

# CURRICULUM VITAE

## Angela D. Davies

Assistant Professor  
 Department of Physics and Optical Science  
 The University of North Carolina at Charlotte

<b>EDUCATION</b>	Cornell University	1994 1991	Ph.D. Physics M.S. Physics
	University of Oregon	1988	B.S. Physics
<b>PERSONAL</b>	Date of Birth: January 1, 1966 Home Address: 2210 Kenmore Ave Charlotte, NC 28204 (704) 332-8714 Work Address: 9201 University City Blvd. Department of Physics and Optical Science 208 Grigg Building Charlotte, NC 28223-0001 (704) 687-8135		
<b>PROFESSIONAL EXPERIENCE</b>	University of North Carolina at Charlotte Charlotte, North Carolina, USA		2001-Present
	<ul style="list-style-type: none"> <li>Assistant Professor, Physics and Optical Science</li> </ul>		2002-Present
	National Institute of Standards and Technology Gaithersburg, Maryland, USA		1994-2001
	<ul style="list-style-type: none"> <li>Postdoctoral Fellow, Physics Laboratory</li> </ul>		1994-1995
	<ul style="list-style-type: none"> <li>Physicist, Physics Laboratory</li> </ul>		1995-1998
	<ul style="list-style-type: none"> <li>Physicist, Manufacturing Engineering Laboratory</li> </ul>		1998-2001
	Cornell University Ithaca, New York, USA		1988-1994
	<ul style="list-style-type: none"> <li>Graduate Research Assistant</li> </ul>		1989-1994
	<ul style="list-style-type: none"> <li>Teaching Assistant</li> </ul>		1988-1989

<b>UNIVERSITY SERVICE Department</b>	Graduate Committee	2001-Present
	Faculty Search Committee	2001-2002 2003-2004 2004-2005
	Strategic Planning Committee for 2004-2009 Plan	2001-2002
	Department Chair Advisory Committee	2002-2003 2003-2004
	Undergraduate Laboratory Restructuring Committee	2002-2003
	PHYS1101/1102 and PHYS2101/2102 Curriculum Development Committee	2003-2004
<b>UNIVERSITY SERVICE College</b>	Search Committee for the Director of Sponsored Research	2003-2004
	Department Chair Review Committee	Fall 2004
<b>UNIVERSITY SERVICE University</b>	Planning Committee for the Interdisciplinary Nanotechnology Ph.D. Program	2003-Present
	Subcommittee Chair for the Interdisciplinary M.S. and Ph.D. Optical Science and Engineering Degree Programs	2004-2005
<b>PROFESSIONAL SERVICE External</b>	Invited Attendee NSF Workshop on “Ultra-high-capacity Optical Communications and Networking”. Co-chair of “Packaging, Processing, and Manufacturing” Subcommittee.	Fall 2000
	Education Committee for the American Society of Precision Engineering	2001-Present
	Program Committee Member, SPIE Annual Symposium, Interferometry XII Conference	2003-2004
	Program Committee Member, SPIE Annual Symposium, Interferometry XIII Conference	2005-2006

<p><b>PROFESSIONAL SERVICE</b>  <b>External</b>  (continued)</p> <p><b>Invited Seminars</b></p>	<p>Guest Editor, Journal of Lightwave Technology, Special Edition on Manufacturing for Optical Technologies</p> <p>Measuring Micro-Optic Components, Regional OSA Meeting, Charlotte North Carolina</p> <p>Improving Metrology for Micro-Optics Manufacturing, SPIE Annual Symposium, Gradient Index, Miniature, and Diffractive Optical Systems III Conference, San Diego California</p> <p>Metrology Challenges for Micro-Optics Manufacturing, CIRP International Congress for Manufacturing Research, Paris France</p> <p>Measuring Micro-Optics, Spotlight on Research, UNC Charlotte Channel 22</p> <p>Measurement Advances for Micro-refractive Fabrication, OSA Annual Symposium, Diffractive Optics and Micro-Optics Conference, Rochester New York</p> <p>Measurement Advances for Micro-Refractive Fabrication, SPIE International Symposium on Optical Metrology, Micro- and Nano-Metrology Conference, Munich, Germany</p>	<p>2003-2004</p> <p>October 2001</p> <p>August 2003</p> <p>January 2004</p> <p>March 2004</p> <p>October 2004</p> <p>June 2005</p>
<p><b>PUBLICATIONS</b>  <b>Refereed Journal</b></p>	<ol style="list-style-type: none"> <li>1. "An Interferometric Measurement of the Phase Change on Reflection." Kate M. Medicus, Marcus Chaney, John E. Brodziak Jr., and Angela Davies, Submitted for Publication to <i>Applied Optics</i>, August 2006.</li> <li>2. "Self-Calibration for Transmitted Wave Front Measurements." B. C. Bergner and A. Davies, <i>Applied Optics</i>, April 2006. <u>In Press.</u></li> <li>3. "Effective Wavelength Calibration for Moiré Fringe Projection." Daryl Purcell, Angela Davies, and Faramarz Farahi, Accepted for Publication to <i>Applied Optics</i>, April 2006. <u>In Press.</u></li> </ol>	

**PUBLICATIONS**  
**Refereed**  
**Journal**  
(continued)

4. "Modeling the Interferometric Radius Measurement using a Gaussian Beam Propagation." K. M. Medicus, J. Snyder, and A. Davies, Accepted for Publication to *Applied Optics*, April 2006. In Press.
5. "Self-calibration for Micro-refractive Lens Measurements." N. Gardner and A. Davies, *Optical Engineering*, **45** (3): 033603-1 – 033603-5, 2006.
6. "Correcting for Stage Error Motions in Radius Measurements." A. Davies and T. Schmitz, *Applied Optics*, **44** (28): 5884-5893 OCT 1 2005.
7. "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.
8. "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.
9. "Estimating the RMS of a Wavefront and Its Uncertainty." A. Davies and M. Levenson, *Applied Optics*, **40**, 6203-6209 (2001).
10. "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).
11. "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).
12. "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).
13. "Effect of interfacial roughness on exchange coupling." Unguris J., Celotta R.J., Davies A., Pierce D.T., Stroscio J.A., *Journal of Applied Physics*, **81**, 4342-4342 (1997).
14. "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).

<p><b>PUBLICATIONS</b>  <b>Refereed</b>  <b>Journal</b>  (continued)</p>	<ol style="list-style-type: none"> <li>15. "Tunneling spectroscopy of bcc(001) surface-states." J. A. Stroscio, A. Davies, D. T. Pierce, R. J. Celotta, <i>Physical Review Letters</i>, <b>75</b>, 2960-2963 (1995).</li> <li>16. "Ballistic electron emission microscopy characteristics of reverse-biased Schottky diodes." A. Davies and H. G. Craighead, <i>Applied Physics Letters</i>, <b>64</b>, 2833-2835 (1994).</li> <li>17. "Ballistic electron emission microscopy investigation of SiGe nanostructures fabricated using reactive ion etching." J. G. Couillard, A. Davies, and H. G. Craighead, <i>Journal of Vacuum Science Technology B</i>, <b>10</b>, 3112-3115 (1992).</li> <li>18. "Ballistic electron emission microscopy of laterally patterned microstructures." A. Davies, J. G. Couillard, and H. G. Craighead, <i>Applied Physics Letters</i>, <b>61</b>, 1040-1042 (1992).</li> </ol>
<p><b>PUBLICATIONS</b>  <b>Conference</b>  <b>Proceedings</b></p>	<ol style="list-style-type: none"> <li>1. "A Least-squares Minimization and Monte Carlo Approach to Estimating the Conic Constant and Uncertainty for Microlens Measurements", A. Davies and S. A. Gugsu, <i>Proceedings of the 2006 NSF Design, Service, and Manufacturing Grantees and Research Conference</i>, St. Louis, Missouri, July (2006).</li> <li>2. "A Self-calibration Approach to Transmitted Wave Front Measurements", A. Davies and B. C. Bergner, <i>Proceedings of the 2006 NSF Design, Service, and Manufacturing Grantees and Research Conference</i>, St. Louis, Missouri, July (2006).</li> <li>3. "Gaussian Beam Modeling of the Radius of Curvature Measurement", Kate Medicus, James J. Snyder, and Angela Davies, <i>Proceedings of the SPIE 50th Annual International Symposium on Optics and Photonics, Recent Developments in Traceable Dimensional Measurements III Conference</i>, San Diego, August (2005).</li> <li>4. "The Effect of Phase Change on Reflection on Optical Measurements", Kate M. Medicus, Anneliese Fricke, John Edward Brodziak Jr, Angela Davies, <i>Proceedings of the SPIE 50th Annual International Symposium on Optics and Photonics, Recent Developments in Traceable Dimensional Measurements III Conference</i>, San Diego, August (2005).</li> </ol>

**PUBLICATIONS**  
**Conference**  
**Proceedings**  
(continued)

5. "Radius case study: Optical bench measurement and uncertainty including stage error motions", Tony L. Schmitz, Neil Gardner, Matthew Vaughn, Angela Davies, *Proceedings of the SPIE 50th Annual International Symposium on Optics and Photonics*, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).
6. "Retrace error evaluation on a figure-measuring interferometer", Neil Gardner and Angela Davies, *Proceedings of the SPIE 50th Annual International Symposium on Optics and Photonics*, Optical Manufacturing and Testing VI Conference, San Diego, August (2005).
7. "Monte Carlo analysis on determination of conic constant of an Aspheric Micro Lens based on SWLI Measurement", S. A. Gugsu and A. Davies, *Proceedings of the SPIE 50th Annual International Symposium on Optics and Photonics*, Advanced Characterization Techniques for Optics, Semiconductors, and Nanotechnologies II Conference, San Diego, August (2005).
8. "Moiré and Fringe Projection Technique for the Measurement of Form, Waviness and Roughness", Ayman Samara, Angela Davies, and Faramarz Farahi, *Proceedings of the SPIE 50th Annual International Symposium on Optics and Photonics*, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).
9. "Systematic Bias Compensation for a Moiré Fringe Projection System", D. Purcell, A. Samara, A. Davies, and F. Farahi, *Proceedings of the SPIE 50th Annual International Symposium on Optics and Photonics*, Recent Developments in Traceable Dimensional Measurements III Conference, San Diego, August (2005).
10. "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).
11. "Measurement advances for micro-refractive fabrication", Neil Gardner, Angela Davies and Brent Bergner, Invited Paper, *Proceedings of the SPIE 50th Annual International Symposium on Optical Metrology, Micro- and Nano-Metrology Conference*, Munich, Germany, June (2005).
12. "A Simulation Package for Evaluating Interferometric Micro-Aspheric Lens Measurements", S. A. Gugsu and A. Davies, *Proceedings of the 2005 NSF DMII Grantees Conference*, Scottsdale, Arizona, January (2005).

**PUBLICATIONS**  
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**Proceedings**  
(continued)

13. "Self-calibration for Micro-Refractive Lens Metrology", A. Davies and N. Gardner, *Proceedings of the 2005 NSF DMII Grantees Conference*, Scottsdale, Arizona, January (2005).
14. "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).
15. "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).
16. "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).
17. "Radius of Curvature Uncertainty: Nonlinear Measurand and Treatment", T. Schmitz and A. Davies, *Proceedings of the ASPE Summer Topical Meeting on Uncertainty Analysis in Measurement and Design*, State College, PA, pp. 78-82, June 30-July 1 (2004).
18. "Radius of Curvature Uncertainty: Nonlinear Measurand and Treatment", T. Schmitz and A. Davies, *Proceedings of the ASPE Summer Topical Meeting on Uncertainty Analysis in Measurement and Design*, State College, PA, pp. 78-82., June 30-July 1 (2004).
19. "Traceable Radius of Curvature Measurements on a Micro-Interferometer." Devendra Karodkar, Neil Gardner, Brent C. Bergner, and Angela Davies, *Proceedings of the SPIE 48th Annual International Symposium on Optical Science and Technology*, Optical Manufacturing and Testing V Conference, San Diego, August (2003).
20. "Self-calibration Technique for Transmitted Wavefront Measurements." Brent C. Bergner\*, Angela Davies, *Proceedings of the SPIE 48th Annual International Symposium on Optical Science and Technology*, Optical Manufacturing and Testing V Conference, San Diego, August (2003).
21. "Self-Calibration for Micro-Refractive Lens Measurements." Neil Gardner, Timothy Randolph, and Angela Davies, *Proceedings of the SPIE 48th Annual International Symposium on Optical Science and Technology*, Optical Manufacturing and Testing V Conference, San Diego, August (2003).

**PUBLICATIONS**  
**Conference**  
**Proceedings**  
(continued)

22. "Defining the Measurand in Radius of Curvature Measurements." A. Davies and T. Schmitz, *Proceedings of the SPIE 48th Annual International Symposium on Optical Science and Technology, Recent Developments in Traceable Dimensional Measurements II Conference*, San Diego, August (2003).
23. "Improving Metrology for Micro-Optics Manufacturing." Invited Paper, A. Davies, *Proceedings of the SPIE 48th Annual International Symposium on Optical Science and Technology, Gradient Index, Miniature, and Diffractive Optical Systems III Conference*, San Diego, August (2003).
24. "Interferometric figure metrology; enabling in-house traceability." C. J. Evans, A. Davies, T. Schmitz and R. E. Parks, *Proceedings of the SPIE 46th Annual International Symposium on Optical Science and Technology, Harnessing Light: Optical Science and Metrology at NIST Conference*, July (2001).
25. "Uncertainties in interferometric measurements of radius of curvature." T. L. Schmitz, A. Davies, and C. J. Evans, *Proceedings of the SPIE 46th Annual International Symposium on Optical Science and Technology, Optical Manufacturing and Testing IV*, July (2001).
26. "Interferometric Testing of Photomask Blank Flatness." C. J. Evans, R. E. Parks, L. Shao, T. Schmitz, and A. Davies, *Proceedings of the SPIE SPIE 26th Annual International Symposium on Microlithography*, February (2001).
27. "Haidinger interferometer for silicon wafer TTV measurement." R. E. Parks, L. Shao, A. Davies, and C. J. Evans, *Proceedings of the SPIE SPIE 26th Annual International Symposium on Microlithography*, February (2001).
28. "Interferometric Metrology of Photomask Blanks: Approaches Using 633 nm Wavelength." C. J. Evans, A. Davies, R. E. Parks, L. Shao, *NISTIR 6701*, December (2000).
29. "Sensitivity of Homogeneity Measurements to Sample Position, Focus, and Beam Coherence." A. Davies and C. J. Evans, *Proceedings of the ASPE Spring Topical Meeting on Precision Interferometric Metrology*, May 2000.
30. "Estimating the RMS Wavefront Error from a Data Set and the Associated Measurement Uncertainty." A. Davies and M. Levenson, *Proceedings of the ASPE Spring Topical Meeting on Precision Interferometric Metrology*, May 2000.

<b>PUBLICATIONS</b> <b>Conference</b> <b>Proceedings</b> (continued)	<ol style="list-style-type: none"> <li>31. "The NIST X-ray optics CALIBration InterefometeR (XCALIBIR)." A. Davies and C. J. Evans, <i>Proceedings of the ASPE Spring Topical Meeting on Precision Interferometric Metrology</i>, May 2000.</li> <li>32. "An investigation of uncertainties limiting radius measurement performance." T. Schmitz, C. J. Evans, and A. Davies, <i>Proceedings of the ASPE Spring Topical Meeting on Precision Interferometric Metrology</i>, May 2000.</li> </ol>
<b>PUBLICATIONS</b> <b>Popular Press</b> <b>Articles</b>	<ol style="list-style-type: none"> <li>1. "Advanced Optics Characterization." A. Davies, C. Tarrío, and C. J. Evans, <i>Optics &amp; Photonics News</i>, 12, 34-38 (2001).</li> </ol>
<b>PROFESSIONAL</b> <b>AFFILIATIONS</b>	<p>Member of the American Physical Society</p> <p>Member of the Optical Society of America</p> <p>Member of the American Society of Precision Engineering</p> <p>Member of SPIE - The International Society for Optical Engineering</p>