Angela D. Davies

Department of Physics and Optical Science
University of North Carolina at Charlotte
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Education

Cornell University, College of Arts and Science, Ithaca, New York
Department of Physics
Doctor of Philosophy Degree, August 1994
Thesis Advisor: Professor Harold G. Craighead
Thesis Abstract: Ballistic-electron-emission microscopy (BEEM) was used to study the nanometer-scale properties of two types of metal/semiconductor contacts, laterally microfabricated interfaces and reverse-biased contacts. With the microfabricated interfaces, the microscopic variation of damage resulting from dry etching techniques was studied and the resolution capabilities of BEEM was explored. By reverse biasing the metal/semiconductor contact, depletion-layer transport was studied, indicating that the image potential, hot electron scattering and the details of quantum mechanical transmission significantly influence interface transport.

University of Oregon, College of Arts and Science, Eugene, Oregon
Department of Physics, Bachelor of Science Degree, May 1988

Relevant Experience

Physics and Optical Science Department, University of North Carolina at Charlotte, Charlotte, NC
Associate Professor — January 2007 – Present
- Research and develop methods for characterizing precision optical systems
- Research and develop methods for evaluating performance of micro-optical systems

Physics and Optical Science Department, University of North Carolina at Charlotte, Charlotte, NC
Assistant Professor — July 2001 – January 2007
- Research and develop methods for characterizing precision optical systems
- Research and develop methods for evaluating performance of micro-optical systems

Advanced Optics Metrology Program, Manufacturing Engineering Laboratory, National Institute of Standards and Technology, Gaithersburg, MD
Physicist — June 1998 – 2001
- Developed optics-oriented measurement methods and capabilities to support advanced optical and semiconductor system fabricators
- Developed measurement methods that allow traceable measurements without reference

to external authorities or reference artifacts

Electron and Optical Physics Division, Physics Laboratory,
National Institute of Standards and Technology, Gaithersburg, MD
Physicist September 1994 – June 1998

- Carried out scanning tunneling microscopy (STM) studies of growth processes on metal surfaces.
- Investigated STM light emission techniques that can be used to evaluate surface magnetization on the atomic scale.

Applied and Engineering Physics Department, Cornell University, Ithaca, NY
Graduate Research Assistant May 1989 – July 1994

- Set up a laboratory and extensively modified a commercial STM to enable the BEEM measurement. This involved design and construction of low-noise analog circuitry, electronic computer-to-experiment interfacing and machining.
- Fabricated Au/Si(SiGe) Schottky contacts using wet-etching and thin film deposition techniques.
- Assisted with the lithography of the microfabricated contacts involving plasma-enhanced chemical vapor deposition and electron-beam lithography.
- Developed software in C for data acquisition and analysis.

Physics Department, Cornell University, Ithaca, NY
Teaching Assistant September 1988 – May 1989
Courses : Mechanics and Heat (Phys 112)
Optics, Waves and Particles (Phys 214)

Funding

Traceable Evaluation of the Performance of Micro-aspheric Refractive Lenses (PI)
Digital Optics Corporation
$35,850 Award Period: 1/02-09/02

Traceable Evaluation of the Performance of Micro-aspheric Refractive Lenses (PI)
Digital Optics Corporation Contract
$9,600 Award Period: 1/03-5/03

Self-calibration of Micro-lenses (PI)
Junior Faculty Research Grant, UNC Charlotte
$6,000 Award Period: 1/02-6/03

Three-flat Testing and Radius of Curvature Metrology (PI)
National Institute of Standards and Technology
$24,960 Award Period: 3/02-8/03

I/UCRC Supplement: International Collaboration for Research on the Production of Precision Micro-optic Switches (Co-PI, Significant Contribution)
NSF

$120,000 Award Period: 7/03-7/05

Industry/University Cooperative Research Center for Precision Metrology (Co-PI, Minor Contribution)
NSF
$265,000 Award Period: 08/03-07/09

Evaluating and Improving Metrology for Arrays of Solder Bumps (PI, Proposed by Intel)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$42,000 Award Period: 9/02-12/04

Fundamental Investigations of the Phase Change on Reflection of Light (PI)
Research Corporation
$35,316 Award Period: 6/03 -5/05

Improving Measurements Based on the Cat's Eye Reflection (PI)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$71,500 Award Period: 9/02-9/05

Measuring Performance of Micro-lenses Using an Extended Source (PI)
Junior Faculty Research Grant, UNC Charlotte
$6,000 Award Period: 1/04-6/05

Construction and Error Analysis of a Fringe Projection System (PI, Proposed by Veeco)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$43,400 Award Period: 9/03-9/05

GOALI: A Symmetry-Based Group Theory Approach to Data Reduction for Micro-Optics Manufacturing (PI)
NSF
$236,249 Award Period: 9/03 – 8/06

CAREER: Self-Calibration Metrology Advances for Micro-Optics Manufacturing (PI)
NSF
$400,000 Award Period: 5/04 – 5/10

MRI: Nano-solid Freeform Generator for Micro-Optics Replication (Co-PI, Major Contribution)
NSF
$430,501 Award Period: 09/04 - 08/07

Characterization of Optical Materials with a Zygo MST Interferometer (PI)
Northrop Grumman Corporation
$5,619 Award Period: 09/04 - 12/04

Ultra Precision Coordinate Measuring Machine (PI)
Eastman Kodak
$192,736 Award Date: 10/04

Industry/University Cooperative Research Center for Precision Metrology (Co-PI, Minor Contribution)
NSF
$43,000 Award Period: 08/03 - 07/06

Micro-lens Performance Metrology Advances (PI)
NSF REU Supplement
$12,000 Award Period: 5/04 – 5/10

Advancing Metrology for Micro-Optics Manufacturing Through an International Collaboration with the Vrije Universiteit Brussel (VUB) (PI)
NSF IREE Supplement to CAREER
$28,000 Award Period: 5/04 – 5/10

Non-contact Metrology of Large Structures Literature Review (PI)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$10,000 Award Period: 6/06-12/06

Terahertz Metrology (PI)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$90,000 Award Period: 9/06-12/09

Fringe Projection for Metrology of Large Structures (PI)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$90,000 Award Period: 9/06-12/09

6DOF Sensor using Optical Scattering and Photogrammetry (Co-PI)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$99,000 Award Period: 6/09-5/12

In Situ Form Metrology in Manufacturing by Combining Engineered Optical Scattering and Photogrammetry (PI)
NSF
$464,062 Award Period: 8/09 - 8/12

Extending Capabilities for Optical Profilometry (PI)
Center for Precision Metrology Industrial Affiliates Program, UNC Charlotte
$52,000 Award Period: 1/11-1/13

Service

Department of Physics and Optical Science Graduate Committee, 2001-Present.

Faculty Search Committee, 2001-2002, 2003-2004, and 2004-2005 Academic Years.

2004-2009 Academic Plan Committee, 2001-2002 Academic Year.

Educational Committee in the American Society of Precision Engineering, 2001-Present.

President Elect, Optical Society of America Local Chapter, 2001-2003.

Department Chair Advisory Committee, 2002-2003 and 2003-2004 Academic Year.

Undergraduate Laboratory Restructuring Committee, 2002-2003 Academic Year.

Guest Editor, Special Edition, Journal of lightwave Technology on Manufacturing for Optical Technologies, 2003-2004.

PHYS1101/1102 and PHYS2101/2102 Curriculum Development Committee, 2003-2004 Academic Year.

Search Committee for the Director of Sponsored Research for the College of Arts and Sciences, 2003-2004 Academic Year.

Department of Chemistry Planning Committee for the Nanotechnology Ph.D. Program, 2003-2004 Academic Year..

Department Chair Review Committee, Fall 2004.

Program Committee Member, SPIE Annual Meeting, Interferometry, July 2004, 2006, 2008.

Chair of Subcommittee for the Optical Science and Engineering Degree Program, 2004-2005 Academic Year.

Program Committee Member, SPIE Annual Meeting, Interferometry XIII, August 2006.

Program Committee Member, Optical Fabrication and Testing Topical Meeting, October 2006.

Program Committee Member, American Society of Precision Engineering, Interferometry Topical Meeting, June 2010.

Optics Graduate Colloquium Coordinator, January 2007 – Present.

Graduate Coordinator, Department of Physics and Optical Science, July 2009-Present

Review, Promotion, Tenure Committee, July 2009-Present

Future of the Faculty Committee, September 2009-Present

Director, Optical Science and Engineering Interdisciplinary Degree Program, July 2009-Present

Conference Co-Chair, American Society of Precision Engineering Summer Topical, June 2010

Professional Societies

Member of the Optical Society of America
Member of the American Society of Precision Engineering
Member of SPIE - The International Society for Optical Engineering

Advising

Neil Gardner, M.S. Mechanical Engineering, Fall 2003
Devendra Karodkar, M.S. Mechanical Engineering, Spring 2004
Brent Bergner, M.S. Optical Science and Engineering, Spring 2004
Daryl Purcell, M.S. Optical Science and Engineering, Fall 2005
Ayman Samara, Ph.D. Optical Science and Engineering, Fall 2005
Katherine Medicus, Ph.D. Mechanical Engineering, Spring 2006
Solomon Gugsa, Ph.D. Optical Science and Engineering, Summer 2006
Neil Gardner, Ph.D. Mechanical Engineering, Spring 2007
Amit Suratkar, Ph.D. Optical Science and Engineering, April 2009
Daryl Purcell, Ph.D. Optical Science and Engineering, March 2010
Javaid Ikram, M.S. Optical Science and Engineering, May 2010
Young-Sik Ghim, Postdoctoral Research Associate, January 2008 - October 2009
Yue Dong, Ph.D. Optical Science and Engineering, To Graduate 2014

Refereed Publications

"Ballistic electron emission microscopy of laterally patterned microstructures." A. Davies, J. G. Couillard, and H. G. Craighead, Applied Physics Letters 61, 1040-1042 (1992).

"Ballistic electron emission microscopy investigation of SiGe nanostructures fabricated using reactive ion etching." J. G. Couillard, A. Davies, and H. G. Craighead, Journal of Vacuum Science Technology B 10, 3112-3115 (1992).

"Ballistic electron emission microscopy characteristics of reverse-biased Schottky diodes." A. Davies and H. G. Craighead, Applied Physics Letters, 64, 2833-2835 (1994).

"Tunneling spectroscopy of bcc(001) surface-states." J. A. Stroscio, A. Davies, D. T. Pierce, R. J. Celotta, Physical Review Letters 75, 2960-2963 (1995).

"Atomic-scale observations of alloying at the Cr-Fe(001) interface." A. Davies, J. A. Stroscio, D. T. Pierce, R. J. Celotta, Physical Review Letters 76, 4175-4178 (1996).

Effect of interfacial roughness on exchange coupling.” Unguris J, Celotta RJ, Davies A, Pierce DT, Stroscio JA, Journal of Applied Physics 81, 4342-4342 (1997).

“Observations of alloying in the growth of Cr on Fe(001).” Davies A, Stroscio JA, Pierce DT, Unguris J, Celotta RJ, Journal of Magnetism and Magnetic Materials 165, 82-86 (1997).

"Polarized light emission from the metal-metal STM junction." D. T. Pierce, A. Davies, J. A. Stroscio, and R. J. Celotta, Applied Physics A 66, S403-S406 (1998).

"Non-collinear exchange coupling in Fe/Mn/Fe (001): Insight from scanning tunneling microscopy." D. T. Pierce, A. Davies, J. A. Stroscio, D. A. Tulchinsky, J. Unguris, and R. J. Celotta, Journal of Magnetism and Magnetic Materials, 222 (1-2) 13-27 (2000).

"Estimating the RMS of a Wavefront and Its Uncertainty." A. Davies and M. Levenson, Applied Optics, 40, 6203-6209 (2001).

"Advanced Optics Characterization." A. Davies, C. Tarrio, and C. J. Evans, Optics & Photonics News, 12, 34-38 (2001).

“Displacement Uncertainty in Interferometric Radius Measurements.” T. L. Schmitz, C. J. Evans, A. Davies, and W. T. Tyler, Annals of the CIRP, 51/1: 451-454, 2002.

“Silicon Wafer Thickness Variation Measurements using the NIST Infrared Interferometer.” T. Schmitz, A. Davies, C. J. Evans, and R. Parks, Optical Engineering, 42/8: 2281-2290, 2003.

“Correcting for Stage Error Motions in Radius Measurements.” A. Davies and T. Schmitz, Applied Optics. 44 (28): 5884-5893 OCT 1 2005.

“Self-calibration for Micro-refractive Lens Measurements.” N. Gardner and A. Davies, Optical Engineering, 45 (3): 033603-1 – 033603-5, 2006.

“Self-Calibration for Transmitted Wave Front Measurements.” B. C. Bergner and A. Davies, *Applied Optics*, **46**, 18-24 (2007).

“Modeling the Interferometric Radius Measurement using a Gaussian Beam Propagation.” K. M. Medicus, J. Snyder, and A. Davies, *Applied Optics*, **45**, 8621-8628 (2006).

“Effective Wavelength Calibration for Moiré Fringe Projection.” Daryl Purcell, Angela Davies, Faramarz Farahi, *Applied Optics*, **45**, 8629-8635 (2006).

“An Interferometric Measurement of the Phase Change on Reflection.” Kate M. Medicus, Marcus Chaney, John E. Brodziak Jr, and Angela Davies, *Applied Optics*, **46**, 2027-2035

(2007).

"Improving Optical Bench Radius Measurements Using Stage Error Motion Data." Tony L. Schmitz, Neil Gardner, Kate M. Medicus, Angela Davies, *Applied Optics*, **47**, 6692-6700 (2008).

"Micro-optic reflection and transmission interferometer for complete microlens characterization." Virginia Gomez, Young-Sik Ghim, Heidi Ottevaere, Neil Gardner, Brent Bergner, Kate Medicus, Angela Davies, and Hugo Thienpont, *Measurement Science and Technology*, **20**, 025901 (2009).

"Wavelength scanning interferometer for 3D topographical thickness measurements of thin wafers." Young-Sik Ghim*, Amit Suratkar, and Angela Davies, *Optics Express*, **18**, Issue 7, pp. 6522-6529 (2010).

"Interferometric technique for faceted microstructure metrology using an index matching liquid," Daryl Purcell, Amit Suratkar, Angela Davies, Faramarz Farahi, Heidi Ottevaere, and Hugo Thienpont, *Applied Optics,* **49**, 732-738 (2010).

Other Publications

"An investigation of uncertainties limiting radius measurement performance." T. Schmitz, C. J. Evans, and A. Davies, Extended Abstract, American Society for Precision Engineering Spring Topical Meeting on Precision Interferometric Metrology, May 2000.

"The NIST X-ray optics CALIBration InterefometeR (XCALIBIR)." A. Davies and C. J. Evans, Extended Abstract, American Society for Precision Engineering Spring Topical Meeting on Precision Interferometric Metrology, May 2000.

"Estimating the RMS Wavefront Error from a Data Set and the Associated Measurement Uncertainty." A. Davies and M. Levenson, Extended Abstract, American Society for Precision Engineering Spring Topical Meeting on Precision Interferometric Metrology, May 2000.

"Sensitivity of Homogeneity Measurements to Sample Position, Focus, and Beam Coherence." A. Davies and C. J. Evans, Extended Abstract, American Society for Precision Engineering Spring Topical Meeting on Precision Interferometric Metrology, May 2000.

"Interferometric Metrology of Photomask Blanks: Approaches Using 633 nm Wavelength." C. J. Evans, A. Davies, R. E. Parks, L. Shao, NISTIR 6701, December (2000).

"Haidinger interferometer for silicon wafer TTV measurement." R. E. Parks, L. Shao, A. Davies, and C. J. Evans, SPIE Conference Proceedings, SPIE's 26th Annual International Symposium Microlithography, February (2001).

“Interferometric Testing of Photomask Blank Flatness.” C. J. Evans, R. E. Parks, L. Shao, T. Schmitz, and A. Davies, SPIE Conference Proceedings, SPIE’s 26th Annual International Symposium Microlithography, February (2001).

“Uncertainties in interferometric measurements of radius of curvature.” T. L. Schmitz,A. Davies, and C. J. Evans, SPIE Conference Proceedings, SPIE’s 46th Annual International Symposium on Optical Science and Technology, July (2001).

“Interferometric figure metrology; enabling in-house traceability." C. J. Evans, A. Davies, T. Schmitz and R. E. Parks, SPIE Conference Proceedings, SPIE’s 46th Annual International Symposium on Optical Science and Technology, July (2001).

“Improving Metrology for Micro-Optics Manufacturing.” Invited Paper. A. Davies, SPIE Conference Proceedings, SPIE’s 48th Annual International Symposium on Optical Science and Technology, Gradient Index, Miniature, and Diffractive Optical Systems III Conference, San Diego, August (2003).

“Defining the Measurand in Radius of Curvature Measurements.” A. Davies and T. Schmitz, SPIE Conference Proceedings, SPIE’s 48th Annual International Symposium on Optical Science and Technology, Recent Developments in Traceable Dimensional Measurements II Conference, San Diego, August (2003).

“Self-Calibration for Micro-Refractive Lens Measurements.” Neil Gardner, Timothy Randolph, and Angela Davies, SPIE Conference Proceedings, SPIE’s 48th Annual International Symposium on Optical Science and Technology, Optical Manufacturing and Testing V Conference, San Diego, August (2003).

“Self-calibration Technique for Transmitted Wavefront Measurements.” Brent C. Bergner*, Angela Davies, SPIE Conference Proceedings, SPIE’s 48th Annual International Symposium on Optical Science and Technology, Optical Manufacturing and Testing V Conference, San Diego, August (2003).

“Traceable Radius of Curvature Measurements on a Micro-Interferometer.” Devendra Karodkar, Neil Gardner, Brent C. Bergner, and Angela Davies, SPIE Conference Proceedings, SPIE’s 48th Annual International Symposium on Optical Science and Technology, Optical Manufacturing and Testing V Conference, San Diego, August (2003).

“Compact Interferometer for Micro-Optic Performance and Shape Characterization.” K. M. Medicus, D. Karodkar, B. Bergner, N. Gardner, A. Davies, SPIE Conference Proceedings, SPIE’s 48th Annual International Symposium on Optical Science and Technology, Lithographic and Micromachining Techniques for Optical Component Fabrication II Conference, San Diego, August (2003).

“Radius of Curvature Uncertainty: Nonlinear Measurand and Treatment”, T. Schmitz and

A. Davies, Proceedings of Uncertainty Analysis in Measurement and Design, ASPE Summer Topical Meeting, State College, PA, pp. 78-82., June 30-July 1 (2004).

"Advances in micro-lens surface metrology: the role of retrace errors", Neil Gardner and Angela Davies, Proceedings of the Optical Fabrication and Testing Conference, Rochester, NY, October (2004).

"Traceable Radius Measurements of Micro-lenses", Ayman M. Samara, Brent C. Bergner, Angela Davies, Kate Medicus and Neil Gardner, Proceedings of the Optical Fabrication and Testing Conference, Rochester, NY, October (2004).

"The Effect of Phase Change on Reflection on Optical Measurements", Kate M. Medicus, Liesel R. Fricke, John E. Brodziak Jr., Sharon Carnevale, Marcus Chaney, Rachel Wolff, Angela D. Davies, Proceedings of the ASPE Annual Meeting, Orlando, FL, November (2004).

"Self-calibration for Micro-Refractive Lens Metrology", A. Davies and N. Gardner, Proceedings of the 2005 NSF DMII Grantees Conference, Scottsdale, Arizona, January (2005).

"A Simulation Package for Evaluating Interferometric Micro-Aspheric Lens Measurements", S. A. Gugsa and A. Davies, Proceedings of the 2005 NSF DMII Grantees Conference, Scottsdale, Arizona, January (2005).

"Measurement advances for micro-refractive fabrication", Neil Gardner, Angela Davies and Brent Bergner, Invited Paper, SPIE Conference Proceedings, SPIE International Symposium on Optical Metrology, Micro- and Nano-Metrology Conference, Munich, Germany, June (2005).

"Gaussian Beam Modeling of the Radius of Curvature", Kate M. Medicus, James Synder, Angela D. Davies, Proceedings of the ASPE 2005 Summer Topical Meeting, Precision Interferometric Metrology, Middletown, Connecticut, July (2005).

"Systematic Bias Compensation for a Moiré Fringe Projection System", D. Purcell, A. Samara, A. Davies, and F. Farahi, SPIE Conference Proceedings, SPIE's 50th Annual International Symposium on Optics and Photonics, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).

"Moiré and Fringe Projection Technique for the Measurement of Form, Waviness and Roughness", Ayman Samara, Angela Davies, and Faramarz Farahi, SPIE Conference Proceedings, SPIE's 50th Annual International Symposium on Optics and Photonics, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).

"Monte Carlo analysis on determination of conic constant of an Aspheric Micro Lens

based on SWLI Measurement", S. A. Gugsa and A. Davies, SPIE Conference Proceedings, SPIE's 50th Annual International Symposium on Optics and Photonics, Advanced Characterization Techniques for Optics, Semiconductors, and Nanotechnologies II Conference, San Diego, August (2005).

"Retrace error evaluation on a figure-measuring interferometer", Neil Gardner and Angela Davies, SPIE Conference Proceedings, SPIE's 50th Annual International Symposium on Optics and Photonics, Optical Manufacturing and Testing VI Conference, San Diego, August (2005).

"Radius case study: Optical bench measurement and uncertainty including stage error motions", Tony L. Schmitz, Neil Gardner, Matthew Vaughn, Angela Davies, SPIE Conference Proceedings, SPIE's 50th Annual International Symposium on Optics and Photonics, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).

"The Effect of Phase Change on Reflection on Optical Measurements", Kate M. Medicus, Anneliese Fricke, John Edward Brodziak Jr, Angela Davies, SPIE Conference Proceedings, SPIE's 50th Annual International Symposium on Optics and Photonics, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).

"Gaussian Beam Modeling of the Radius of Curvature Measurement", Kate Medicus, James J. Snyder, and Angela Davies, SPIE Conference Proceedings, SPIE's 50th Annual International Symposium on Optics and Photonics, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).

"A Self-calibration Approach to Transmitted Wave Front Measurements", A. Davies and B. C. Bergner, Proceedings of the 2006 NSF Design, Service, and Manufacturing Grantees and Research Conference, St. Louis, Missouri, July (2006).

"A Least-squares Minimization and Monte Carlo Approach to Estimating the Conic Constant and Uncertainty for Microlens Measurements", A. Davies and S. A. Gugsa, Proceedings of the 2006 NSF Design, Service, and Manufacturing Grantees and Research Conference, St. Louis, Missouri, July (2006).

"Ray-trace simulation of the random ball test to improve microlens metrology", Neil Gardner and Angela Davies, SPIE Conference Proceedings, Conference on Interferometry XIII, AUG 14-16, 2006, Interferometry XIII: Techniques and Analysis 6292: 29204-29204 (2006).

"Ray-trace simulation of the random ball test to improve microlens metrology", Neil Gardner and Angela Davies, Proceedings of the Optical Fabrication and Testing Conference, Rochester, NY, October (2006).

“Improving Radius Measurements on a Commercial Interferometer”, Angela Davies, Tony L. Schmitz, Neil Gardner, Kate M. Medicus, and Matthew L. Vaughn, Proceedings of the Optical Fabrication and Testing Conference, Rochester, NY, October (2006).

“Measuring the Wavefront Distortion of a Microlens Array Using an Index Matching Liquid”, D. Purcell, A. Suratkar, A. Davies, and F. Farahi, Proceedings of the Optical Fabrication and Testing Conference, Rochester, NY, October (2006).

“Uncertainty Analysis on the Absolute Thickness of a Cavity Using Wavelength Shifting Interferometry”, Amit R, Suratkar, Angela Davies, Proceedings of the Optical Fabrication and Testing Conference, Rochester, NY, October (2006).

“New interferometric technique to measure the length (thickness) of opaque objects using a commercial interferometer”, Amit Suratkar, Angela Davies, and Faramarz Farahi, SPIE Optics + Photonics 2007, Proceedings of SPIE, Optical Manufacturing and Testing VII, Vol. 6671, 66710N, San Diego, August (2007). Very significant contribution.

“An Interferometric Technique for Micro-Structure Measurements Using an Index Matching Liquid”, Angela Davies, Daryl Purcell, Amit Suratkar, Faramarz Farahi, Heidi Ottevaere, Hugo Thienpont, Proceedings of the 2008 NSF Engineering Research and Innovation Conference, Knoxville, Tennessee, January (2008).

“Absolute Length (Thickness) Measurements Using Wavelength Scanning Interferometry”, A. Suratkar, A. Davies, and F. Farahi, Extended Abstract, American Society for Precision Engineering Annual Meeting, Portland, OR, October (2008).

"Uncertainty Analysis on a Commercial Wavelength Scanning Interferometer Measuring Absolute Distances", Amit Suratkar, Young-Sik Ghim, and Angela Davies, Proceedings of SPIE, 7063, 70630R (2008).