University of North Carolina at Charlotte Thesis: <i>Reducing Frame Stiffness Dependency in Nanoindentation</i> Advisors: Prof. Stuart T. Smith and Prof. Robert J. Hocken	5/2007
Bachelor of Science , Mechanical Engineering University of North Carolina at Charlotte GPA: 3.6/4.0 <i>Cum Laude</i>	5/2005

Books

2. **Ellis JD**, *Field Guide to Displacement Interferometry*, SPIE Press 2014 (ISBN print: 978-0-8194-9799-4, ISBN ebook: 978-0-8194-9800-7)
1. **Ellis JD**, *Optical Metrology Techniques for Dimensional Stability Measurements*, PhD Thesis, Delft University of Technology, 2010 (ISBN: 978-94-91104-06-0)

Journal Publications

17. Wang C, **Ellis JD**. Dynamic Doppler frequency shift errors: measurement, characterization, and compensation. *IEEE Transactions on Instrumentation and Measurement* 2014; (accepted)
16. Savage DE, Brooks DR, DeMagistris M, Xu L, MacRae S, **Ellis JD**, Knox WH, Huxlin KR. First Demonstration of Ocular Refractive Change using Blue-IRIS in Live Cats, *Investigative Ophthalmology & Visual Science* 2014; **55**(7): pp. 4603–4612 [www]
15. Echter MA, Roll CD, Keene AD, **Ellis JD**. Carrier fringe analysis algorithms for three degree of freedom optical probing, *Precision Engineering* 2014; **34**(4): pp. 893–902 [www]
14. Brooks DR, Brown NS, Savage DE, Wang C, Knox WH, **Ellis JD**. Precision large field scanning system for high numerical aperture lenses and application to femtosecond micromachining of ophthalmic materials, *Review of Scientific Instruments* 2014; **85**(6): 065107 [www]
13. Gillmer SR, Smith RCG, Woody SC, **Ellis JD**. Compact fiber-coupled three degree-of-freedom displacement interferometry for nanopositioning stage calibration, *Measurement Science & Technology* 2014; **25**(7): 075205 [www]
12. Zhu M, Li Y, **Ellis JD**. Polarization model for total internal reflection-based retroreflectors, *Optical Engineering* 2014; **53**(6): 064101 [www]

11. **Ellis JD**, Baas M, Joo K, Spronck JW. Errors in correction algorithms for periodic nonlinearity in displacement measuring interferometers, *Precision Engineering* 2012; **36**(2): pp. 261–269 [www]
10. **Ellis JD**, Voigt D, Spronck JW, Verlaan AL, Munnig Schmidt RH. Frequency Stabilized HeNe Gas Laser with 3.5 mW from a single mode, *Precision Engineering* 2012; **36**(2): pp. 203–209 [www]
9. **Ellis JD**, Meskers AJH, Spronck JW, Munnig Schmidt RH. Fiber coupled displacement interferometry without periodic nonlinearity, *Optics Letters* 2011; **36**(18): pp. 3584–3586 [www]
8. Voigt D, **Ellis JD**, Verlaan AL, Bergmans RH, Spronck JW, Munnig Schmidt RH. Towards interferometry for dimensional drift measurements with nanometer uncertainty, *Measurement Science & Technology* 2011; **22**: 094029 (5pp) [www]
7. Joo K, **Ellis JD**, Spronck JW, Munnig Schmidt RH. Real-time wavelength corrected heterodyne laser interferometry, *Precision Engineering* 2010; **35**(1): pp. 38–43
6. **Ellis JD**, Joo K, Buice ES, Spronck JW. Frequency stabilized three mode HeNe laser using nonlinear optical phenomena, *Optics Express* 2010; **18**(2): pp. 1373–1379 [www]
5. Joo K, **Ellis JD**, Buice ES, Spronck JW, Munnig Schmidt RH. High resolution heterodyne interferometer without detectable periodic nonlinearity, *Optics Express* 2010; **18**(2): pp. 1159–1165 [www]
4. Joo K, **Ellis JD**, Spronck JW, Munnig Schmidt RH. Design of a folded, multi-pass Fabry-Perot interferometer using a He-Ne laser for displacement metrology (Technical Design Note), *Measurement Science & Technology* 2009; **20**(10): 107001 (5pp) [www]
3. **Ellis JD**, Joo K, Spronck JW, Munnig Schmidt RH. Balanced interferometric system for stability measurements, *Applied Optics* 2009; **48**(9): pp. 1733–1740 [www]
2. Joo K, **Ellis JD**, Spronck JW, van Kan PJM, Munnig Schmidt RH. A simple heterodyne laser interferometer with sub-nm periodic errors, *Optics Letters* 2009; **34**(3): pp. 386–388 [www]
1. **Ellis JD**, Smith ST, Hocken RJ. Alignment uncertainties in ideal indentation styli, *Precision Engineering* 2008; **32**: pp. 207–214 [www]

Conference Proceedings

47. Brooks DR*, Brown NS, Savage DE, Knox WH, **Ellis JD**, , In: *Proceedings of the 29th ASPE Annual Meeting, 9-14 Nov 2014, Boston, MA USA* (accepted)
46. Yu X, Gillmer SR, Wang C, **Ellis JD**. Beam aberration analysis of differential wavefront interferometry, In: *Proceedings of the 29th ASPE Annual Meeting, 9-14 Nov 2014, Boston, MA USA* (accepted)
45. Zhao Y, Schmidt G, Moore DT, **Ellis JD**. Absolute thickness metrology with high precision using low coherence interferometry, In: *Proceedings of the 29th ASPE Annual Meeting, 9-14 Nov 2014, Boston, MA USA* (accepted)
44. Wang C*, **Ellis JD**. Phase compensation for dynamic Doppler frequency shifts, In: *Proceedings of the 29th ASPE Annual Meeting, 9-14 Nov 2014, Boston, MA USA* (accepted)
43. Keene AD, Pullan EE, Ricci MA, Lanphear J, Echeter MA, **Ellis JD**. Fiber launching device with polarization control and alignment-preserving reconnection, In: *Proceedings of the 29th ASPE Annual Meeting, 9-14 Nov 2014, Boston, MA USA* (accepted)
42. Lu C, Troutman JR, **Ellis JD**, Schmitz TL, Tarbutton JA. Periodic error compensation using frequency measurement with continuous wavelet transform, In: *Proceedings of the 29th ASPE Annual Meeting, 9-14 Nov 2014, Boston, MA USA* (accepted)
41. **Ellis JD***, Echter MA. Non-contact, point-to-point methods for measuring freeform optics, In: *Proceedings of Optical Fabrication & Testing, 22-26 Jun 2014, Kohala Coast, HI USA*, (Invited)
40. Theisen MJ, Head ST, Brown TG, Gillmer SR, **Ellis JD**, Amplitude, phase, and polarization control with a single spatial light modulator, In: *Proc. SPIE Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI*, 89491X, 01 Feb, 2014 San Francisco, CA USA
39. Brown TG, Alonso MA, Vella A, Theisen MJ, Head ST, Gillmer SR, **Ellis JD** Focused beam scatterometry for deep subwavelength metrology, In: *Proc. SPIE Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI*, 89490Y, 01 Feb, 2014 San Francisco, CA USA
38. Lu C, Gillmer SR, **Ellis JD**, Schmitz TL, Troutman J, Tarbutton JA, Application of wavelet analysis in heterodyne interferometry, In: *Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN USA*
37. Fesperman R, Brown N, Elliot K, **Ellis JD**, Grabowski A, Ludwick S, Maneuf S, O’Conner B, Woody S, Methods for performance evaluation of single axis positioning systems: a new standard, In: *Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN USA*
36. Fesperman R, O’Conner B, **Ellis JD** Methods for performance evaluation of single axis positioning systems: dynamic straightness, In: *Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN USA*

35. **Ellis JD**, Gillmer SR, O'Connor B, Methods for performance evaluation of single axis positioning systems: dynamic angular performance, *In: Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN USA*
34. **Ellis JD**, Ludwick S, Methods for performance evaluation of single axis positioning systems: move and settle performance, *In: Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN USA*
33. Zhu M, Li Y, **Ellis JD**, Retroreflector Polarization Model, *In: Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN USA*
32. Brooks DR*, Brown NS, Xu L, Savage DE, Knox WH, **Ellis JD**, Precision high numerical aperture scanning system for femtosecond micromachining of ophthalmic materials over large field, *In: Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN USA*
31. Echter MA, Roll CD, Keene AD, **Ellis JD**, Three degree-of-freedom optical probe with fiber detection using carrier fringe methods, *In: Proceedings of the 28th ASPE Annual Meeting, 20-25 Oct 2013, St. Paul, MN, USA*
30. Echter MA, Roll CD, Keene AD, **Ellis JD**, Slope-sensitive optical probe for freeform optics metrology, *Proc. SPIE Optifab 2013, Rochester, NY, USA*
APOMA Best Poster Award
29. Briggs D*, Echaves S, Pidgeon B, Travis N, **Ellis JD**, Stiffness and Contact Area Testing in UltraForm Finishing, *Proc. SPIE Optifab 2013, Rochester, NY, USA*
28. Gillmer SR*, **Ellis JD**, Design Considerations in a Novel Fiber-Coupled Three Degree-of-Freedom Displacement Interferometer, *Proc. SPIE 8836, Optomechanical Engineering 2013, 883604*
27. Briggs D*, Echaves S, Pidgeon B, Travis N, **Ellis JD**, Accurately measuring dynamic coefficient of friction in UltraForm Finishing, *Proc. SPIE 8838, Optical Manufacturing and Testing X, 88380U 2013*
26. Gillmer SR*, Smith RGC, Woody SC, Tarbutton J, **Ellis JD**, Miniature, fiber-coupled 3-DOF interferometer for precision micro-motion stage metrology, *In: Proceedings of the 27th ASPE Annual Meeting, 21-26 Oct 2012, San Diego, CA, USA*
25. Smith RGC, Wang C, **Ellis JD**, Sensitivity of optical fibers to mechanical and thermal perturbations for interferometric applications, *In: Proceedings of the 27th ASPE Annual Meeting, 21-26 Oct 2012, San Diego, CA, USA*
24. Burnham-Fay ED, **Ellis JD**, Precision flexure stage utilizing parasitic motion, *In: Proceedings of the 27th ASPE Annual Meeting, 21-26 Oct 2012, San Diego, CA, USA*
23. Katz P, Lynch T, Magill A, Maag-Tanchack J, **Ellis JD**, UFF Belt Characterization, *In: Proceedings of Optical Fabrication & Testing, 24-28 Jun 2012, Monterey, CA, USA*
22. **Ellis JD***, Gillmer SR, Wang C, Smith RGC, Woody SC, Tarbutton J, Fiber-coupled 3-DOF interferometer for EUV lithography stage metrology, *In: Proceedings of ASPE Summer Topical Meeting: Precision Engineering and Mechatronics Supporting the Semiconductor Industry, 24-26 Jun 2012, Berkeley, CA, USA*
21. **Ellis JD**, Voigt D, Spronck JW, Verlaan AL, Munnig Schmidt RH. Stabilized HeNe gas laser with greater than 3.5 mW of optical power, *In: Proceedings of the 26th ASPE Annual Meeting, 13-18 Nov 2011, Denver, CO, USA*
20. **Ellis JD***, Meskers AJH, Spronck JW, Munnig Schmidt RH. Towards fiber-coupled displacement measuring interferometers, *In: Proceedings of the 26th ASPE Annual Meeting, 13-18 Nov 2011, Denver, CO, USA*
19. Voigt D, **Ellis JD**, Verlaan A, Spronck JW, Bergmans R, Munnig Schmidt RH. Displacement interferometry for dimensional stability measurements, *In: Proceedings of the International Congress of Metrology, 3-6 October 2011, Paris, France*
18. Genberg V*, **Ellis JD**, Training of optomechanical engineers at the University of Rochester, *In: Proc. SPIE 8125, Optomechanics 2011: Innovations and Solutions, September 23, 2011, San Diego, CA, USA*
17. Meskers AJH, **Ellis JD**, Spronck JW, Munnig Schmidt RH. Displacement interferometry with fiber coupled delivery, *In: Proceedings of the 10th IMEKO Symposium, 12-14 Sept 2011, Braunschweig, Germany*
16. Meskers AJH, **Ellis JD**, Spronck JW, Munnig Schmidt RH. Fiber coupled sub nanometer displacement interferometry without periodic nonlinearity, *In: Proceedings of the 10th International Symposium on Measurement Technology and Intelligent Instruments, 29 Jun - 2 July 2011, KAIST, Daejeon, Korea*
15. Voigt D, **Ellis JD**, Verlaan A, Spronck JW, Bergmans R, Munnig Schmidt RH. Interferometry for picometer-level dimensional stability measurements, *In: Proceedings of CLEO/Europe-EQEC 2011, 21-26 May 2011, Munich, Germany*
14. **Ellis JD***, Baas M, Spronck JW. Errors in measurement and compensation algorithms for periodic nonlinearity correction, *In: Proceedings of the 25th ASPE Annual Meeting, 31 Oct-5 Nov 2010, Atlanta, GA*
13. Voigt D, **Ellis JD**, Verlaan A, Spronck JW, Bergmans R, Munnig Schmidt RH. Towards traceable metrology for material stability characterization, *In: Proceedings of the NanoScale 2010, 27-29 Oct 2010, Brno, Czech Republic*
12. Verlaan A*, **Ellis JD**, Voigt D, Spronck JW, Munnig Schmidt RH. Interferometric system for pm-level stability characterization, *In: Proceedings of the ISCO 2010, 4-8 Oct 2010, Rhodes Island, Greece*
11. Joo K, **Ellis JD**, Buice ES, Spronck JW, Munnig Schmidt RH. A novel heterodyne displacement interferometer with

- no detectable periodic nonlinearity and optical resolution doubling, *In: Proceedings of the 10th euspen International Conference, 31 May – 3 Jun 2010, Delft, The Netherlands*
10. **Ellis JD**, Joo K, Buice ES, Spronck JW, Munnig Schmidt RH. Frequency stabilization and heterodyne system via the mixed mode in three mode HeNe lasers, *In: Proceedings of the 10th euspen International Conference, 31 May - 3 Jun 2010, Delft, The Netherlands*
 9. **Ellis JD**, Joo K, Buice ES, Spronck JW, Munnig Schmidt RH. Magnetic field effects on the secondary beat frequency profile for three mode HeNe laser stabilization, *In: Proceedings of the 24th ASPE Annual Meeting, 4-9 Oct 2009, Monterey, CA* [www]
 8. **Ellis JD***, Joo K, Spronck JW, Munnig Schmidt RH. Double-sided interferometer with low drift for stability testing, *In: Proceedings of the 9th International Symposium on Measurement Technology and Intelligent Instruments, 29 Jun – 2 July 2009, St. Petersburg, Russia*
 7. Joo K*, **Ellis JD**, Spronck JW, van Kan PJM, Munnig Schmidt RH. Simple heterodyne laser interferometer without periodic errors, *In: Proceedings of the 9th International Symposium on Measurement Technology and Intelligent Instruments, 29 Jun – 2 July 2009, St. Petersburg, Russia*
 6. Joo K, **Ellis JD**, Spronck JW, Munnig Schmidt RH. Wavelength corrected, non-polarizing heterodyne laser interferometry in air, *In: Proceedings of the 9th euspen International Conference, 2-5 Jun 2009, San Sebastian, Spain*
 5. **Ellis JD***, Joo K, Verlaan A, Spronck JW, Munnig Schmidt RH. Uncertainty considerations for interferometric stability testing, *In: Proceedings of the 23rd ASPE Annual Meeting, 19-23 Oct 2008, Portland, OR* [www]
 4. Buice ES, **Ellis JD**, Langen HH, Munnig Schmidt RH. Importance of metrology in micro-machines, *In: Proceedings of the 6th International Workshop on Microfactories, 14-19 Oct 2008, Chicago, IL*
 3. **Ellis JD**, Hatzigeorgopoulos JH, Spronck JW, Munnig Schmidt RH. Optically balanced, multi-pass displacement interferometry for picometer stability testing, *In: Proceedings of the 22nd ASPE Annual Meeting, 14-19 Oct 2007, Dallas, TX* [www]
 2. **Ellis JD**, Smith ST, Hocken RJ. Reducing uncertainties in nanoindentation, *In: Proceedings of the 7th euspen International Conference, 20-24 May 2007, Bremen, Germany*; 2007 **1**: pp. 274-277
 1. **Ellis JD**, Smith ST, Hocken RJ. An instrument for nanoindentation without frame stiffness dependency, *In: Proceedings of the 21st ASPE Annual Meeting, 15-20 Oct 2006, Monterey, CA* [www]

*denotes oral speaker, [www] is the link to the journal article/conference website

Patents (Awarded & Submitted)

6. **Ellis JD**, Roll CD, Keene AD, Echter MA, Compact, Slope sensitive Optical Probe, US Provisional Application 61/859,944 (filed July 30,2013)
5. Knox WH and **Ellis JD**, High numerical aperture optomechanical scanner for layered gradient index microlenses, methods, and applications, US Provisional Application 61843553 (Filed July 8, 2013)
currently licensed to Clerio Vision
4. **Ellis JD**, Spronck JW, PCT Application; Interferometer, System, and Method of Use (Filed November 29, 2012)
currently licensed to InSituTec, Inc.
3. **Ellis JD**, Smith ST, Hocken RJ. US7568381 B2. Method and apparatus for surface property measurements and profiling indentations with in-process compensation of instrument frame distortions, issued 8/5/2009. [www]
currently in license negotiations
2. **Ellis JD**, Joo K, Buice ES, Spronck JW. Frequency stabilized laser. Netherlands application NL 48.182.
1. Joo K, **Ellis JD**, Spronck JW. Laser Interferometer. International application PCT/NL2009/ 050541.

Two other invention disclosures have been submitted for applications.

Other Publications

7. Savage DE, Brooks DR, DeMagistris M, **Ellis JD**, Knox WH, Huxlin KR, Refractive index shaping in live cat cornea in vivo. CEIS Poster Showcase, 11 April 2014
Best Poster Award
6. Briggs DE, Echaves S, Pidgeon B, Travis N, **Ellis JD**, Funkenbusch PD, Determining the Effects of Varying Machine Stiffness in UltraForm Finishing, CEIS Poster Showcase, 11 April 2014
5. Echter MA, **Ellis JD**, Design of a Slope-Sensitive Optical Probe for Freeform Optics Metrology, CEIS Poster Showcase, 11 April 2014

4. Head ST, Theisen MJ, Gillmer SR, Brown TG, **Ellis JD**, Amplitude, Phase, and Polarization Control with a Single Spatial Light Modulator, CEIS Poster Showcase, 11 April 2014
3. Brooks DR, Savage DE, **Ellis JD**, Knox WH, Gradient index lens writing in ophthalmic hydrogels using femtosecond micromachining, CEIS Poster Showcase, 11 April 2014
2. Mirhosseini M, Magaña-Loaiza OS, Gillmer SR, Malik M, **Ellis JD**, Boyd RW, Amplification of optical time delays using weak measurements, *Coherence and Quantum Optics*, Poster Presentation, 17–19 Jun 2013, Rochester, NY, USA
1. **Ellis JD**, Spotlight on Optics, Comments on *Precision absolute positional measurement of laser beams*, April 2013

Research: Extramural Funding: \$1,327,427

Funding Success Rate: 36% (16 of 44**, 3 pending)

NIST - \$44,515	09/01/2014 - 08/31/2015
Role: PI	
<i>Absolute Refractometry for the NIST Watt Balance</i>	
NSF RET Supplement - \$8,000	07/01/2014 - 08/31/2014
Role: PI	
<i>RET Support for Collaborative Research: Wavelet-Based Characterization of Interferometric Periodic Nonlinearity</i>	
NSF STTR - \$124,865	07/01/2014 - 06/30/2015
Role: subcontract PI	
<i>Multi-sine 6-DOF Interferometry for Precision Stage Metrology</i>	
CTSI-SAC - \$250,000	07/01/2014 - 06/30/2016
Role: coPI	
<i>Intratissue refractive index shaping (IRIS) for customizing refractive correction</i>	
CeFO - \$90,000	01/01/2014 - 12/31/2015
Role: Single PI	
<i>Slope-Sensitive Optical Probe</i>	
NSF - \$390,000*	08/2013 - 07/2018
Role: Collaborator, Affiliated Faculty	
<i>NSF IUCRC: Center for Freeform Optics</i>	
funded with satellite site at UNC Charlotte	
Bausch+Lomb - \$71,205	07/01/2013 - 06/30/2014
Role: PI with coPI Knox	
<i>Development of a High Speed, High Numerical Aperture Scanner for Ophthalmic Applications</i>	
CEIS - \$10,212	07/01/2013 - 06/30/2014
Role: PI, with coPI Funkenbusch	
<i>Optical Probe for Freeform Optics Metrology</i>	
NSF - \$83,509	08/01/2013 - 07/31/2015
Role: PI	
<i>Collaborative Research: Wavelet-Based Characterization of Interferometric Periodic Nonlinearity</i>	
with Schmitz (UNCC) and Tarbuton (S. Carolina)	
OptiPro - \$20,000	01/2013 - 12/2014
Role: subcontract PI	
<i>ONR SBIR Phase 2 Subcontract: N112-144 Low-Drag Infrared Domes</i>	
OptiPro - \$20,000	01/2013 - 12/2014
Role: subcontract PI	
<i>ONR SBIR Phase 2 Subcontract: N112-146 Fabrication of Corrector Optics for Aerodynamic Domes</i>	
NIST PML Grant - \$174,165	09/01/2012 - 08/31/2014
Role: Single PI	
<i>Improved Refractive Index Tracking for the NIST Watt Balance</i>	
NSF - \$14,500*	2012
Role: Collaborator, PI Rolland	
<i>NSF IUCRC: Center for Freeform Optics planning grant</i>	

Bausch+Lomb - \$84,000	07/01/2012 - 06/30/2013
Role: PI, with coPI Knox <i>Development of a High Speed High Numerical Aperture Scanner for Ophthalmic Applications</i>	
IBM - \$273,956	07/01/2012 - 10/01/2014
Role: coPI, with PI Brown & coPI Alonso <i>Structured Light-based Microscope for Deep Sub-Wavelength Imaging</i>	
OptiPro - \$10,000	06/01/2012 - 08/30/2012
Role: Single PI <i>STAR: Optical Probing for UltraSurf</i>	
OptiPro - \$18,000	2011
Role: PI, with coPIs Burns & Lambropoulos <i>Phase I Subcontract: Ultra Form Development</i>	
OptiPro - \$45,000	2011
Role: PI, with coPIs Burns & Lambropoulos <i>Phase II.5 Subcontract: Fabrication of Corrective Optics for Aerodynamic Domes</i>	

*not included in funding total & metrics

**Two proposals turned down by UR for ITAR issues, two others substantially reduces for ITAR issues.

Presentations

<i>Center for Freeform Optics</i>	01/28/2014
NAVAIR SBIR Review Open Forum, Webster, NY, USA	
<i>Flexure stage for Ophthalmic Applications</i>	06/20/2013
Bausch+Lomb, Rochester, NY, USA	
<i>Fiber-Delivered, Multi-DOF Interferometry for Precision Stage Metrology</i>	04/23/2013
Optikos Corporation, Wakefield, MA, USA	
<i>Compact, Multi-DOF Interferometry for Precision Stage Metrology</i>	04/22/2013
MIT Lincoln Labs, Lexington, MA, USA	
<i>Random Move & Settle Performance Evaluation</i>	03/7/2013
ASME B5/TC52 Committee Meeting, Gaithersburg, MD, USA	
<i>Precision Engineering the Future</i>	02/21/2013
Invited at Student Night, ASME Rochester Senior Section, Rochester, NY, USA	
<i>Refractive Index Tracking for the NIST Watt Balance</i>	12/14/2012
Invited at NIST, Gaithersburg, MD, USA	
<i>Instrumentation, Metrology, and Precision Engineering at UR</i>	10/2011
Industrial Associates Meeting at Institute of Optics, Rochester, NY, USA	
<i>Errors in M&C Algorithms for Periodic Nonlinearity Compensation</i>	10/25/2010
Invited at ASML Netherlands B.V, Veldhoven, The Netherlands	
<i>TU Delft Interferometric Metrology Developments</i>	10/9/2009
Invited at Agilent Technologies Inc., Santa Clara, California, USA	
<i>Optical Measurement Techniques</i>	6/9/2009
Course lecture at Delft University of Technology, Delft, The Netherlands	
<i>Interferometry for Measuring Dimensional Stability</i>	4/20/2009
Invited at TNO Science & Industry, Delft, The Netherlands	
<i>Challenge the Future</i>	4/16/2008
Recruiting at the Intermediar PhD Career Event, Amsterdam, The Netherlands	
<i>Instrumentation for Material Stability Testing</i>	2/1/2008
Invited at Massachusetts Institute of Technology, Cambridge, MA, USA	
<i>Reducing Frame Stiffness Dependency in Nanoindentation</i>	11/2007
Invited at Eindhoven University of Technology, Eindhoven, The Netherlands	
<i>Mechanism for Helicopter Active Flap Control</i>	10/2005
Student competition at Duke University, Durham, NC, USA	

Mentorship

Students Graduated (7)

Michael Echter, ME	<i>currently at UR for PhD</i>	2013–2014
MS Thesis: Design of a Slope-sensitive Optical Probe with Fiber Detection for Freeform Optics Metrology		
Chen Wang, ECE	<i>currently at UR for PhD</i>	2011–2013
MS Thesis: FPGA-based, 4-channel, High-speed Phasemeter for Heterodyne Interferometry		
Richard Smith, OPT	<i>currently at Semrock</i>	2011–2013
MS Thesis: Physical Optics Analysis of a Fiber-Delivered Displacement Interferometer		
Steven Gilmer, ME	<i>currently at UR for PhD</i>	2011–2013
MS Thesis: Development of a Novel Fiber-Coupled 3DOF Displacement Interferometer		
Arjan Meskers	<i>currently at TU Delft</i>	2010
MS Project: Sub-nanometer interferometry for 300 mm stages		
Jan Obrebski	<i>currently at Philips Applied Tech</i>	2010
MS Project: High speed Z-axis stage for atomic force microscopy		
Michiel Baas	<i>currently at IBS Precision</i>	2010
MS Project: Comparison of periodic nonlinearity measurement algorithms		

PhD Students (8)

Ethan Burnham-Fey, ME		2011–current
Project: Active vibration stabilization of NIF-scale Direct Drive cryogenic targets		
Daniel Brooks, OPT	<i>with WH Knox</i>	2012–current
Project: High-speed optomechanical scanner for ophthalmic applications		
Xiangzhi Yu, ME		2012–current
Project: Improved Refractive Index Tracking for the NIST Watt Balance		
Steven Gillmer, ME		2013–current
Project: Structured light microscope for deep sub-wavelength imaging		
Allison Browar, ME		2013–current
Project: High stability, high power HeNe lasers		
Chen Wang, ECE		2013–current
Project: Interferometry phase compensation and periodic error modeling with wavelets		
Yang Zhao, OPT	<i>with DT Moore</i>	2013–current
Project: Absolute thickness measurements of GRIN optics		
Michael Echter, ME		2014–current
Project: System design for femtosecond micromachining		

MS Students (4)

Dennis Briggs, ME		2012–current
Project: In-process tool correction in sub-aperture grinding and polishing		
Rachel Bierasinski, ME	<i>with DH Kelley</i>	2013–current
Project: Light field video camera for 3-D particle tracking		
Sam Butler, ME		2014–current
Project: Slope-Sensitive Optical Probe		
Michael Ricci, ME		2014–current
Project: Compact fiber collimating device with polarization control		

Visiting Scholars & Students (3)

Minhao Zhu, ME, PhD Student, Tsinghua University		2012–2013
Project: Fabry-Perot interferometer for displacement metrology		
Dr. Yu Xin, ME, Associate Professor, Nanjing University of Science and Technology		2013–2014
Project:		
Xiaofeng Wang, OPT, PhD Student, Nanjing University of Science and Technology		2013–2014

Project: Wavelet-based mid-spatial frequency characterization

Undergraduate Students (7)

Loudon Blake, ME	2014–current
William Green, ME	2014–current
Jessica Bernstein, ME	2014–current
David DeLong, ME	2014–current
Christopher Wong, Comp. Sci. <i>Webmaster</i>	2014–current
Nicolas Brown, OPT <i>with WH Knox</i>	2012–current
Koji Muto, ME <i>Precision Instrumentation Group Accountant</i>	2013–current

Former Undergraduate Students (7)

Emersyn Pullen, ME <i>currently at Bechtel Corporation</i>	2014
Andrew Keene, ME <i>currently at Carnegie Mellon</i>	2012–2014
Pedro Vallejo Ramirez, OPT <i>with WH Knox</i>	2013
Adalberto Perez, ME <i>Xerox Fellow, currently with DH Kelley</i>	2013
Joseph Lanphear, ME <i>currently at Harris RF</i>	2013–2014
Jane Thompson, ME <i>currently at Apple</i>	2013–2014
Samantha Eschaves, ME <i>currently at John Deere</i>	2013
Christopher Roll, ME <i>currently at MIT Lincoln Labs</i>	2011

Teaching

Courses

ME245/445, OPT245/445: Precision Instrument Design	Fall 2014
ME242: Solids and Materials Laboratory	Fall 2014
ME492: Precision Engineering	Fall 2013
ME242: Solids and Materials Laboratory	Fall 2013
ME242: Solids and Materials Laboratory	Fall 2012
ME203: Aspects of Modern Design (20%)	Fall 2012
ME492: Precision Engineering	Spring 2012
ME242: Solids and Materials Laboratory	Fall 2011

Funding

ME242 Undergraduate Teaching Laboratory - \$300,000	2013
Redesign & upgrade equipment and facilities to support simultaneous labs and projects	
Equipment Support: \$150,000	
Facilities Upgrades: \$150,000	

Academic & Professional Service

Department-Level Committees

Mechanical Engineering Faculty Search Committee	2013–current
Mechanical Engineering Class of 2017 Academic Advisor	2013–current
Mechanical Engineering Graduate Admissions & Colloquia	2011–current
Institute of Optics Graduate Admissions	2011–current
Mechanical Engineering Class of 2015 Academic Advisor	2011–current

College-Level Committees

AS&E Committee on Research/Project Opportunities for Undergraduates	2012–2013
Recruitment Committee, Delft University of Technology	2008–2010
Graduate Council Representative, University of North Carolina at Charlotte	Fall 2006

Thesis Committees

Steven Pearsons, Optics, PhD Thesis Defense	2014
Ryan Beams, Optics, PhD Thesis Defense	2013
Kejia Fang, OPT, PhD Thesis Proposal	2013
Joseph Lawson, ME, PhD Thesis Proposal	2013
Charles Chan, ChemE, MS Thesis Defense	2013
Yang Zhao, Optics, MSc Essay	2013

Peter McCarthy, Optics, PhD Thesis Proposal	2012
Sivan Salzman, Materials Science, PhD Thesis Proposal	2012
Paul Narr, Biomedical Engineering, MS Thesis Defense	2012

Professional Service

Associate Editor, Precision Engineering Journal (4 year term)	2014
NSF SBIR Phaes II Panel Review (Schrag)	2014
Optical System Alignment, Tolerancing, and Verification, Program Committee, Optics & Photonics	2013
Optical Fabrication of Freeform Surfaces, Session Chair, OptiFab	2013
NSF SBIR Phaes I Panel Review (Schrag)	2013
Director-at-Large, Board of Directors, American Society for Precision Engineering	2012–current
Treasurer, American Society of Precision Engineering	2012–current
ASME B5 TC52 Subcommittee	2012–current
<i>Methods for Performance Evaluation of Precision Positioning Systems</i>	
NSF CMMI Open Submission Panel Review (Hazelrigg)	2012
Peer Reviewer	2008–current
ASPE Annual Meeting Organizing Committee & Session Chair	2007–current
President, ASPE Student Chapter, University of North Carolina at Charlotte	2006–2007
President, ASME Student Chapter, University of North Carolina at Charlotte	2004–2005
Team Leader, ASME Student Design Team, University of North Carolina at Charlotte	2005

Awards

CEIS Most Promising Commercial Application Award	2014
APOMA Best Poster Award, SPIE Optifab	2013
Dutch Team Member, 1 st International euspen Challenge	2010
ASPE Student Scholarship	2008
NCSL International Scholarship	2005
ASPE Student Chapter Undergraduate Research Award	2005
2 nd Place, Regional ASME Student Design Competition	2005
2 nd Place, Regional ASME Old Guard Oral Competition	2005
Best Technical Presentation, Regional ASME Old Guard Oral Competition	2005
Leadership Award, College of Engineering; UNC Charlotte	2005
3 rd Place, Regional ASME Student Design Competition	2004

Professional Associations

American Society for Precision Engineering (ASPE)
European Society for Precision Engineering and Nanotechnology (euspen)
Optical Society of America (OSA)
SPIE
Tau Beta Pi (Engineering Honor Society)

Personal

Date of Birth: March 12, 1982 (age: 32)
Citizenship: United States of America
Nationality: American
Work Address: 233 Hopeman Bldg, Dept. of Mech. Engr., Rochester, NY, 14627-0132
Work Telephone: +1 (585) 275-4950
Work Email: j.d.ellis@rochester.edu
Website: Precision Instrumentation Group
Google Scholar: Link
Last Updated: November 4, 2014