

AARON R. HAWKINS

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EDUCATION

Ph.D. Electrical and Computer Engineering (1998)

University of California, Santa Barbara Santa Barbara, CA

- Dissertation Title: Silicon-Indium-Gallium-Arsenide Avalanche Photodetectors
- Advisor: John E. Bowers

M.S. Electrical and Computer Engineering (1996)

University of California, Santa Barbara Santa Barbara, CA

B.S. (Honors) Applied Physics (1994)

California Institute of Technology Pasadena, CA

ACADEMIC EXPERIENCE

Professor (2008-Present)

Department of Electrical and Computer Engineering, Brigham Young University, Provo, UT

- Teach undergraduate and graduate classes
- Supervise and guide master's and doctoral students' thesis work
- Supervise and guide undergraduate research and senior level projects
- Establish and direct Microengineering research program

Director of Integrated Microfabrication Laboratory (cleanroom) (2002-Present)

Brigham Young University, Provo, UT

- Manage professional staff working in laboratory
- Oversee capital equipment and supply expenditures for laboratory
- Oversee student training, documentation, and research and teaching direction for laboratory
- Laboratory is a 2500 ft², class 10 cleanroom
- Since 2002, 23 new machines or systems have been brought on-line in this facility

Associate Professor (2002-2008)

Department of Electrical and Computer Engineering, Brigham Young University, Provo, UT

COURSES TAUGHT

New Student Seminar (ECEn191)* – undergraduate level

includes laboratory portion

Introduction to Circuits (ECEn212) – undergraduate level

Semiconductor Devices (ECEn450)* – undergraduate level

Semiconductor Devices Laboratory (ECEn452)* – undergraduate level

Solar Lighting, Free Space Optical Communications, Lightsuits (ECEn490)* – senior project

Micro-electro-mechanical Systems (ECEn550)* – graduate level

includes laboratory portion

Optoelectronic Devices (ECEn555)* – graduate level

includes laboratory portion

* Indicates new course development

PROFESSIONAL EXPERIENCE

Consultant (2004 – 2006)

Palmar Technologies, Provo, UT

- Designed thin-film based electrodes for compact mass spectrometer
- Oversaw electrode fabrication on silicon and ceramic substrates

Staff Applications Engineer (2001 - 2002)

Intel Corporation, Calabasas, CA

- Provide technical support to networking customers for Intel's products from the optical fiber layer to the framer including TIAs, LIAs, Laser Drivers, CDRs, Mux and Demuxes, and FECs
- Perform systems and component level testing for new products including noise characterization, jitter performance, S-parameter measurements, and sensitivity measurements and predictions
- Set product specifications for next generation devices for SONET and Ethernet applications

Principle Engineer (1998 – 2001)

CIENA Corporation, Santa Barbara, CA

- Lead technical effort to bring InGaAs-Silicon avalanche photodiodes (APDs) to commercial viability at 10 Gbit/s and 2.5 Gbit/s, creating world's most sensitive optical receivers
- Hired, trained, and supervised a team of engineers and technicians to create and validate component processes, DC and RF testing procedures, package designs, and device reliability.
- Oversaw and scheduled component production utilizing \$2M annual budget

Vice President of Research and Development (1997 – 1998)

Terabit Technology Incorporated, Santa Barbara, CA

- Co-founded company based on graduate research
- Oversaw \$15M corporate acquisition of Terabit by CIENA Corporation
- Built semiconductor cleanroom and procured processing and testing equipment with \$2M capital equipment budget
- Fabricated prototype APDs for commercial applications using wafer fusion and standard silicon and III-V processing including implantation, CVD, RIE, RTA, zinc diffusion, SOG application, SEM, and AFM

Graduate Student Researcher (1994 – 1997)

University of California, Santa Barbara, Santa Barbara, CA

- Reported world record gain-bandwidth-product for optical detector
- Invented technique of InGaAs to silicon wafer fusion

Undergraduate Research Assistant (1992 – 1993)

Los Alamos National Laboratory, Los Alamos, NM

- Worked in hydrodynamics testing group modeling X-ray production from large radiographic machines

Teaching Assistant (1993 – 1994)

Applied Physics Department, California Institute of Technology, Pasadena, CA

- Graded, conducted recitations, and supervised labs for undergraduate optics class

Undergraduate Research Assistant (1991 – 1992)

Chemistry Department, California Institute of Technology, Pasadena, CA

- Assisted with time-of-flight mass spectrometry experiments

HONORS AND AWARDS

- Engineering and Technology Endowed Chair (2012 – present)
- BYU Electrical Engineering Department Outstanding Faculty Award, 2011
- BYU Electrical Engineering Department Outstanding Faculty Teaching Award, 2011
- BYU Karl G. Maeser Research and Creative Arts Award, 2010
- BYU College of Engineering, Excellence in Scholarship Award, 2005
- IEEE Senior Member, 2004
- Intel Division Award, 2002
- UCSB Chancellor's Fellowship, 1994-1995
- Caltech ARCS Scholar, 1992-1994
- Robert C. Byrd Scholarship from state of New Mexico
- High school valedictorian

PUBLICATIONS AND PATENTS

Books

1. Aaron R. Hawkins and Holger Schmidt (Eds.), "Handbook of Optofluidics," CRC Press, Taylor & Francis, ISBN 9781420093544, (2010).
2. Aaron R. Hawkins and Stephen M. Schultz, "Practically Magic – A Guide to Electrical and Computer Engineering," Kendall Hunt, ISBN 9780757581786, (2010).

Book Chapters

1. Aaron R. Hawkins, Matthew R. Holmes, Tao Shang, and Yue Zhao, "Microfabrication," in "Handbook of Optofluidics," Aaron R. Hawkins and Holger Schmidt, eds., CRC Press, Taylor & Francis, ISBN 9781420093544, (2010).
2. Holger Schmidt and Aaron R. Hawkins, "Single molecule analysis with planar optofluidics," in "Advanced Photonic Structure for Biological and Chemical Sensing," Xudong Fan, ed., Springer Verlag, (2009).
3. K. Alexis Black, Aaron R. Hawkins, Near M. Margalit, Dubravko I. Babic, Archie L. Holmes, Jr., Ying-Lan Chang, Patrick Abraham, John E. Bowers, and Evelyn L. Hu, "Fusion Bonding: Hetero-interfacial Materials Analysis and Device Application," in "Heterogeneous Integration: Systems on a Chip" A. Husain, M. Fallahi, eds., SPIE, Bellingham, Washington, (1998).

Archival Journal Publications

1. Shuo Liu, Yue Zhao, Joshua W. Parks, David D. Deamer, Aaron R. Hawkins, and Holger Schmidt, "Nanopore smart gate for simultaneous optical and electrical analysis of single viruses," In Review *Proceedings of the National Academy of Science*.
2. Joshua W. Parks, Michael A. Olson, Jungkyu Kim, Ricardo Carrion Jr., Jean L. Patterson, Richard A. Mathies, Aaron R. Hawkins, and Holger Schmidt, "Integration of digital microfluidics and on-chip fluorescence detection for biosensing applications," In Review *Biosensors and Bioelectronics*.
3. Spencer Chadderdon, LeGrand Shumway, Andrew Powell, Ailin Li, Daniel E. Austin, Aaron R. Hawkins, Richard H. Selfridge, Stephen M. Schultz, "Ion Trap Ion trap electric field measurements using slab coupled optical fiber sensors," In Press *Journal of the American Society for Mass Spectrometry*.

4. Ailin Li, Brett J. Hansen, Andrew T. Powell, Aaron R. Hawkins, Daniel E. Austin, "Miniaturization of a Planar-Electrode Linear Ion Trap Mass Spectrometer," In Press *Rapid Communications in Mass Spectrometry*.
5. Sara Ehlert, Nathan Ives, and Aaron R. Hawkins, "Cross-flow microfilters with large-diameter sacrificially-etched cross sections," *Microfluidics and Nanofluidics* **16**, 465 – 471, (2014).
6. Kaelyn D. Leake, Brian S. Phillips, Thomas D. Yuzvinsky, Aaron Hawkins, and Holger Schmidt, "Optical particle sorting on an optofluidic chip," *Optics Express* **21**, 32605-32610, (2013).
7. Suresh Kumar, Jie Xuan, Milton L. Lee, Dennis Tolley, Aaron R. Hawkins and Adam T. Woolley, "Thin-Film Microfabricated Nanofluidic Arrays for Size-Selective Protein Fractionation," *Lab on a Chip* **13**, 4591-4598 (2013).
8. Joshua W. Parks, Hong Cai, Lynnell Zempoaltecatl, Thomas D. Yuzvinsky, Kaelyn Leake, Aaron R. Hawkins, and Holger Schmidt, "Hybrid optofluidic integration," *Lab on a Chip* **13**, 4118-4123, (2013).
9. Kaelyn D. Leake, Aaron R. Hawkins, and Holger Schmidt, "All-optical particle trap using orthogonally intersecting beams," *Photonics Research* **1**, 47-51 (2013).
10. Bryan S. Blankenagel, Shiul Khadka, Aaron R. Hawkins, Karl F. Warnick, and Brian A. Mazzeo, "Radio-frequency microfluidic interferometer in printed circuit board," *Microwave and Optical Technology Letters* **55**, 1616–1618, (2013)
11. Brett J. Hansen, Richard J. Niemi, Aaron R. Hawkins, Stephen A. Lammert, and Daniel E. Austin, "A Lithographically Patterned Discrete Planar Electrode Linear Ion Trap," *IEEE/ASME Journal of Microelectromechanical Systems* **22**, 876 – 883 (2013).
12. John F. Hulbert, Matthieu Giraud-Carrier, Tom Wall, Aaron R. Hawkins, Scott Bergeson, Jennifer Black, and Holger Schmidt, "Versatile Rb vapor cells with long lifetimes," *Journal of Vacuum Science and Technology A* **31**, 033001 (2013).
13. Yue Zhao, Brian Phillips, Damla Ozcelik, Joshua Parks, Philip Measor, David Gulbransen, Holger Schmidt, and Aaron R. Hawkins, "Tailoring the spectral response of liquid waveguide diagnostic platforms," *Journal of Biophotonics* **5**, 703–711, (2012).
14. Damla Ozcelik, Brian S. Phillips, Joshua W. Parks, Philip Measor, David Gulbransen, Aaron R. Hawkins, and Holger Schmidt, "Dual-core optofluidic chip for independent particle detection and tunable spectral filtering," *Lab on a Chip* **12**, 3728-33, (2012).
15. Dirk Schulze-Makuch, Joop M. Houtkooper, Michael Knoblauch, Roberto Furfaro, Wolfgang Fink, James N. Head, Alberto G. Fairén, Hojatollah Vali, S. Kelly Sears, Mike Daly, David Deamer, Holger Schmidt, Aaron R. Hawkins, Henry J. Sun, Darlene S.S. Lim, James Dohm, Louis N. Irwin, Alfonso Davila, Abel Mendez, and Dale Andersen, "The Biological Oxidant and Life Detection (BOLD) Mission: A Proposal for a Mission to Mars," *Planetary and Space Science* **67**, 57–69, (2012).
16. Yue Zhao, Kaelyn D. Leake, Philip Measor, Micah H. Jenkins, Jared Keeley, Holger Schmidt, and Aaron R. Hawkins, "Optimization of Interface Transmission Between Integrated Solid Core and Optofluidic Waveguides," *Photonics Technology Letters* **24**, 46-48, (2012).
17. Holger Schmidt and Aaron R. Hawkins, "Photonic integration of non-solid media via optofluidics," *Nature Photonics* **5**, 598-604, (2011).

18. Matthew R. Holmes, Shuo Liu, Jared Keeley, Micah Jenkins, Kaelyn Leake, Holger Schmidt, and Aaron R. Hawkins, "Hollow Waveguides with Low Intrinsic Photoluminescence Fabricated with PECVD Silicon Nitride and Silicon Dioxide Films," *IEEE Photonics Technology Letters* **23**, 1466-1488, (2011).
19. Brian S. Phillips, Micah H. Jenkins, Shuo Liu, Holger Schmidt, and Aaron R. Hawkins, "Selective Thin Film Deposition for Optofluidic Platforms with Optimized Transmission," *IEEE Photonics Technology Letters* **23**, 721-723, (2011).
20. Jie Xuan, Mark N. Hamblin, John M. Stout, H. Dennis Tolley, Adam T. Woolley, Aaron R. Hawkins, and Milton L. Lee, "Effects of surfactant addition and alternating current electrophoretic oscillation on size fractionation of nanoparticles using channels with three different height segments," *Journal of Chromatography A* **1218**, 9102-9110, (2011).
21. Ying Peng, Brett J. Hansen, Hannah Quist, Zhiping Zhang, Miao Wang, Aaron R. Hawkins, and Daniel E. Austin, "Coaxial Ion Trap Mass Spectrometer: Concentric Toroidal and Quadrupolar Trapping Regions," *Analytical Chemistry* **83**, 5578-5584, (2011).
22. Mikhail I. Rudenko, Matthew R. Holmes, Dmitri N. Ermolenko, Evan J. Lunt, Sarah Gerhardt, Harry F. Noller, David W. Deamer, Aaron Hawkins, and Holger Schmidt, "Controlled gating and electrical detection of single 50S ribosomal subunits through a solid-state nanopore in a microfluidic chip," *Biosensors and Bioelectronics* **29**, 34-39, (2011).
23. Mark N. Hamblin, Aaron R. Hawkins, Dallin Murray, Daniel Maynes, Milton L. Lee, Adam T. Woolley, H. Dennis Tolley, "Capillary Flow in Sacrificially-etched Nanochannels," *Biomicrofluidics* **5**, 021103, (2011).
24. Micah H. Jenkins, Brian S. Phillips, Yue Zhao, Matthew R. Holmes, Holger Schmidt, and Aaron R. Hawkins, "Optical Characterization of Optofluidic Waveguides Using Scattered Light Imaging," *Optics Communications* **284**, 3980-3982 (2011).
25. John F. Hulbert, Katie Hurd, Aaron R. Hawkins, Bin Wu, and Holger Schmidt, "A versatile approach to Rb vapor cell construction," *Journal of Vacuum Science and Technology A*, **29**, 033001, (2011).
26. Yue Zhao, Micah Jenkins, Philip Measor, Kaelyn Leake, Shuo Liu, Holger Schmidt, and Aaron R. Hawkins, "Hollow Waveguides with Low Intrinsic Photoluminescence Fabricated with Ta₂O₅ and SiO₂ Films," *Applied Physics Letters* **98**, 091104 (2011).
27. Zhigang Liu, Rebekah Brandt, Yu Yahagi, Brett Hansen, Bruce Harteneck, Jeffrey Bokor, Stefano Cabrini, Aaron Hawkins, and Holger Schmidt, "Detecting single nanomagnet dynamics beyond the diffraction limit in varying magnetostatic environments," *Applied Physics Letters* **98**, 052502, (2011).
28. Aiqing Chen, M. M. Eberle, Evan J. Lunt, Shuo Liu, Kaelyn Leake, Mikhail I. Rudenko, Aaron R. Hawkins, and Holger Schmidt, "Dual-color fluorescence cross-correlation spectroscopy on a planar optofluidic chip," *Lab on a Chip* **11**, 1502-1506, (2011).
29. Philip Measor, Brian S. Phillips, Aiqing Chen, Aaron R. Hawkins, and Holger Schmidt, "Tailorable integrated optofluidic filters for biomolecular detection," *Lab on a Chip* **11**, 899-904, (2011).
30. Miao Wang, Hannah E. Quist, Brett J. Hansen, Ying Peng, Zhiping Zhang, Aaron R. Hawkins, Alan L. Rockwood, Daniel E. Austin, and Milton L. Lee, "Performance of a Halo Ion Trap Mass Analyzer

- with Exit Slits for Axial Ejection,” *Journal of the American Society for Mass Spectrometry* **22**, 369-378, (2011).
31. Zhiping Zhang, Ying Peng, Hannah Quist, Brett J. Hansen, Aaron R. Hawkins, Daniel E. Austin, “Effects of Higher-order Multipoles on the Performance of a Quadrupole Ion Trap Mass Analyzer,” *International Journal of Mass Spectrometry* **299**, 151-157, (2011).
 32. Matthew Holmes, Jared Keeley, Katherine Hurd, Holger Schmidt, and Aaron R. Hawkins, “Optimized Piranha Etching Process for SU8 Based MEMS and MOEMS Construction,” *Journal of Micromechanics and Microengineering* **20**, 115008, (2010).
 33. Bin Wu, John F. Hulbert, Evan J. Lunt, Katie Hurd, Aaron R. Hawkins, and Holger Schmidt, “Slow light on a chip via atomic quantum state control,” *Nature Photonics* **4**, 776-779, (2010).
 34. Holger Schmidt and Aaron R. Hawkins, “Atomic Spectroscopy and Quantum Optics in Hollow-core Waveguides,” *Laser & Photonics Reviews* **4**, 720–737, (2010).
 35. Evan J. Lunt, Bin Wu, Jared M. Keeley, Philip Measor, Holger Schmidt, and Aaron R. Hawkins, “Hollow ARROW Waveguides on Self-Aligned Pedestals for Improved Geometry and Transmission,” *IEEE Photonics Technology Letters* **22**, 1147 – 1149, (2010).
 36. Tao Shang, Eric Teng, Adam T. Woolley, Brian A. Mazzeo, Stephen M. Schultz, and Aaron R. Hawkins, “Contactless conductivity detection of small ions in a surface micro-machined CE chip,” *Electrophoresis* **31**, 2596–2601, (2010).
 37. Brian S. Phillips, Philip Measor, Yue Zhao, Holger Schmidt, and Aaron R. Hawkins, “Optofluidic notch filter integration by lift-off of thin films,” *Optics Express* **18**, 4790-4795, (2010).
 38. Matthew R. Holmes, Mikhail Rudenko, Philip Measor, Tao Shang, Holger Schmidt, Aaron R. Hawkins, “Micropore and Nanopore Fabrication in Hollow ARROW Waveguides,” *Journal of Micro/Nanolithography, MEMS, and MOEMS* **9**, 023004, (2010).
 39. Benjamin Todd, Brian D. Jensen, Stephen M. Schultz, and Aaron R. Hawkins, “Design and Testing of a Thin-Flexure Bistable Mechanism Suitable for Stamping from Metal Sheets,” *Journal of Mechanical Design* **132**, 071011 (2010).
 40. Sergie Kühn, Philip Measor, Evan J. Lunt, Brian S. Phillips, David W. Deamer, Aaron R. Hawkins, and Holger Schmidt, “Ultralow power trapping and fluorescence detection of single particles on an optofluidic chip” *Lab on a Chip* **10**, 189-194, (2010).
 41. Mark N. Hamblin, Jie Xuan, Daniel Maynes, H. Dennis Tolley, David M. Belnap, Adam T. Woolley, Milton L. Lee, and Aaron R. Hawkins, “Selective trapping and concentration of nanoparticles and viruses in dual-height nanofluidic channels,” *Lab on a Chip* **10**, 173-178 (2010).
 42. Philip Measor, Sergei Kühn, Evan J. Lunt, Brian S. Phillips, Aaron R. Hawkins, and Holger Schmidt, “Multi-mode mitigation in an optofluidic chip for particle manipulation and sensing,” *Optics Express* **17**, 24342-24348 (2009).
 43. Zhiping Zhang, Ying Peng, Brett J. Hansen, Ivan W. Miller, Miao Wang, Milton L. Lee, Aaron R. Hawkins and Daniel E. Austin, “Paul Trap Mass Analyzer Consisting of Opposing Microfabricated Electrode Plates,” *Analytical Chemistry* **81**, 5241–5248, (2009).

44. Sergei Kühn, Philip Measor, Evan J. Lunt, Brian S. Phillips, David W. Deamer, Aaron R. Hawkins, and Holger Schmidt, "Loss-based optical trap for on-chip particle analysis", *Lab on a Chip* **9**, 2212 (2009).
45. Sergei Kühn, Philip Measor, Evan J. Lunt, Brian S. Phillips, Aaron R. Hawkins, and Holger Schmidt, "Optofluidic particle concentration by a long-range dual-beam trap", *Optics Letters* **34**, 2306-2308 (2009).
46. Mikhail I. Rudenko, Sergei Kühn, Evan J. Lunt, David W. Deamer, Aaron R. Hawkins and Holger Schmidt, "Ultrasensitive Q β Phage Analysis Using Fluorescence Correlation Spectroscopy on an Optofluidic Chip", *Biosensors and Bioelectronics* **24**, 3258-3263 (2009).
47. Michael S. Johnson, Joshua L. Beutler, Alan P. Nelson, Yuihin Tseung, and Aaron R. Hawkins, "SiO₂ Barriers for Increasing Gain Events in Solid-state Impact-ionization Multipliers," *IEEE Journal of Quantum Electronics* **45**, 1068 – 1073, (2009).
48. Michael S. Johnson, Joshua L. Beutler, Alan P. Nelson, and Aaron R. Hawkins, "Solid-state Impact-ionization Multiplier with P-N Junction Injection Node," *IEEE Transactions on Electron Devices* **56**, 1360-1364, (2009).
49. Christopher J. Carron, Mallory Phillips, Brian S. Phillips, Laurie-Anne Parks, Stephen M. Schultz, and Aaron R. Hawkins, "Fast Etch Channels Photo-definable Microchannels Made With Spin-on Polymers and Short Sacrificial Etch Times," *Journal of Microfluidics and Nanofluidics* **7**, 283-289, (2009).
50. Benjamin Todd, Mallory Phillips, Stephen M. Schultz, Aaron R. Hawkins, and Brian D. Jensen, "Low Cost RFID Shock Sensors," *IEEE Sensors Journal* **9**, 464 – 469, (2009).
51. Bin Wu, John F. Hulbert, Aaron R. Hawkins, and Holger Schmidt, "Planar hollow-core waveguide technology for atomic spectroscopy and quantum interference in alkali vapors (Invited)," *Journal of Lightwave Technology* **26**, 3727-3733, (2008).
52. Evan J. Lunt, Philip Measor, Brian S. Phillips, Sergei Kühn, Holger Schmidt, and Aaron R. Hawkins, "Improving solid to hollow core transmission for integrated ARROW waveguides" *Optics Express* **16**, 20981-20986, (2008).
53. Daniel E. Austin, Ying Peng, Brett J. Hansen, Ivan W. Miller, Alan L. Rockwood, Aaron R. Hawkins, and Samuel E. Tolley, "Novel Ion Traps Using Planar Resistive Electrodes: Implications for Miniaturized Mass Analyzers," *Journal of the American Society for Mass Spectrometry* **19**, 1435-1441, (2008).
54. Philip Measor, Sergei Kühn, Evan J. Lunt, Brian S. Phillips, Aaron R. Hawkins, and Holger Schmidt, "Hollow-core waveguide characterization by optically induced particle transport," *Optics Letters* **33**, 672-674, (2008). (Also selected for Vol. 3, Iss. 5 *Virtual Journal for Biomedical Optics*)
55. Holger Schmidt and Aaron R. Hawkins, "Optofluidic waveguides: I. Concepts and implementations (Invited Review)," *Journal of Microfluidics and Nanofluidics* **4**, 3-16, (2008).
56. Aaron R. Hawkins and Holger Schmidt, "Optofluidic waveguides: II. Fabrication and structures (Invited Review)," *Journal of Microfluidics and Nanofluidics* **4**, 17-32, (2008).
57. Hongze Liu, Aaron R. Hawkins, Stephen M. Schultz, and Travis E. Oliphant, "Fast Nonlinear Image Reconstruction for Scanning Impedance Imaging," *IEEE Transactions on Biomedical Engineering* **55**, 970-977, (2008).

58. Evan J. Lunt, Brian S. Phillips, Cory J. Jones, Aaron R. Hawkins, Philip Measor, Sergei Kuehn, and Holger Schmidt, "Hollow waveguide optimization for fluorescence based detection," *Proceedings of the SPIE* **6883**, 68830H, (2008).
59. Aaron R. Hawkins, John F. Hulbert, Brandon T. Carroll, Bin Wu, and Holger Schmidt, "Fabrication methods for compact atomic spectroscopy (Invited)," *Proceedings of the SPIE* **6898**, 688317, (2008).
60. Mikhail I. Rudenko, Sergei Keuhn, Evan J. Lunt, Brian S. Phillips, David W. Deamer, Aaron R. Hawkins, and Holger Schmidt, "Fluorescence correlation spectroscopy of single molecules on an optofluidic chip (Invited)," *Proceedings of the SPIE* **6898**, 689819, (2008).
61. Bin Wu, John Hulbert, Aaron R. Hawkins, and Holger Schmidt, "Quantum interference effects in rubidium vapor on a chip (Invited)," *Proceedings of the SPIE* **6904**, 69040E, (2008).
62. John F. Hulbert, Brandon T. Carroll, Aaron R. Hawkins, Bin Wu, and Holger Schmidt, "Sealing techniques for on-chip atomic vapor cells," *Proceedings of the SPIE* **6904**, 69040N, (2008).
63. David W. Deamer, Holger Schmidt, and Aaron R. Hawkins, "Nanopore biosensors and the search for biosignatures," *Proceedings of the SPIE* **6694**, 669437, (2007).
64. Kaylee McElroy, Robert C. Davis, Aaron Hawkins, "The Effect of Contact Length on Adhesion between Carbon Nanotubes on Silicon Dioxide," *Applied Physics Letters* **91**, 233119. (2007).
65. Brett J. Hansen, Chris J. Carron, Aaron R Hawkins, Stephen M. Schultz, and Brian D. Jensen, "Plastic latching accelerometer based on bistable compliant mechanisms," *Smart Materials and Structures* **16**, 1967-1972, (2007).
66. Wenge Yang, Donald B. Conkey, Bin Wu, Dongliang Yin, Aaron R. Hawkins, and Holger Schmidt, "Atomic Spectroscopy on a Chip," *Nature Photonics* **1**, 331-335, (2007).
67. Dongliang Yin, Evan J. Lunt, Mikhail I. Rudenko, David W. Deamer, Aaron R. Hawkins, and Holger Schmidt, "Planar optofluidic chip for single particle detection, manipulation, and analysis," *Lab on a Chip* **7**, 1171-1175, (2007).
68. Richard H. Selfridge, Stephen M. Schultz, and Aaron R. Hawkins, "Free-space Optical Link as a Model Undergraduate Design Project," *IEEE Transactions on Education* **50**, 208-215, (2007).
69. Mark N. Hamblin, John M. Edwards, Milton L. Lee, Adam T. Woolley, and Aaron R. Hawkins, "Electroosmotic flow in vapor deposited silicon dioxide and nitride microchannels," *Biomicrofluidics* **1**, 034101, (2007).
70. Dongliang Yin, Evan J. Lunt, Anjan Barman, Aaron R. Hawkins, and Holger Schmidt, "Microphotonic control of single molecule fluorescence correlation spectroscopy using planar optofluidics," *Optics Express* **15**, 7290-7295, (2007).
71. Brian G. Buss, Daniel N Evans, Hongze Liu, Tao Shang, Travis E Oliphant, Stephen M Schultz, and Aaron R Hawkins, "Quantifying Resistivity Using Scanning Impedance Imaging," *Sensors and Actuators: A. Physical* **137**, 338-344, (2007).
72. Suqin Wang, Anjan Barman, Holger Schmidt, Jeffrey D. Maas, Aaron R. Hawkins, and Sunghoon Kwon, "Optimization of nano-magneto-optic sensitivity using dual layer enhancement," *Applied Physics Letters* **90**, 252504, (2007).

73. Philip Measor, Leo Seballos, Dongliang Yin, Jin Z. Zhang, Evan J. Lunt, Aaron R. Hawkins, and Holger Schmidt, "On-chip surface-enhanced Raman scattering detection using integrated liquid-core waveguides," *Applied Physics Letters* **90**, 211107, (2007).
74. Kyle S. McKay, Felix P. Lu, Jungsang Kim, Changhyun Yi, April S. Brown, and Aaron R. Hawkins, "Band discontinuity measurements of the wafer bonded InGaAs/Si heterojunction," *Applied Physics Letters* **90**, 222111, (2007).
75. Anjan Barman, Suqin Wang, Jeffrey Maas, Aaron R. Hawkins, Sunghoon Kwon, J. Bokor, A. Liddle, and Holger Schmidt, "Size dependent damping in picosecond dynamics of single nanomagnets," *Applied Physics Letters*, **90**, 202504, (2007).
76. Daniel E. Austin, Miao Wang, Samuel E. Tolley, Jeffrey D. Maas, Aaron R. Hawkins, Alan L. Rockwood, H. Dennis Tolley, Edgar D. Lee, and Milton L. Lee, "Halo Ion Trap Mass Spectrometer," *Analytical Chemistry* **79**, 2927-2932, (2007).
77. Brett J. Hansen, Christopher J. Carron, Aaron R. Hawkins, Stephen M. Schultz, "Zero-power shock sensors using bistable compliant mechanisms," *Proceedings of the SPIE* **6525**, 65251W, (2007).
78. Hongze Liu, Aaron R. Hawkins, Stephen M. Schultz, and Travis E. Oliphant, "Verification and application of a finite-difference model for quasi-electrostatic scanning impedance imaging," *Journal of Electrostatics* **65**, 244-250, (2007).
79. Joshua L. Beutler, Carleton S. Clauss, Michael S. Johnson, and Aaron R. Hawkins, "Frequency Response of Solid-State Impact-Ionization Multipliers," *Journal of Applied Physics* **101**, 023117 (2007).
80. Jeffrey R. Lee, John P. Barber, Zachary A. George, Milton L. Lee, Holger Schmidt, and Aaron R. Hawkins, "Micro-channels with different core shapes fabricated using sacrificial etching," *Journal of Micro/Nanolithography, MEMS, and MOEMS* **6**, 013010, (2007).
81. John M. Edwards, Mark N. Hamblin, Hernan V. Fuentes, Bridget A. Peeni, Milton L. Lee, Adam T. Woolley, and Aaron R. Hawkins, "Thin Film Electroosmotic Pumps for Biomicrofluidic Applications," *Biomicrofluidics* **1**, 014101, (2007).
82. Mikhail I. Rudenko, Dongliang Yin, Matthew Holmes, Aaron R. Hawkins, and Holger Schmidt, "Integration and characterization of SiN nanopores for single-molecule detection in liquid-core ARROW waveguides," *Proceedings of the SPIE* **6444**, 64440L, (2007).
83. Donald B. Conkey, Rebecca L. Brenning, Aaron R. Hawkins, Wenge Yang, Bin Wu, and Holger Schmidt, "Microfabrication of integrated atomic vapor cells," *Proceedings of the SPIE* **6475**, 647518, (2007).
84. Aaron R. Hawkins, Evan J. Lunt, Matthew R. Holmes, Brian S. Phillips, Dongliang Yin, Mikhail Rudenko, Bin Wu, and Holger Schmidt, "Advances in integrated hollow waveguides for on-chip sensors," *Proceedings of the SPIE* **6462**, 64620U, (2007).
85. U. Hakanson, P. Measor, D. Yin, E. Lunt, A. R. Hawkins, V. Sandoghdar, and H. Schmidt, "Tailoring the transmission of liquid-core waveguides for wavelength filtering on a chip," *Proceedings of the SPIE* **6477**, 647715, (2007).
86. Holger Schmidt, Wenge Yang, Bin Wu, Dongliang Yin, Donald B. Conkey, John Hulbert, Aaron R. Hawkins, "Rubidium spectroscopy on a chip," *Proceedings of the SPIE* **6482**, 64820P, (2007).

87. Anjan Barman, Suqin Wang, Jeffrey D. Maas, Aaron R. Hawkins, Sunghoon Kwon, Alexander Liddle, Jeffrey Bokor, and Holger Schmidt, "Magneto-optical observation of picosecond dynamics of single nanomagnets," *Nano Letters* **6**, 2939-2944, (2006).
88. Bridget A. Peeni, Milton L. Lee, Aaron R. Hawkins, and Adam T. Woolley, "Sacrificial Layer Microfluidic Device Fabrication Methods," *Electrophoresis* **27**, 4888-4895, (2006).
89. Travis E. Oliphant, Hongze Liu, Aaron R. Hawkins, and Stephen M. Schultz "Simple Linear Models of Scanning Impedance Imaging for Fast Reconstruction of Relative Conductivity of Biological Samples," *IEEE Transactions on Biomedical Imaging* **53**, 2323-2332, (2006).
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Conference Papers and Presentations

1. Hong Cai, Joshua W. Parks, Ricardo Carrion, Lynnell Zempoaltecatl, Jean P. Patterson, Aaron Hawkins, Holger Schmidt, "On-chip detection of clinical Ebola virus RNA using specific DNA binding technique," CLEO/QELS, San Jose, CA, June 8-13, (2014).
2. Shuo Liu, Yue Zhao, Joshua W. Parks, Aaron Hawkins, Holger Schmidt, "On-chip Opto-electrical Discrimination of Single Biological Nanoparticles," CLEO/QELS, San Jose, CA, June 8-13, (2014).
3. Joshua W. Parks, Lynnell Zempoaltecatl, Richard A. Mathies, Aaron Hawkins, Holger Schmidt, "Automated Single Molecule Nucleic Acid Detection with a Waveguide Chip," CLEO/QELS, San Jose, CA, June 8-13, (2014).
4. Aaron R. Hawkins and Holger Schmidt, "Atom photonics on a chip", META'14, the 5th International Conference on Metamaterials, Photonic Crystals and Plasmonics, Singapore, May 20-23, (2014).
5. Anzi Wang, Aaron R. Hawkins, H. Dennis Tolley, Milton L. Lee, "Enhancing Separation Performance of Microfabricated Gas Chromatography Using Temperature Gradients," Pittcon Conference and Expo, Chicago, IL, March 2-6, (2014).
6. Suresh Kumar, Jie Xuan, H. Dennis Tolley, Milton L. Lee, Aaron R. Hawkins, Adam T. Woolley, "Thin-Film Microfabricated Nanofluidic Arrays for Size-Selective Protein Fractionation," Pittcon Conference and Expo, Chicago, IL, March 2-6, (2014).
7. Adam T. Woolley, Suresh Kumar, Jie Xuan, Milton L. Lee, H. Dennis Tolley, and Aaron R. Hawkins, "Size-based protein fractionation in nanofluidic channel arrays," MicroTAS 2013, Freiburg, Germany, October 27-31, (2013).
8. Holger Schmidt, Joshua Parks, and Aaron Hawkins, "Hybrid optofluidic integration," SPIE Optics + Photonics, San Diego, California, August 25-29, (2013).
9. Aaron R. Hawkins, Lynnell U. Zempoaltecatl, and Holger Schmidt, "Design and fabrication of silicon-based optofluidic waveguide platforms," SPIE Optics + Photonics, San Diego, California, August 25-29, (2013).
10. Joshua Parks, Jungkyu Kim, Lynnell U. Zempoaltecatl, Damla Ozcelik, Hong Cai, Rich Mathies, Aaron Hawkins, Holger Schmidt, "Hybrid Optofluidic Device for Fluidic Particle Manipulation and Detection," CLEO/QELS, San Jose, CA, June 9-14, (2013).

11. Matthieu Giraud-Carrier, John F. Hulbert, Thomas Wall, Aaron Hawkins, Holger Schmidt, Jennifer A. Black, "High Longevity Rubidium Packaging Method Suitable for Integrated Optics," CLEO/QELS, San Jose, CA, June 9-14, (2013).
12. Damla Ozcelik, Joshua W. Parks, Lynnell U. Zempoaltecatl, Kealyn Leake, Jennifer A. Black, Yaeji Lim, Holger Schmidt, Aaron Hawkins, "High Sensitivity Fluorescence Detection with Multi-spot Excitation Using Y-splitters," CLEO/QELS, San Jose, CA, June 9-14, (2013).
13. Shuo Liu; Yue Zhao; Aaron Hawkins; Holger Schmidt, "Correlated Optical and Electrical Detection of Single Nanoparticles on a Nanopore-Optofluidic Chip," CLEO/QELS, San Jose, CA, June 9-14, (2013).
14. Philip Measor, Lynnell U. Zempoaltecatl, Josh Parks, Samia Naccache, Steve Miller, Charles Chiu, Aaron Hawkins, Holger Schmidt, "Clinical Detection of Viral Infection on an Optofluidic Chip," CLEO/QELS, San Jose, CA, June 9-14, (2013).
15. Adam T. Woolley, Suresh Kumar, Jie Xuan, Aaron Hawkins, Milton L. Lee, "Size-selective protein fractionation in arrays of nanofluidic channels," 37th International Symposium on Capillary Chromatography, Palm Springs, CA, May 12-16, (2013).
16. Milton L. Lee, Jie Xuan, Mark Hamblin, John Stout, Suresh Kumar, Dennis Tolley, Daniel Maynes, Adam T. Woolley, Aaron Hawkins, "Size-Selective Trapping of Bioparticles Using Planar Nanofluidic Devices," Pittcon Conference and Expo, Philadelphia, PA, March 17-21, (2013).
17. Philip Measor, Yue Zhao, Aaron Hawkins, and Holger Schmidt, "An Ultrasensitive Optofluidic Nucleic Acid Biosensor," CLEO/QELS, San Jose, CA, May 6, (2012).
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20. Adam T. Woolley, Suresh Kumar, Jie Xuan, Milton L. Lee, H. Dennis Tolley, Daniel R. Maynes, Aaron R. Hawkins, "Planar Thin-film Nanofluidic Devices for Sample Fractionation," Pittcon, Orlando, FL, March 11 – 15, (2012).
21. Aaron R. Hawkins and Holger Schmidt, "Optofluidic Waveguide Development for High Sensitivity Bioparticle Detection," Invited talk, SLAS 2012, San Diego, CA, February 4-8, (2012).
22. Kaelyn D. Leake, Shamik Mascharak, Philip Measor, Brian S. Phillips, Aaron R. Hawkins, and Holger Schmidt, "Manipulation, trapping, and SERS detection of nanoparticle-coated microspheres in optofluidic waveguides," Invited talk, Photonics West, San Jose, CA, January 21-26, (2012).
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24. Daniel Austin, Brett Hansen, Hannah Quist, and Aaron Hawkins, "Microfabricated Linear Ion Trap Mass Spectrometer," Pittcon, Atlanta, GA, March 13 – 18, (2011).

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31. Philip Measor, Brian S. Philips, Evan J. Lunt, Aaron R. Hawkins and Holger Schmidt, "Single-particle spectroscopy and manipulation in optofluidic devices," Frontiers in Optics, Rochester, NY, October 24-28, (2010).
32. Brian S. Phillips, Jared Keeley, Mikhail Rudenko, Kaelyn Leake, Philip Measor, Aiqing Chen, Shuo Liu, Evan Lunt, Holger Schmidt, and Aaron R. Hawkins, "Optimizing ARROW Transitions by Selective Deposition of Thin Films," Integrated Photonics Research, Silicon and Nano Photonics, Monterey, CA, July 25-28, (2010).
33. Aiqing Chen, Mikhail I. Rudenko, Evan J. Lunt, Brian S. Phillips, Aaron Hawkins, Holger Schmidt, "Dual-Color Fluorescence Cross Correlation Spectroscopy on an Integrated Optofluidic Chip," CLEO/QELS, San Jose, CA, May 16-21, (2010).
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35. Michael S. Johnson, Roy C. Shuldberg, Aaron R. Hawkins, "Improving Gain Efficiency in Planar Impact Ionization Devices," The 218th Meeting of the Electrochemical Society, Las Vegas, NV, October 10-15, (2010).
36. Ying Peng, Zhiping Zhang, Brett J. Hansen, Miao Wang, Milton L. Lee, Aaron R. Hawkins, and Daniel E. Austin, "Design and Performance of Coaxial Ion Trap: Transferring Ions between Two Trapping Regions in One Mass Analyzer," 58th ASMS Conference on Mass Spectrometry, Salt Lake City, UT, May 23-27, (2010).
37. Brett Hansen, Hannah Quist, Brandon Barney, Aaron Hawkins, and Daniel Austin, "A Linear-type Ion Trap Realized with Two Lithographically Patterned Substrates," 58th ASMS Conference on Mass Spectrometry, Salt Lake City, UT, May 23-27, (2010).

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45. Evan J. Lunt, Brian S. Phillips, Jared M. Keeley, Aaron R. Hawkins, Philip Measor, Bin Wu, Holger Schmidt, "Hollow ARROW waveguides on self-aligned pedestals for high-sensitivity optical sensing," SPIE Photonics West, San Francisco, CA, January 23-28, (2010).
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53. Philip Measor, Sergei Kuhn, Evan J. Lunt, Brian S. Phillips, Aaron R. Hawkins, and Holger Schmidt, "Optofluidic Platform Advancements for Optical Particle Manipulation," CLEO/QELS Conference, Baltimore, MD, June 1-6, (2009).
54. Sergei Kuhn, Phillip Measor, Evan J. Lunt, Brian S. Phillips, David W. Deamer, Aaron R. Hawkins, and Holger Schmidt, "Active Trapping of Individual Particles on an Optofluidic Analysis Platform," CLEO/QELS Conference, Baltimore, MD, June 1-6, (2009).
55. Z. Liu, R. Brandt, B. Hansen, B. Harteneck, S. Cabrini, A.R. Hawkins, J. Bokor, and H. Schmidt, "Detecting single nanomagnet dynamics in varying magnetostatic environments", INTERMAG conference, Sacramento, CA, May 4-8 (2009).
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60. Sergei Kuehn, Philip Measor, Evan J. Lunt, Aaron R. Hawkins, and Holger Schmidt, "Particle Manipulation with Integrated Optofluidic Traps (Invited)," *IEEE/LEOS Summer Topical Meeting on Optofluidics*, Acapulco, Mexico, July 21-22, (2008).
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63. Ying Peng, Ivan W. Miller, Zhiping Zhang, Brett J. Hansen, Samuel E. Tolley, Milton L. Lee, Aaron R. Hawkins, and Daniel E. Austin, "Novel Planar Ion Traps with Resistive Electrodes," *Joint Northwest & Rocky Mountain Regional Meeting of the American Chemical Society*, Park City, UT, June 15-18, (2008).

64. Edgar D. Lee, Samuel E. Tolley, Aaron R. Hawkins, Daniel E. Austin, Brett J. Hansen, Milton L. Lee, and Doug L. Later, "Planar Electrode Array Ion Traps including a unique Coaxial Geometry," *56th ASMS Conference on Mass Spectrometry & Allied Topics*, Denver, CO, June 1 - 5, (2008).
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71. Christopher Carron and Aaron Hawkins, "Method for Quickly Fabricating Micro-channels from Photosensitive Polymers," *Utah Conference on Undergraduate Research*, February 29, Orem, UT, (2008).
72. Evan J. Lunt, Brian S. Phillips, Cory J. Jones, Aaron R. Hawkins, Philip Measor, Sergei Kuehn, and Holger Schmidt, "Hollow waveguide optimization for fluorescence based detection," *Photonics West*, San Jose, CA, January 19-24, (2008).
73. Aaron R. Hawkins, John F. Hulbert, Brandon T. Carroll, Bin Wu, and Holger Schmidt, "Fabrication methods for compact atomic spectroscopy (Invited)," *Photonics West*, San Jose, CA, January 19-24, (2008).
74. Mikhail I. Rudenko, Sergei Keuhn, Evan J. Lunt, Brian S. Phillips, David W. Deamer, Aaron R. Hawkins, and Holger Schmidt, "Fluorescence correlation spectroscopy of single molecules on an optofluidic chip (Invited)," *Photonics West*, San Jose, CA, January 19-24, (2008).
75. Bin Wu, John Hulbert, Aaron R. Hawkins, and Holger Schmidt, "Quantum interference effects in rubidium vapor on a chip (Invited)," *Photonics West*, San Jose, CA, January 19-24, (2008).
76. John F. Hulbert, Brandon T. Carroll, Aaron R. Hawkins, Bin Wu, and Holger Schmidt, "Sealing techniques for on-chip atomic vapor cells," *Photonics West*, San Jose, CA, January 19-24, (2008).
77. H. Schmidt, A. Barman, S. Wang, J. Maas, A.R. Hawkins, S. Kwon and J. Bokor, "Magneto-optical observation of picosecond dynamics in single nanomagnets (Invited)", *Symposium on "Magnetization dynamics in nanomagnets"*, *52nd MMM Conference*, Tampa, FL, November 5-9, (2007).

78. Holger Schmidt, Sergei Kuehn, Evan Lunt, Mikhail I. Rudenko, Philip Measor, Brian S. Philips, David W. Deamer, and Aaron Hawkins, "Planar Optofluidics for Single Molecule Analysis (Invited)," *LEOS Annual Meeting*, Lake Buena Vista, FL, October 21-25, (2007).
79. Sergei Kühn, Philip Measor, Holger Schmidt, Evan J. Lunt, and Aaron R. Hawkins, "Two-beam optical trap in a waveguide," (Postdeadline Paper) *OSA Annual Meeting*, San Jose, CA, September 16-20, (2007).
80. Philip Measor, Sergei Kühn, Holger Schmidt, Evan J. Lunt, and Aaron R. Hawkins, "Loss Determination of Hollow-core Waveguides by Optically-induced Particle Transport," (Postdeadline Paper) *OSA Annual Meeting*, San Jose, CA, September 16-20, (2007).
81. David W. Deamer, Holger Schmidt, and Aaron R. Hawkins, "Nanopore biosensors and the search for biosignatures," *Annual Meeting of the SPIE*, San Diego, CA, August 16-18, (2007).
82. Holger Schmidt, Wenge Yang, Bin Wu, Don B. Conkey, John Hulbert, and Aaron R. Hawkins, "Saturation Absorption Spectroscopy in an Integrated Rubidium Vapor Cell," *Nonlinear Optics: Materials, Fundamentals and Applications*, Kona, HI, July 30 - August 3, (2007).
83. Matthew R. Holmes, Mikhail Rudenko, Tao Shang, Holger Schmidt, and Aaron R. Hawkins, "Micropore and Nanopore Features on Integrated Hollow Waveguides," *Integrated Photonics and Nanophotonics Research and Applications*, Salt Lake City, UT, July 8-11, (2007).
84. Yue Zhao, Evan J. Lunt, Dongliang Yin, Holger Schmidt, and Aaron R. Hawkins, "Integrated Hollow-Core Waveguides Made by Sputter Deposition," *Integrated Photonics and Nanophotonics Research and Applications*, Salt Lake City, UT, July 8-11, (2007).
85. Daniel E. Austin, Miao Wang, Samuel E. Tolley, Aaron R. Hawkins, Alan L. Rockwood, Edgar D. Lee, H. Dennis Tolley, and Milton L. Lee, "The Halo Ion Trap Mass Analyzer," *55th ASMS Conference on Mass Spectrometry*, Indianapolis, IN, June 3-7, (2007).
86. Mikhail I. Rudenko, Dongliang Yin, David W. Deamer, Holger Schmidt, Evan J. Lunt, Brian Phillips, and Aaron R. Hawkins, "Virus Detection on a Planar Optofluidic chip," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, Baltimore, MD, May 6-11, (2007).
87. Holger Schmidt, Wenge Yang, Bin Wu, Donald B. Conkey, Rebecca Brenning, and Aaron R. Hawkins, "Integrated Semiconductor Chips for EIT (Invited)," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, Baltimore, MD, May 6-11, (2007).
88. Brett J. Hansen, Christopher J. Carron, Aaron R. Hawkins, Stephen M. Schultz, "Zero-power shock sensors using bistable compliant mechanisms," *Smart Structures/Nondestructive Evaluation for Health Monitoring + Diagnostics*, San Diego, CA, March 29 – April 5, (2007).
89. Brian S. Phillips, Evan J. Lunt, and Aaron R. Hawkins, "Liquid Filled Optical Waveguides for On-chip Chemical Analysis," *Utah Conference on Undergraduate Research*, February 2, Salt Lake City, UT, (2007).
90. Brett J. Hansen, Christopher J. Carron, Aaron R. Hawkins, and Stephen M. Schultz, "Zero Power Shock Sensors," *Utah Conference on Undergraduate Research*, February 2, Salt Lake City, UT, (2007).

91. Holger Schmidt, Wenge Yang, Bin Wu, Dongliang Yin, Donald B. Conkey, John Hulbert, Aaron R. Hawkins, "Rubidium spectroscopy on a chip (Invited)," *Photonics West*, January 20-25, San Jose, CA, (2007).
92. U. Hakanson, D. Yin, P. Measor, E.J. Lunt, V. Sandoghdar, A.R. Hawkins, H. Schmidt, "Tailoring the transmission of liquid-core waveguides for wavelength filtering on a chip," *Photonics West*, January 20-25, San Jose, CA, (2007).
93. Donald B. Conkey, Rebecca L. Brenning, Aaron R. Hawkins, Wenge Yang, Bin Wu, Holger Schmidt, "Microfabrication of integrated atomic vapor cells," *Photonics West*, January 20-25, San Jose, CA, (2007).
94. Aaron R. Hawkins, Evan J. Lunt, Matthew Holmes, Brian Phillips, Dongliang Yin, Mikhail I. Rudenko, Holger Schmidt, "Advances in integrated hollow waveguides for on-chip sensors (Invited Paper)," *Photonics West*, January 20-25, San Jose, CA, (2007).
95. Mikhail I. Rudenko, Dongliang Yin, Matthew Holmes, Aaron R. Hawkins, Holger Schmidt, "Integration and characterization of SiN nanopores for single-molecule detection in liquid-core ARROW waveguides," *Photonics West*, January 20-25, San Jose, CA, (2007).
96. Anjan Barman, Suqin Wang, Jeff Maas, Aaron R. Hawkins, Sunghoon Kwon, and Holger Schmidt, "Size (aspect ratio) dependent damping of precessional dynamics in individual single domain nanomagnets", *10th Joint Intermag/MMM Conference*, Baltimore, MD, January 7-11 (2007).
97. Suqin Wang, Anjan Barman, Jeff Maas, Aaron R. Hawkins, Sunghoon Kwon, and Holger Schmidt, "Demonstration of ultra-high MOKE sensitivity for nanomagneto- optics using dual layer nanofabrication process", *10th Joint Intermag/MMM Conference*, Baltimore, MD, January 7-11 (2007).
98. Suqin Wang, Anjan Barman, Jeff Maas, Aaron R. Hawkins, and Holger Schmidt, "Thickness dependence of ultrafast magnetization dynamics in Nickel films", *10th Joint Intermag/MMM Conference*, Baltimore, MD, January 7-11 (2007).
99. Aaron R. Hawkins and Holger Schmidt, "Integrated Optical and Electrical Single Molecule Sensors (Invited)," *OIDA Annual Forum*, Washington, DC, December 6-7, (2006).
100. Holger Schmidt and Aaron R. Hawkins (Invited), "Integrated Optics Using Quantum State Control in Alkali Atoms," *OIDA Annual Forum*, Washington, DC, December 6-7, (2006).
101. Wenge Yang, Dongliang Yin, Bin Wu, Holger Schmidt, Donald B. Conkey, Evan J. Lunt, Aaron R. Hawkins, "Monolithically Integrated Atomic Vapor Cell for Quantum Optics on a Chip," *90th OSA Annual Meeting*, Rochester, NY, October 8-12, (2006).
102. Dongliang Yin, John P. Barber, Aaron R. Hawkins, Holger Schmidt, "Fluorescence Correlation Spectroscopy of Single Molecules on a Chip," *90th OSA Annual Meeting*, Rochester, NY, October 8-12, (2006).
103. Holger Schmidt, Dongliang Yin, Phillip Measor, John Barber, Evan Lunt, and Aaron Hawkins, "Single-molecule optofluidics using liquid-core ARROW waveguides," Invited Talk, *IEEE LEOS Summer Topical Meeting on Optofluidics: Emerging technologies and applications*, Quebec City, CANADA, July 17-19, (2006).

104. Anjan Barman, Suqin Wang, Naser Qureshi, Mark Lowther, Aaron.R. Hawkins, Sunghoon Kwon, Alexander Liddle, Jeffrey Bokor, and Holger Schmidt, "Femtosecond laser induced magnetization dynamics in single Ni nanomagnets", *INTERMAG Conference*, San Diego, CA, May 8-12, (2006).
105. Phillip Measor, Dongliang Yin, John P. Barber, L. Seballos, J. Zhang, Aaron R. Hawkins, and Holger Schmidt, "Integrated liquid-core ARROW Waveguides for surface-enhanced Raman scattering", *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, Long Beach, CA, May 21-26, (2006).
106. Dongliang Yin, Holger Schmidt, John P. Barber, and Aaron R. Hawkins, "Single molecule sensitivity and electrically-controlled fluorescence detection in integrated planer ARROW waveguides," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, Long Beach, CA, May 21-26, (2006).
107. Hongze Liu, Aaron R. Hawkins, Stephen P. Schultz, and Travis E. Oliphant, "Microscopic Impedance Imaging of Small Tissues," *IEEE International Symposium on Biomedical Imaging: From Nano to Micro*, Arlington, VA, April 6-9, (2006).
108. Hong-Wei Lee, Joshua L. Beutler, and Aaron R. Hawkins, "Silicon impact-ionization multiplier for optical detection," *Optical Fiber Communication Conference & the National Fiber Optic Engineers Conference*, Anaheim, CA, March 7-9, (2006).
109. Milton L. Lee, J. Liu, X. Sun, B. Gu, Y. Li, B.A. Peeni, A.T. Woolley, C.L. Christianson, A.R. Hawkins, "Integration of Functional Components in Microfluidic Separation Devices," *Lab.Automation 2006*, Palm Springs, CA, January 21-25, (2006).
110. John P. Barber, Evan J. Lunt, Dongliang Yin, and Holger Schmidt, and Aaron R. Hawkins, "Monolithic fabrication of hollow ARROW based sensors," *SPIE Photonics West*, San Jose, CA, January 23-25, (2006).
111. Holger Schmidt, Dongliang Yin, Wenge Yang, Donald B. Conkey, John P. Barber, Aaron R. Hawkins, and Bin Wu, "Towards integration of quantum interference in alkali atoms on a chip," *SPIE Photonics West*, San Jose, CA, January 23-25, (2006).
112. Dongliang Yin, John P. Barber, Evan Lunt, Dmitri Ermolenko, Harry Noller, Aaron R. Hawkins, Holger Schmidt, "Planar single-molecule sensors based on hollow-core ARROW waveguides," *SPIE Photonics West*, San Jose, CA, January 23-25, (2006).

113. Suqin Wang, Naser Qureshi, Mark A. Lowther, Aaron R. Hawkins, Sunghoon Kwon, Alexander Liddle, Jeffrey Bokor, Holger Schmidt, "Optimization of cavity enhancement for magneto-optic studies of nanomagnets," *50th Magnetism and Magnetic Materials Conference*, San Jose, CA, October 30 – November 3, (2005).
114. Dongliang Yin, Aaron R. Hawkins, and Holger Schmidt, "Design of integrated hollow-core waveguides for EIT on a chip," *OSA Annual Meeting*, Tucson, AZ, October 15-20, (2005).
115. Tyson Lowder, Kevin H. Smith, Aaron R. Hawkins, Richard Selfridge, and Stephen M. Schultz, "High-Temperature Sensing Using Surface Relief Fiber Bragg Gratings," *OSA Annual Meeting*, Tucson, AZ, October 15-20, (2005).
116. Hongze Liu, Aaron R. Hawkins, Stephen M. Schultz, and Travis E. Oliphant, "Modelling for Scanning Impedance Imaging," *Engineering in Medicine and Biology 27th Annual Conference*, Shanghai, China, September 1-4, (2005).
117. Krystle Price, Aaron Hawkins, Stephen Schultz, Richard Selfridge, "D-fiber Bragg gratings for sensors," *Joint Conference on Information Sciences*, Salt Lake City UT, July 28-31, (2005). Hong-Wei Lee, Joshua L. Beutler, and Aaron R. Hawkins, "Solid-state Impact-ionization Multiplier (SIM)," *Joint Conference on Information Sciences*, Salt Lake City UT, July 28-31, (2005).
119. Matthew M. Smith, John P. Barber, Bridget A. Peeni, Dongliang Yin, Holger Schmidt, and Aaron R. Hawkins "Planar fabrication of liquid core optical waveguides and microfluidic devices," *Joint Conference on Information Sciences*, Salt Lake City UT, July 28-31, (2005).
120. Justin Henrie, Aaron R. Hawkins, and Stephen M. Schultz, "Spectrum Sampling Reflectometer," *50th SPIE Annual Meeting*, San Diego CA, July 1-5, (2005).
121. Samuel E. Tolley, Edgar D. Lee, Stephen A. Lammert, Aaron Hawkins, James R. Oliphant, H. Dennis Tolley, Alan L. Rockwood, and Milton L. Lee, "Open Storage Ring Ion Trap Mass Analyzer," *53rd ASMS Conference on Mass Spectrometry*, San Antonio, TX, June 5-9, (2005).
122. Dongliang Yin, Holger Schmidt, John P. Barber, and Aaron R. Hawkins, "Fluorescence detection of few molecules with high collection efficiency in ARROWs," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, Baltimore MD, May 22-25, (2005).
123. John P. Barber, Donald B. Conkey, Matthew M. Smith, Jeffrey R. Lee, Bridget A. Peeni, Zackary A. George, Aaron R. Hawkins, Dongliang Yin, and Holger Schmidt, "Hollow waveguides on planar substrates with selectable geometry cores," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, Baltimore MD, May 22-25, (2005).
124. Bridget A. Peeni, Ryan Kelly, Adam T. Woolley, Milton L. Lee, and Aaron R. Hawkins, "Planar Thin Film Device for Capillary Electrophoresis," *28th International Symposium on Capillary Chromatography and Electrophoresis*, Las Vegas NV, May 22-25, (2005).
125. Bridget A. Peeni, Donald B. Conkey, Adam T. Woolley, Milton L. Lee, and Aaron R. Hawkins, "Electro-osmotic Pumps Constructed Using Sacrificial Etching," *28th International Symposium on Capillary Chromatography and Electrophoresis*, Las Vegas NV, May 22-25, (2005).
126. John P. Barber, Matthew M. Smith, Aaron R. Hawkins, Dongliang Yin, and Holger Schmidt, "Integrated hollow and solid-core waveguides for sensor platforms," *Integrated Photonics Research and Applications*, San Diego CA, April 11-14, (2005).

127. Dongliang Yin, Holger Schmidt, John P. Barber, and Aaron R. Hawkins, "Fluorescence detection in integrated intersecting ARROW waveguides with liquid and solid cores," *Integrated Photonics Research and Applications*, San Diego CA, April 11-14, (2005).
128. Naser Qureshi, Holger Schmidt, Mark Lowther, and Aaron R. Hawkins, "Near-field Optical Magnetometry and Magnetic Imaging of Nanomagnets," *SPIE 8th International Symposium on Laser Metrology*, Merida, Mexico, February 14-18, (2005).
129. Dongliang Yin, John P. Barber, Aaron R. Hawkins, and Holger Schmidt, "Low-loss Integrated Optical Sensors Based on Hollow-Core ARROW Waveguides," *SPIE Photonics West*, San Jose, CA, January 22-27, (2005).
130. Holger Schmidt, Dongliang Yin, David W. Deamer, John P. Barber, and Aaron R. Hawkins, "Integrated ARROW waveguides for gas/liquid sensing" (Invited Paper), *SPIE's 49th Annual Meeting*, Denver, CO, August 2-6, (2004).
131. Naser Qureshi, Holger Schmidt, and Aaron R. Hawkins, "Cavity-enhanced Near-Field Optical Magnetometry," *SPIE's 49th Annual Meeting*, Denver, CO, August 2-6, (2004).
132. Hongze Liu, Travis E. Oliphant, Stephen M. Schultz, and Aaron R. Hawkins, "Non-contact Scanning Electrical Impedance Imaging," *Engineering in Medicine and Biology 26th Annual Conference*, San Francisco, CA, September 1-5, (2004).
133. Dongliang Yin, David W. Deamer, Holger Schmidt, John P. Barber, and Aaron R. Hawkins, "Integrated biophotonic sensor with single-molecule resolution," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, San Francisco, CA, May 16-21, (2004).
134. Holger Schmidt, Dongliang Yin, John P. Barber, and Aaron R. Hawkins, "Low-loss propagation in hollow ARROW waveguides for optical sensing," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, San Francisco, CA, May 16-21, (2004).
135. Holger Schmidt, Dongliang Yin, John P. Barber, Ghassan Sanber, Elizabeth Despain, and Aaron R. Hawkins, "Integration of Electromagnetically Induced Transparency in Alkali Atoms on a Semiconductor Chip," *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference*, San Francisco, CA, May 16-21, (2004).
136. Ran Wang and Aaron R. Hawkins, "Dielectric color pictures on silicon wafers," *MICRON Research Conference*, Boise ID, September 20-21, (2003).
137. Naser Qureshi, Holger Schmidt, and Aaron R. Hawkins: "Cavity-enhanced Kerr Effect for Magneto-Optic Spectroscopy of Nanostructures", *IEEE Nano-Conference*, San Francisco CA, August 12-14, (2003).
138. Holger Schmidt, Dongliang Yin, and Aaron R. Hawkins: "Integrated optical spectroscopy of low-index gases and liquids using ARROW waveguides", Technical Digest, *Integrated Photonics Research and Applications*, Washington, DC, June 16-18, (2003).
139. K. Alexis Black, Aaron R. Hawkins, Near M. Margalit, Dubravko I. Babic, Archie L. Holmes Jr., Ying-Lan Chang, Patrick Abraham, John E. Bowers, and Evelyn L. Hu, "Fusion Bonding: Hetero-interfacial Materials Analysis and Device Application," *Optoelectronics West '98*, San Jose, CA, January 26-29 (1998).
140. Aaron R. Hawkins and John E. Bowers, "High-Speed Wafer-Fused Photodetectors," (Invited Paper), *Lasers and Electro-Optics Society Annual Meeting*, San Francisco, CA, November 11-13 (1997).

141. John E. Bowers, Aaron R. Hawkins, and Near M. Margalit, "Novel Optoelectronic Devices Using Wafer Bonding," (Invited Paper), *1997 American Vacuum Society Annual Meeting*, San Jose, October 20, (1997).
142. Weishu Wu, Aaron R. Hawkins, and John E. Bowers, "Silicon Based Telecommunication Avalanche Photodetectors," (Invited Paper), *O'ECC '97*, Seoul, Korea, July 8-11, (1997).
143. John E. Bowers, Aaron Hawkins, Near Margalit, Patrick Abraham, Alexis Black, Archie Holmes, and Evelyn Hu, (Invited Paper), "Wafer Fusion Technology for Optoelectronic Devices," (Invited Paper), *Conference on Lasers and Electro-Optics*, Baltimore, MD, May 18-23, (1997).
144. Weishu Wu, Aaron R. Hawkins, and John E. Bowers, "Effect of Electric Field Profile on Gain-Bandwidth Product of InGaAs/Si Avalanche Photodetectors," *Conference on Lasers and Electro-Optics*, Baltimore, MD, May 18-23, (1997).
145. Patrick Abraham, Alexis K. Black, Near M. Margalit, Aaron R. Hawkins, Steven P. DenBaars, and John E. Bowers, "Substrate Engineering of 1.55 μm Lasers," *Indium Phosphide and Related Materials*, Hyannis, MA, May 11-15, (1997).
146. Barry F. Levine, Aaron R. Hawkins, Sangee Hiu, B. J. Tseng, Cliff A. King, L. A. Gruezke, R. W. Johnson, D. R. Zolnowski, and John E. Bowers, "20 GHz high performance planar Si/InGaAs P-I-N photodetector," *Indium Phosphide and Related Materials*, Hyannis, MA, May 11-15, (1997).
147. Weishu Wu, Aaron R. Hawkins, and John E. Bowers, "High Gain-Bandwidth Product Si/InGaAs Avalanche Photodetectors," *Optical Fiber Conference*, Dallas, TX, February 16-21, (1997).
148. Aaron R. Hawkins, Weishu Wu, and John E. Bowers, "Improvement of Avalanche Photodetectors Through Integration of InGaAs and Si," (invited paper), *SPIE Proceedings*, **2999**, 68-75, (1997).
149. Weishu Wu, Aaron R. Hawkins, and John E. Bowers, "Design of Si/InGaAs Avalanche Photodetectors for 400 GHz Gain-Bandwidth Product," (invited paper), *SPIE Proceedings*, **3006**, 38-47, (1997).
150. Aaron R. Hawkins, Weishu Wu, Patrick Abraham, Klaus Streubel, and John E. Bowers, "High Gain-Bandwidth Product Silicon Hetero-Interface Photodetector," (Postdeadline Paper), *Lasers and Electro-Optics Society Annual Meeting*, Boston, MA, November 18-21 (1996).
151. Aaron R. Hawkins, Thomas E. Reynolds, Derek England, Dubravko I. Babic, Klaus Streubel, and John E. Bowers, "81 GHz Gain-Bandwidth Product Silicon Hetero-Interface Photodetector," *Device Research Conference*, Santa Barbara, CA, June 24-26, (1996).
152. Aaron R. Hawkins and John E. Bowers, "Silicon-InGaAs APDs - the best of both worlds," *WOSCEMMAD*, Santa Fe, NM, February 19-21, (1996).
153. Aaron R. Hawkins, Thomas Reynolds, Derek R. England, Dubravko I. Babic, Mark Mondry, and John E. Bowers, "Silicon Hetero-Interface Photodetector," *Lasers and Electro-Optics Society Annual Meeting*, San Francisco, Oct. 30-Nov. 2, (1995).
154. Aaron R. Hawkins, Scott A. Watson, and Todd J. Kauppila, "Absolute Bremsstrahlung Energy Spectral and Dose Distributions – Theory and Experiment," Los Alamos National Laboratory Report M-4:GR-93-09, Sept. 1, (1993).

Patents

5 Issued patents while at UCSB and CIENA on avalanche photodiodes and photonics packaging technology

Patents issued while at Brigham Young University:

- Apparatus for optical measurements on low index non-solid materials based on ARROW waveguides
- Noncontact scanning impedance imaging
- Impact ionization amplification apparatus method and system
- Apparatus for optical measurements on low-index non-solid materials based on ARROWs (continuation)
- Integrated sensor with electrical and optical single molecule sensitivity
- Low Loss Hollow Core Optical Waveguide
- Integrated electrical/optical sensor for biomolecule analysis with single molecule sensitivity
- Integrated platform for atomic absorption spectroscopy

Patents pending and filed while at Brigham Young University:

- Plastic latching accelerometer based on bistable compliant mechanisms
- Method to improve integrated optical waveguides with non-solid cores
- Device for light-based particle manipulation on waveguides
- Thin film planar nanosieving device

RECENT GRANT FUNDING

Project Name	Period	Funding Source	Role	Project PI	Total Grant	Funds Supervised
Solid State Ion Detection (SSID) Technology	2012-2014	DTRA/ARO	Co-PI	Ramsey (UNC)	\$2M	\$250,000
A Dual-Nanopore Instrument for Single DNA Measurements and Control	2012-2014	NIH	Co-PI	Dunbar (UCSC)	\$325,000	\$100,000
Hybrid integrated molecular analysis (HIMAS) for point-of-care diagnostics	2012-2014	NIH	Co-PI	Schmidt (UCSC)	\$325,000	\$100,000
Collaborative Research: Ultrasensitive Cancer Biomarker Detection on Biophotonic Chips	2012-2015	NSF	PI		\$210,000	\$210,000
Rapid, low-cost mRNA analysis system for cancer companion diagnostics	2012-2013	NIH	Co-PI	Measor (LiquiLume)	\$250,000	\$40,000
MRI: Acquisition of a direct write micro patterning system	2011-2012	NSF	Co-PI	Austin (BYU)	\$400,000	\$50,000

Project Name	Period	Funding Source	Role	Project PI	Total Grant	Funds Supervised
Portable Amplification-free Virus Nucleic Acid Detector	2011-2012	NSF	Co-PI	Measor (LiquiLume)	\$200,000	\$30,000
Collaborative Research: Slow and Stopped Light Photonics with Atomic Spectroscopy Chips	2011-2014	NSF	PI		\$180,000	\$180,000
Integrated optical particle trap for biomolecule analysis and manipulation	2009-2011	NIH	Co-PI	Schmidt (UCSC)	\$325,000	\$147,000
MRI: Acquisition of chlorine based reactive ion etcher	2007-2008	NSF	PI		\$300,000	\$300,000
Impact Ionization Based Multipliers for Optical Receivers	2007-2010	NSF	PI		\$270,000	\$270,000
The Open Storage Ring: a Mass-Mobility Spectrometer for in situ Characterization of Planetary Atmospheres and Evolved Gases	2007-2010	NASA	Co-PI	Austin (BYU)	\$558,000	\$150,000
Research Initiation: Optically Powered Transistor	2007-2008	BYU	PI		\$15,000	\$15,000
Single biomolecule sensors using integrated optical waveguides with liquid cores	2006-2009	NIH	Co-PI	Schmidt (UCSC)	\$1.3 M	\$500,000
Collaboration: SST: Integrated optical and electrical single molecule sensors	2006-2009	NSF	PI		\$400,000	\$133,000
Visible/Short Wave Infrared-Photon Counting Arrays (PCAR)	2006-2009	DARPA	Co-PI	Jack (Raytheon)	\$4 M	\$425,000
Research Initiation: Impedance Measurement of Micro-Fluidic Channels	2006-2007	BYU	PI		\$15,000	\$15,000
Collaboration: Integrated optical sensors using quantum interference in antiresonant waveguides	2005-2008	NSF	PI		\$225,000	\$112,500

Project Name	Period	Funding Source	Role	Project PI	Total Grant	Funds Supervised
Single-photon nonlinear optics in integrated hollow-core waveguides	2005-2009	DARPA	Co-PI	Schmidt (UCSC)	\$900,000	\$400,000
Integrated Hollow-Core Optical Waveguides	2005 - 2007	D. Huber Found.	PI		\$75,000	\$75,000
Low Noise Ionization Amplifier	2005	Raytheon	PI		\$25,000	\$25,000
Integrated Optical Waveguide Sensors for Biomedical Research	2004-2006	NIH	Co-PI	Schmidt (UCSC)	\$375,000	\$175,000
Research Initiation: Scanning Impedance Imager	2004-2006	BYU	PI		\$25,000	\$25,000
Chemical and Biological Agent Detector	2003-2005	DOD	Co-PI	Lee (BYU)	\$250,000	\$100,000
Handheld Chemical and Biological Agent Detector	2003 - 2007	DTRA	Senior Person	Lee (Palmar)	\$6M	\$125,000
IMMERSE – Intensive Mentoring and Research in Micro-Electronics for Students in Engineering	2003 - 2013	BYU	PI		\$200,000	\$200,000
IMMERSE and IML Maintenance	2007-2013	Micron Foundation	PI		\$430,000	\$430,000
				Totals:	\$19.59 M	\$4.583 M

STUDENT MENTORING

Graduate Students Advised

Completed Degrees – Primary Advisor

- John P. Barber – Ph.D. (2006)
- Hong-Wei Lee – Ph.D. (2006)
- Donald B. Conkey – M.S. (2007)
- Hanho Cho – M.S. (2008)
- Joshua L. Beutler – Ph.D. (2010)
- Tao Shang – Ph.D. (2010)
- Evan J. Lunt – Ph.D. (2010)
- Mark N. Hamblin – Ph.D. (2010)
- Katie Hurd – M.S. (2010)
- Michael S. Johnson – Ph.D. (2011)
- Matthew R. Holmes – Ph.D. (2011)

- Brian S. Phillips – Ph.D. (2011)
- Yue Zhao – Ph.D. (2012)
- Brett J. Hansen – Ph.D. (2013)
- John F. Hulbert – Ph.D. (2013)
- Lynnell Zempoaltecatl – M.S. (2013)

Completed Degrees – Committee Member

- 17 Ph.D., 7 M.S. Students

Current Students – Primary Advisor

- Matthieu Girrard-Carrier – Ph.D. (Expected 2015)
- John M. Stout – Ph.D. (Expected 2016)
- Thomas Wall – Ph.D. (Expected 2016)
- Matthew Stott – Ph.D. (Expected 2018)
- Michael Olson – M.S. (Expected 2014)
- Sadek Sabbah – M.S. (Expected 2014)
- Sanjiv Pant – M.S. (Expected 2015)
- Cameron Hill – M.S. (Expected 2016)

Current Students – Committee Member

- 8 Ph.D., 3 M.S. Students

Undergraduate Research Programs

IMMERSE Program

Together with Prof. Stephen Schultz of BYU's Electrical and Computer Engineering Department, I initiated the Intensive Mentoring and Micro-Electronic Research for Students in Engineering (IMMERSE) program in 2003. Its goal is to prepare students for entry into top tier graduate programs and provide them an opportunity to author or co-author a technical paper. Each year approximately 20 undergraduate students participate in the program that involves one-on-one training by faculty and senior students, imbedding students into existing research projects, and assigning each student an independent project. Students are offered full time employment in the summer and part time employment during the school year. Funding is provided by an existing BYU mentoring program, the MICRON Foundation and through external research grants.

IMMERSE Highlights:

- 120 Students employed since 2003
- > 80% of students have authored or co-authored a technical paper
- > 75% of students have pursued graduate degrees
- <http://immerse.byu.edu>

ORCA Scholarships

BYU's Office of Research and Creative Activities (ORCA) provides \$1800 scholarships for undergraduate students to conduct independent research projects. Students write proposals and conduct the projects with the assistance of a faculty advisor. To date, I have advised 22 of these ORCA scholarship projects.

PROFESSIONAL SERVICE

Editorships

- Editor-in-Chief for IEEE Journal of Quantum Electronics (2014 – present)
- Associate Editor for IEEE Journal of Quantum Electronics (2007 – 2014)

Conference Program Committees

- Advanced Fabrication Technologies for Micro/Nano-Optics & Photonics at *Photonics West* (2008 - present)
- Conference on Lasers and Electro-Optics (CLEO) (2010 - 2012)
- IEEE/LEOS Summer Topical Meeting on Optofluidics (2008)

Reviewer for Research Proposals

- Environmental Molecular Sciences Laboratory
- Department of Energy
- National Aeronautics and Space Administration
- National Institutes of Health
- National Science Foundation

Reviewer for Professional Journals

- Advances in Optical Technology
- Applied Optics
- Applied Physics Letters
- Biomedical Optics Express
- Biomicrofluidics
- Diagnostics
- IEEE Photonics Technology Letters
- IEEE Journal of Quantum Electronics
- IEEE Journal of Lightwave Technology
- Journal of Electronic Materials
- Journal of Microfluidics and Nanofluidics
- Journal of Micromechanics and Microengineering
- Journal of Nanoscience and Nanotechnology
- Lab-on-a-Chip
- Light: Science and Applications
- Measurement Science and Technology
- Nanomaterials and Nanotechnology
- Nanotechnology
- Optical and Quantum Electronics
- Optics Communications
- Optics Express
- RSC Advances
- Science
- Soft Matter
- Solid-State Electronics

Web Based Reference Tools

An effort was begun in 2003 to provide on-line instructions for the tools in BYU's cleanroom facility, the Integrated Microfabrication Laboratory. This work rapidly expanded to include basic reference information on semiconductors, microfabrication, and equipment operation, including tutorials and interactive calculators and graphs. This information is now contained at the following website: www.ee.byu.edu/cleanroom and contains over 250 separate pages of information. The site receives around 90,000 hits per month from external visitors who use it as an essential reference. A companion site was launched in 2005 dedicated to providing reference information on photonics topics: www.ee.byu.edu/photonics. This site contains over 100 separate pages and receives 50,000 hits per month from external visitors. Prof. Stephen Schultz and I oversee the continued expansion and improvement of these two sites. Most of the HTML coding is done by students participating in our IMMERSE program.

Professional Memberships

- IEEE - Institute of Electrical and Electronic Engineers
- APS – American Physical Society
- OSA – Optical Society of America
- ASEE – American Society of Engineering Education

UNIVERSITY SERVICE

University Committees

- Utah Conference on Undergraduate Research selection committee (2006)

Department Committees and Assignments

- Associate Department Chair (2012 – present)
- Chair External Relations Committee (2010 - 2012)
- Member External Relations Committee (2002 – 2010)

Laboratory Director

Since 2002 I have directed the Integrated Microfabrication Laboratory, a 2500 ft² class 10 cleanroom. This facility is open for use by all BYU faculty and students and provides a significant resource for researchers in the micro and nanotechnology fields. I have had oversight of lab budgets, student training and admission, equipment removal and installation, lab procedures, and staff activities. Since my arrival, 25 new systems have been installed, dramatically improving the labs capabilities. The number of lab users has also significantly increased. Current registered users total 85, with 48 of those coming from the Electrical and Computer Engineering Department. It is estimated that the laboratory currently supports research projects with total external funding levels of \$2 Million per year.

CV Last Updated April, 2014