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Professional interests

Techniques (especially nondestructive) for characterization of electronic materials and nanostructures; remote sensing using optical methods; *in situ* process monitoring; control of semiconductor processes; physics of solid state devices; insulated gate transistor physics and technology; properties of electronic materials and their effects on devices; reliability of semiconductor devices, particularly in hostile environments.

Current Research Activities

Remote chemical detection and identification using IR spectroscopy; Optical measurement of nanoscale features, characterization and control of micro- and nano-fabrication processes (particularly plasma processes), high-speed thin film measurements, models for the optical dielectric response of materials, spectroscopic ellipsometry for characterization of electronic materials.

Education

Massachusetts Institute of Technology, Cambridge, Massachusetts

Ph.D. degree, June, 1985, Department of Electrical Engineering and Computer Science. Thesis under Professor S. D. Senturia on “Electron Traps and Interface State Generation in Nitrided Oxides.”

M.S. and B.S. degrees in Electrical Engineering, June, 1981. Thesis entitled “A New Silicon Oxynitride Process for MIS Devices.” Curriculum concerned classical and quantum physics, circuit design, linear systems analysis, computer programming and elementary computer architecture, applied and abstract mathematics.

Experience

University of Michigan, Department of Electrical Engineering and Computer Science, Professor, September 1, 2007-present.

University of Michigan, Department of Electrical Engineering and Computer Science, Associate Professor, September 1, 1991-August, 2007.

Cornell University of Michigan, Department of Electrical and Computer Engineering, Visiting Associate Professor, September, 2001-May, 2002 (sabbatical leave)

University of Michigan, Department of Electrical Engineering and Computer Science, Assistant Professor, September 1, 1985-August, 1991.

Massachusetts Institute of Technology, Cambridge, Massachusetts, and MIT Lincoln Laboratory, Lexington, Massachusetts

June, 1981 to June, 1985

Research Assistant. Engaged in research on the electronic properties of ammonia-annealed (nitrided) silicon dioxide for insulated gate field effect transistors, including bulk electron traps, and the response to ionizing radiation. Radiation-hardened gate dielectric technology transferred to Sandia National Laboratories. Held Secret security (DISCO) clearance from Summer, 1978 to August, 1985.

September, 1980 to January, 1981

Teaching Assistant for laboratory course teaching basic techniques in silicon device fabrication.

June, 1978 to August, 1980

Co-op student. Research included initial investigation of nitrided oxide, laser recrystallization of polycrystalline silicon on silicon dioxide, and laser annealing of ion implantation damage on single crystal silicon.

Publications

Full articles in refereed publications

1. Vinay V. Alexander, Ojas P. Kulkarni, Malay Kumar, Chenan Xia, Mohammed N. Islam, Fred L. Terry Jr., Michael J. Welsh, Kevin Ke, Michael J. Freeman, Manickam Neelakandan, and Allan Chan. Modulation instability initiated high power all-fiber supercontinuum lasers and their applications. *Optical Fiber Technology*, 18(5):349--374, 2012.
2. Malay Kumar, Mohammed N. Islam, Fred L. Terry Jr., Michael J. Freeman, Allan Chan, Manickam Neelakandan, and Tariq Manzur. Stand-off detection of solid targets with diffuse reflection spectroscopy using a high-power mid-infrared supercontinuum source. *Applied Optics*, 51(15):2794--2807, 2012.
3. Vinay V. Alexander, Huaqiu Deng, Mohammed N. Islam, Fred L. Terry, Jr., Raymond B. Pittman, Thomas Valen, "Surface roughness measurement of flat and curved machined metal

- parts using a near infrared super-continuum laser,” *OPTICAL ENGINEERING*, 50(11), article number 113602 pp. 1-11, NOV 2011
4. Ojas P. Kulkarni, Vinay V. Alexander, Malay Kumar, Michael J. Freeman, Mohammed N. Islam, Fred L. Terry, Jr., Manickam Neelakandan, Allan Chan, “Supercontinuum generation from similar to 1.9 to 4.5 μm in ZBLAN fiber with high average power generation beyond 3,8 μm using a thulium-doped fiber amplifier, *JOURNAL OF THE OPTICAL SOCIETY OF AMERICA B-OPTICAL PHYSICS*, 28(10), pp. 2486-2498, OCT 2011
 5. Kulkarni, Ojas P., Islam, Mohammed N., Terry, Fred L., Jr., “Optical probe for porosity defect detection on inner diameter surfaces of machined bores,” *Optical Engineering*, 49(12), article number: 123606 (2010).
 6. Chenan Xia, Zhao Xu, M.N. Islam, F.L. Terry, Jr., M.J. Freeman, A. Zakel, J. Mauricio, “10.5 W Time-averaged power Mid-IR supercontinuum generation extending beyond 4 μm with direct pulse pattern modulation,” *IEEE Journal of Selected Topics in Quantum Electronics*, v 15, n 2, p 422-34, March-April 2009.
 7. Islam, M.N., Chenan Xia, M.J. Freeman, J. Mauricio, A. Zakel, K. Ke, Z. Xu, F.L. Terry, Jr. “Mid-IR super-continuum generation,” *Proceedings of the SPIE - The International Society for Optical Engineering*, v 7195, p 71950W (12 pp.), 2009
 8. Elson Liu and Fred L. Terry, Jr., “Immersion Scatterometry for Improved Nano-Scale Topography Measurements,” *Physica Status Solidi (a)*, Vol. 205, No. 4, 784–788 (2008)
 9. Pete I. Klimecky and Fred L. Terry, Jr., “A multi-sensor study of Cl_2 etching of polycrystalline Si,” *Phys. Stat. Sol. (c)* 5, No. 5, 1341–1345 (2008)
 10. Chenan Xia; M. Kumar, Ming-Yuan Cheng; O.P. Kulkarni, M.N Islam, A Galvanauskas, F.L. Terry, M.J Freeman, D.A .Nolan, W.A. Wood, “Supercontinuum Generation in Silica Fibers by Amplified Nanosecond Laser Diode Pulses,” *IEEE Journal of Quantum Electronics*, Volume 13, Issue 3, May-June 2007 Page(s):789 - 797
 11. Hsu-Ting Huang, Fred L. Terry, Jr., “Spectroscopic ellipsometry and reflectometry from gratings (Scatterometry) for critical dimension measurement and in situ, real-time process monitoring,” *Thin Solid Films*, **455-456**, pp. 828-836 (2004). Refereed journal article from talk at the Third International Conference on Spectroscopic Ellipsometry (ICSE-3), Vienna, Austria, July, 2003. (Invited Talk)
 12. Suhong Kim, Pete Klimecky, Jay B. Jeffries, Fred L. Terry, Jr., and Ronald K. Hanson, “In Situ measurements of HCl during plasma etching of poly-silicon using a diode laser absorption sensor,” *Measurement Science and Technology*, **14**, pp. 1662-1670 (2003).
 13. Pete I. Klimecky, J. W. Grizzle, and Fred L. Terry, Jr. “Compensation for transient chamber wall condition using real-time plasma density feedback control in an inductively coupled plasma etcher,” *J. Vac. Sci. Technol.*, **A 21**, pp. 706-17 (2003).
 14. Hyun-Mog Park, Dennis S. Grimard, Jessy W. Grizzle, and Fred Lewis Terry, Jr., “Etch profile control of high-aspect, deep submicron a-Si gate etch,” *IEEE Transactions on Semiconductor Manufacturing*, **14**, pp 242-254 (2001).
 15. Pete Klimecky, Craig Garvin, Cecilia G. Galarza, Brooke S. Stutzman, Pramod P. Khargonekar, and Fred L. Terry Jr., “Real-Time RIE Metrology Techniques to Enable In Situ Response Surface Process Characterization,” *J. Electrochem. Soc.*, 148, pp. 34-40 (2001).
 16. Tong-Li, Jerzy Kanicki, Wei-Kong, Fred L. Terry, Jr, “Interference fringe-free transmission spectroscopy of amorphous thin films,” *Journal-of-Applied-Physics*, **88**, pp. 5764-71 (2000).

17. B. S. Stutzman, H.-T. Huang, and F. L. Terry, Jr., "Two-channel spectroscopic reflectometry for in situ monitoring of blanket and patterned structures during reactive ion etching," *J. Vac. Sci. Techn.*, **B18**, pp.2785-93 (2000).
18. C. K. Hanish, J. W. Grizzle, and F. L. Terry, Jr., "Estimating and Controlling Atomic Chlorine Concentration via Actinometry," *IEEE Trans. Semicond. Manuf.*, **12**, pp. 323-331 (1999).
19. L. I. Kamlet and F. L. Terry, Jr., "Dielectric Function Modeling for In_{1-y}Al_yAs on InP," *Thin Solid Films*, **313-4**, pp. 435-441 (1998). Refereed journal article from poster presentation at the Second International Conference on Spectroscopic Ellipsometry (ICSE-2), Charleston, SC, July, 1997.
20. T. E. Benson, A. Ramamoorthy, L. I. Kamlet, and F. L. Terry, Jr., "High-Speed, High-Accuracy Optical Measurements of Polycrystalline Silicon for Process Control," *Thin Solid Films*, **313-4**, pp. 177-182 (1998). Refereed journal article from oral presentation at the Second International Conference on Spectroscopic Ellipsometry (ICSE-2), Charleston, SC, July, 1997.
21. C.K. Hanish, J. W. Grizzle, H.H. Chen, L.I. Kamlet, S. Thomas, III, F. L. Terry, Jr., and S. W. Pang, "Modeling and Algorithm Development for Automated Optical Endpointing of an HBT Emitter Etch," *J. Electron. Mat.*, **26**, pp. 1401-8 (1997).
22. L. I. Kamlet; F. L. Terry, Jr; and G. N. Maracas, "A temperature-dependent model for the complex dielectric function of GaAs," *J. Electron. Mat.*, **26**, pp. 1409-16 (1997).
23. T. L. Vincent, P. P. Khargonekar, and F. L. Terry, Jr., "End Point and Etch Rate Determination using Dual Wavelength Laser Reflectometry with a Nonlinear Estimator," *J. Electrochem. Soc.*, **144**, pp. 2467-72 (1997).
24. T. L. Vincent, P. P. Khargonekar, and F. L. Terry, Jr., "An Extended Kalman Filtering-Based Method of Processing Reflectometry Data for Fast In-Situ Etch Rate Measurements," T. L. Vincent, P. P. Khargonekar, and F. L. Terry, Jr., *IEEE Trans. Semicond. Manuf.*, **10**, pp. 42-51 (1997).
25. T. E. Benson, L. I. Kamlet, P. Klimecky, and F. L. Terry, Jr., "In-situ Spectroscopic Reflectometry for Polycrystalline Silicon Thin Film Etch Rate Determination During Reactive Ion Etching," *J. Elec. Mat.*, **25**, pp. 955-64 (1996).
26. T. E. Benson, L. I. Kamlet, S.M. Ruegsegger, C. K. Hanish, P. D. Hanish, B. A. Rashap, P. Klimecky, J. S. Freudenber, J. W. Grizzle, P. P. Khargonekar, and F. L. Terry, Jr., "Sensor systems for real-time feedback control of reactive ion etching," *J. Vac. Sci. Tech.*, **B 14**, pp. 483-8 (1996).
27. P. D. Hanish, J. W. Grizzle, M. D. Giles, and F. L. Terry, Jr., "A model-based technique for real-time estimation of absolute fluorine concentration in a CF₄/Ar plasma," *J. Vac. Sci. Tech.*, **A 13**, pp. 1802-7 (1995).
28. L. I. Kamlet, and F. L. Terry, Jr., "A composition-dependent model for the complex dielectric function of In_{1-x}Ga_xAs_yP_{1-y}/ lattice- matched to InP", *J. Elec. Mat.*, **24**, pp. 2005-13 (1995).
29. B. A. Rashap, M. E. Elta, H. Etemad, J. P. Fournier, J. S. Freduenberg, M. D. Giles, J. W. Grizzle, P. T. Kabamba, P. P. Khargonekar, S. Lafortune, J. R. Moynes, D. Teneketzis, and F. L. Terry, Jr., "Control of Semiconductor Manufacturing Equipment," *IEEE Transactions on Semiconductor Manufacturing*, **8**, pp. 286-297 (1995).

30. D. S. MacGregor, R. A. Rojas, G. F. Knoll, F. L. Terry, Jr., J. East, and, Y. Eisen, "Present Status of Undoped Semi-Insulating LEC Bulk GaAs as a Radiation Spectrometer," *Nucl. Instrum. and Methods in Phys. Res.*, A 343, pp. 527-38 (1994).
31. D. S. MacGregor, R. A. Rojas, G. F. Knoll, F. L. Terry, Jr., J. East, and, Y. Eisen, "Evidence for field enhanced capture by EL2 centers in semi-insulating GaAs and the effect on GaAs radiation detectors," *J. Appl. Phys.*, 75, pp. 7910-15 (1994).
32. J. S. Herman and F. L. Terry, Jr., "Hydrogen Sulfide Plasma Passivation of Indium Phosphide," *J. Elec. Mat.*, 22, p. 119-24 (1993).
33. J. S. Herman and F. L. Terry, Jr., "Plasma Passivation of GaAs," *J. Vac. Sci. Techn.*, A11, pp. 1094-8 (1993).
34. J. L. Dupuie, E. Gulari, and F. L. Terry, Jr., "The Low Temperature Catalyzed Chemical Vapor Deposition and Characterization of Silicon Nitride Thin Films," *J. Electrochem. Soc.*, 139, pp. 1151-1159 (1992).
35. M. E. Sherwin, G. O. Munns, D. T. Nichols, Bhattacharya, P. K. , Terry, F. L. Jr., "Growth of InGaAsP by CBE for SCH quantum well lasers operating at 1.55 and 1.4 μm ," *Journal of Crystal Growth*, 120, pp. 162-166 (1992).
36. M. E. Sherwin, F. L. Terry, Jr., G. O. Munns, J. S. Herman, E. G. Woelk, and G. I. Haddad, "Investigation and Optimization of InGaAs/InP Heterointerfaces Grown by Chemical Beam Epitaxy Using Spectroscopic Ellipsometry and Photoluminescence," *J. Elect. Mat.*, 21, pp. 269-275 (1992).
37. M. E. Sherwin, G. O. Munns, E. G. Woelk, T.J. Drummond, M. E. Elta, F. L. Terry, Jr., and G. I. Haddad, "The Design of an ECR Plasma System and Its Application to InP Grown by CBE," *Journ. Crystal Growth*, 111, pp. 594-598 (1991).
38. M. E. Sherwin, G. O. Munns, M. E. Elta, E. G. Woelk, S. B. Crary, F. L. Terry, Jr., and G. I. Haddad, "Optimization of $\text{In}_x\text{Ga}_{1-x}\text{As}$ and InP Grown by CBE," *Journ. Crystal Growth*, 111, pp. 605-608 (1991).
39. J. L. Lee and F. L. Terry, Jr., "Reactive Ion Etching of Tungsten Silicide Using NF_3 Gas Mixtures," *J. Vac.Sci. Technol.*, B9, pp. 2747-2751 (1991).
40. F. L. Terry, Jr., "A Modified Harmonic Oscillator Approximation Scheme for the Dielectric Constants of $\text{Al}_x\text{Ga}_{1-x}\text{As}$," *J. Appl. Phys.*, 70, pp. 409-417 (1991).
41. H. W. Trombley, F. L. Terry, Jr., and M. E. Elta, "A Self-Consistent Particle Model for the Simulation of RF Glow Discharges," *IEEE Trans. Plasm. Sci.*, 19, pp. 158-162 (1991).
42. J. Mo, A. L. Robinson, D. Fitting, P. Carson, and F. L. Terry, Jr., "Improvement of Integrated Ultrasonic Transducer Sensitivity," *Sensors and Actuators* , A22, pp. 679-682 (1990).
43. J. Mo, A. L. Robinson, D. Fitting, P. Carson, and F. L. Terry, Jr., "Micromachining for Improvement of Integrated Ultrasonic Transducer Sensitivity," *IEEE Trans. Elec. Dev.*, 37, pp. 134-140 (1990).
44. W. T. Shiau and F. L. Terry, Jr., "Bias-Temperature Stability of Nitrided Oxides and Reoxidized Nitrided Oxides," *Journ. Elec. Mat.*, 18, pp. 767-73 (1989).
45. M. A. Schmidt, F. L. Terry, Jr., B. P. Mathur and S. D. Senturia, "Inversion Layer Mobility of MOSFETs with Nitrided Oxide Gate Dielectrics," *IEEE Trans. Elec. Dev.* , 35, pp. 1627-32 (1988).
46. M. A. Schmidt, J. I. Raffel, F. L. Terry, Jr., and S. D. Senturia, "A Metal Gate Self-Aligned MOSFET Using Nitrided Oxide," *IEEE Trans. Elec. Dev.*, 32, pp. 643-8 (1985).

47. F. L. Terry, Jr., P. W. Wyatt, M. L. Naiman, B. P. Mathur, C. T. Kirk, and S. D. Senturia, "High-Field Electron Capture and Emission in Nitrided Oxides," *Journ. Appl. Phys.*, 57, pp. 2036-9 (1985).
48. M. L. Naiman, C. T. Kirk, R. J. Aucoin, F. L. Terry, Jr., P. W. Wyatt, and S. D. Senturia, "Effect of Nitridation of Silicon Dioxide on Its Infrared Spectrum," *Journ. Electrochem. Soc.*, 131, p. 637-640 (1984).
49. F. L. Terry, Jr., M. L. Naiman, R. J. Aucoin, and S. D. Senturia, "Megarad-Resistant 10nm Gate Dielectrics," *IEEE Trans. Nucl. Sci.*, 28, pp. 4389-4391 (1981).

Shorter communications in refereed publications

1. Jian, Li, Hui Du, John Yarbrough, Andrew Normam, Kim Jones, Glenn Teeter, Fred Lewis Terry, Jr., Dean Levi, "Spectral optical properties of $\text{Cu}_2\text{ZnSnS}_4$ thin film between 0.73 and 6.5 eV," *OPTICS EXPRESS* 20(6), pp A327-A332, MAR 12,2012
2. O.P. Kulkarni, M.N. Islam, and F. L. Terry, *Optics Express*, "GaAs-based surface-normal optical modulator compared to Si and its wavelength response characterization using a supercontinuum laser," 19 (5), pp. 4076-4084, 2011
3. Kumar M (Kumar, Malay), Islam MN (Islam, Mohammed N.), Terry FL (Terry, Fred L., Jr.), Aleksoff CC (Aleksoff, Carl C.), Davidson D (Davidson, Douglas), "High resolution line scan interferometer for solder ball inspection using a visible supercontinuum source," *Optics Express*, 18(21), pp. 22471-22484 (2010)
4. Y.B. Guo, C. Divin, A. Myc, F.L. Terry, J.R. Baker, T.B. Norris, J.Y. Ye, "Sensitive molecular binding assay using a photonic crystal structure in total internal reflection," *Opt. Express*, pp 11741-11749 (2008)
5. M. Kumar, C. Xia, X. Ma, V. V. Alexander, M. N. Islam, F. L. Terry, C. C. Aleksoff, A. Klooster, and D. Davidson, "Power adjustable visible supercontinuum generation using amplified nanosecond gains-witched laser diode," *Opt. Express* 16, 6194-6201 (2008).
6. C. Xia, M. Kumar, M. -Y. Cheng, R. S. Hegde, M. N. Islam, A. Galvanauskas, H. G. Winful, F. L. Terry, Jr., M. J. Freeman, M. Poulain, and G. Mazé, "Power scalable mid-infrared supercontinuum generation in ZBLAN fluoride fibers with up to 1.3 watts time-averaged power," *Opt. Express* 15, 865-871 (2007)
7. O. P. Kulkarni, C. Xia, D. J. Lee, M. Kumar, A. Kuditcher, M. N. Islam, F. L. Terry, M. J. Freeman, B. G. Aitken, S. C. Currie, J. E. McCarthy, M. L. Powley, and D. A. Nolan, "Third order cascaded Raman wavelength shifting in chalcogenide fibers and determination of Raman gain coefficient," *Opt. Express* 14, 7924-7930 (2006)
8. S. Govindaswamy, J. East, F. Terry, E. Topsakal, J. L. Volakis, G.I. Haddad, "Frequency-selective surface based bandpass filters in the near-infrared region," *Microwave and Optical Technology Letters*, vol. 41, no. 4, 20 May 2004, p 266-9
9. S. Govindaswamy, J. East, F. Terry, E. Topsakal, J.L. Volakis, G.I. Haddad, "Dual-frequency-selective surfaces for near-infrared bandpass filters," *Microwave and Optical Technology Letters*, vol. 43, no. 2, 20 Oct. 2004, p 95-8
10. "Normal Incidence Spectroscopic Ellipsometry for Critical Dimension Monitoring," Hsu-Ting Huang, Wei Kong, and Fred Lewis Terry, Jr., *Applied Physics Letters*, **78**, 3983-3985 (2001).
11. J. S. Herman and F. L. Terry, Jr., "Hydrogen Sulfide Plasma Passivation of Gallium Arsenide," *Appl. Phys. Lett.*, 60, pp. 716-717 (1992).

12. J. S. Herman and F. L. Terry, Jr., "A Two-Temperature Technique for PECVD SiO₂," *IEEE Elec. Dev. Lett.*, *IEEE Elec. Dev. Lett.*, 12, 236-7 (1991).
13. F. L. Terry, Jr., R. J. Aucoin, M. L. Naiman, P. W. Wyatt, and S. D. Senturia, "Radiation Effects in Nitrided Oxides," *IEEE Elec. Dev. Lett.*, 4, p. 191-3 (1983).

Refereed conference or symposium proceedings

1. "Mid-IR Supercontinuum (SC) Generation in ZBLAN fiber pumped by Tm-doped amplifier with fused silica SC input," Ojas Kulkarni, Vinay Alexander, Malay Kumar, Mohammed N. Islam, Michael J. Freeman, Fred L. Terry, Jr., 2011 CONFERENCE ON LASERS AND ELECTRO-OPTICS (CLEO), May, 2011.
2. "Optical Technique for Porosity Detection inside Valve Body Spool Bores down to 5 mm Diameter," Kulkarni, OP; Islam, MN; Terry, FL, Conference on Lasers and Electro-Optics CLEO/Quantum Electronics and Laser Science Conference (QELS), Date: MAY 16-21, 2010 San Jose CA
3. "Non-Contact Surface Roughness Measurement of Crankshaft Journals Using a Super-Continuum Laser," : Alexander VV (Alexander, Vinay V.), Deng HQ (Deng, Haqiu), Islam MN (Islam, Mohammed N.), Terry FL (Terry, Fred L., Jr.), Conference on Lasers and Electro-Optics CLEO/Quantum Electronics and Laser Science Conference (QELS), San Jose, CA, MAY 16-21, 2010
4. "Effects Of Substrate Temperature On The Optical Properties Of Polycrystalline CuInSe₂ Thin Films," Li JA (Li, Jian), Repins I (Repins, Ingrid), To B (To, Bobby), Mansfield L (Mansfield, Lorelle), Choi SG (Choi, Sukgeun), Contreras M (Contreras, Miguel)1, Terry FL (Terry, Fred Lewis, Jr.), Levi D (Levi, Dean), 35th IEEE Photovoltaic Specialists Conference, Honolulu, HI, JUN 20-25, 2010
5. Zhao Xu, Chenan Xia, M.N. Islam, F.L. Terry, Jr., M.J. Freeman, A. Zakel, J. Mauricio, "10.5 Watts time-averaged power mid-IR supercontinuum generation with direct pulse pattern modulation," 2009 Conference on Lasers and Electro-Optics (CLEO).
6. O.P. Kulkarni, M. Kumar, M.N. Islam, F.L. Terry, Jr., "Colorless, surface normal optical modulator based on free carrier effect in gallium arsenide Source," 2009 Conference on Lasers and Electro-Optics (CLEO).
7. M. Kumar, C.N. Xia, X.Q. Ma, V.V. Alexander, M.N. Islam, F.L. Terry, C.C. Aleksoff, A. Klooster, D. Davidson, "Power Scalable Visible Supercontinuum Generation Using Amplified Nanosecond Gain-Switched Laser Diode," Conference on Lasers and Electro-Optics, 4-9 May 2008 , San Jose, CA, , pp. 2573-4
8. C. Xia, M. Kumar, M.N. Islam, A. Galvanauskas, F.L. Terry, Jr., M.J. Freeman, "All-fiber-integrated mid-infrared supercontinuum system with 0.7 watts time-averaged power," Conference on Lasers and Electro-Optics, 5-11 May 2007 , Baltimore, MD, , pp. 830-1
9. Fred Lewis Terry, Jr. and Joseph J. Bendick, "Immersion Scatterometry for Improved Feature Resolution and High Speed Acquisition of Resist Profiles," *Proc. SPIE Vol. 5752, Metrology, Inspection, and Process Control for Microlithography XIX*, p. 237-247 (May, 2005).
10. Fred L. Terry, Jr., "Accuracy limitations in specular-mode optical topography extraction," *Proc. SPIE Vol. 5038, p. 547-558, Metrology, Inspection, and Process Control for Microlithography XVII*. (2003).

11. H. Kim, F. L. Terry, Jr. , “In-situ UV absorption CF₂ sensor for reactive ion etch process control,” EOS/SPIE Conference on Microelectronic Manufacturing Technologies: Conference on Process and Equipment Control in Microelectronic Manufacturing, Edinburgh, Scotland, United Kingdom, May 18-21, 1999, Proceedings of SPIE - The International Society for Optical Engineering, v 3742, 1999, p 136-143
12. Cecilia G. Galarza , Pete Klimecky, Pramod P. Khargonekar, Fred L. Terry, Jr., “In-Situ Design Of Experiments For A Reactive Ion Etching Process,” MRS Spring Meeting, San Francisco, CA, April 7, 1999.
13. F. L. Terry, Jr., “In Situ Monitoring of III-V Processing,” (Invited Talk), *III-V and IV-IV Materials and Processing Challenges for Highly Integrated Microelectronics and Optoelectronics*, Materials Research Society Symposium Proceedings Vol. 535, pp. 189-200 (December, 1998).
14. W. Kong, H. T. Huang, M. E. Lee, C. Galarza, W. Sun, and F. L. Terry, Jr., “Analysis of Time-Evolved Spectroscopic Ellipsometry Data from Patterned Structures for Etching Process Monitoring and Control,” paper 19.2, SRC TECHCON, Las Vegas, Nevada, September 9-11, 1998. (won best paper award for Factory Control and Operations session)
15. M. E. Lee, C. Galarza, W. Kong, W. Sun, and F. L. Terry, Jr., “Analysis of Reflectometry and Ellipsometry Data from Patterned Structures,” International Conference on Characterization and Metrology for ULSI Technology, Gaithersburg, MD, March 23-27, 1998, AIP Conference Proceedings 449, pp. 331-5 (1998).
16. T. L. Vincent, P. I. Klimecky, W. Sun, P. P. Khargonekar, and F. L. Terry, Jr., “A Highly Accurate Endpoint Method for a TFT Back Channel Recess Etch,” SID/IEEE International Display Research Conference Digest, Toronto, Canada, September 15-19, 1997, pp. 274-7 (1997).
17. T. E. Benson, A. Ramamoorthy, and F. L. Terry, Jr, “High Accuracy Optical Measurements of Polycrystalline Silicon for Real-Time and Run-to-Run Process Control”, SRC Techcon, Pheonix, Ar., Sept 12-14, 1996.
18. M-E. Lee and F. L. Terry, Jr., “A Diffractive Technique for Reactive Ion Etching (RIE) Process Monitoring and Control” SRC Techcon, Pheonix, Ar., Sept 12-14, 1996.
19. P. P. Khargonekar and F. L. Terry, Jr., “Control of Semiconductor Manufacturing: Curriculum Development Under An NSF Combined Research-Curriculum Grant,” Proc. 1995 American Control Conf., Seattle, Wa., pp. 1072-6 (1995).
20. T. L. Vincent, P. P. Khargonekar, and F. L. Terry, Jr., “An extended Kalman filter method for fast in-situ etch rate measurements,” in Diagnostic Techniques for Semiconductor Materials Processing II, (eds. S. W. Pang, et al.), MRS Symposium held November 27-30, 1995 Boston, MA, pp. 87-93, Materials Research Society, Pittsburgh, PA, 1995.
21. M. E. Elta, J. S. Freudenberg, J. W. Grizzle, P.P. Khargonekar, and F. L. Terry, Jr., “Improving RIE Process Robustness via Real-Time Feedback Control,” Electrochem. Soc. Meeting, Reno, Nevada, Proceedings of the Symposium on Process Control, Diagnostics, and Modeling in Semiconductor Manufacturing, pp. 148-56, May, 1995.
22. J. S. Herman, T. E. Benson, O. D. Patterson, C. Y. Chen, A. T. Demos, P. P. Khargonekar, F. L. Terry Jr., and M. E. Elta, “Real-time Control of Reactive Ion Etching of Amorphous Silicon for Thin Film Transistor Applications,” Proc. 2nd Symposium on Thin Film Transistor Technologies, (ed. Y. Kuo), The Electrchemical Society, Miami Beach, FL, pp. 68-76, October, 1994.

23. T. L. Vincent, P. P. Khargonekar, B. A. Rashap, F. L. Terry, Jr., and M. Elta, "Nonlinear System Identification and Control of a Reactive Ion Etcher," Proc. 1994 American Control Conference, pp. 902-906.
24. M. E. Elta, J. Fournier, J. S. Freudenberg, M. D. Giles, J. W. Grizzle, P. T. Kabamba, P. P. Khargonekar, S. Lafortune, S. M. Meerkov, B. A. Rashap, F. L. Terry, Jr., "Real-time Feedback Control of Reactive Ion Etching," and T. Vincent, Proc. 1993 SPIE Conference on Microelectronics Manufacturing, Proc. of SPIE, 2091, pp. 438-451 (1994).
25. M. E. Elta, H. Etemad, J. S. Freudenberg, M. D. Giles, J. W. Grizzle, P. T. Kabamba, P. P. Khargonekar, S. Lafortune, S. M. Meerkov, J. R. Moyne, B. A. Rashap, D. Teneketzis, and F. L. Terry, Jr., "Applications of Control to Semiconductor Manufacturing: Reactive Ion Etching", Proc. 1993 American Control Conference, San Francisco, CA, June 2-4, 1993, pp. 2990-2997.
26. B. A. Rashap, P. P. Khargonekar, J. W. Grizzle, M. E. Elta, J. Freudenberg, and F. L. Terry, Jr., "Real-time Control of Reactive Ion Etching: Identification and Disturbance Rejection," Proc. 32nd IEEE Conference on Decision and Control, pp. 3379-85, 1993.
27. T. Morris, F. L. Terry, Jr., M. E. Elta, "Utilizing Diffraction Imaging for Non-Destructive Wafer Metrology," 1993 SPIE Symposium on Microlithography, March 1-5, 1993, San Diego, Ca., Proceedings of the SPIE, 1926, pp. 27-32 (1993).
28. D. S. Grimard, F. L. Terry, Jr., and M. E. Elta, "Theoretical and Practical Aspects of Real-Time Fourier Imaging," SPIE Symposium on Real-Time Monitoring and Control, Santa Clara, CA, October, 1990, Proceedings of the SPIE, 1392, pp. 535-42 (1991).
29. Dennis S. Grimard, F. L. Terry, Jr., and M. E. Elta, "In Situ Wafer Monitoring for Plasma Etching," SPIE 1989 Symposium on Monitoring and Control of Plasma-Enhanced Processing and Multichamber Growth of Semiconductors, San Diego, CA, October, 1989, Proceedings of the SPIE, 1185, pp. 234-47. (1990).
30. T. J. Drummond and J. Gee (Sandia National Laboratories), and F. L. Terry, Jr. and R. Weng (Univ. of Michigan), "Application of InAlAs/GaAs Superlattice Alloys to GaAs Solar Cells," presented at the IEEE Photovoltaics Specialist Conference, Kissimee, Fl., May 21- 25, 1990, Conference Record of the 21st IEEE Photovoltaic Specialist Conference-1990, pp. 105-10.
31. J. Mo, A. L. Robinson, D. Fitting, P. Carson, and F. L. Terry, Jr., "A Micromachined Diaphragm Structure for Integrated Ultrasound Transducers", IEEE Ultrasonics Symposium, Montreal, Quebec, Canada, vol. 2, pp. 801-4 (October 3-6, 1989).
32. R. B. Brown, F. L. Terry, and K. C. Wu, "High temperature microelectronics-expanding the applications for smart sensors," International Electron Devices Meeting, Dec. 6-9, 1987, Washington, D.C. , IEDM Technical Digest, pp. 274-7. (Reprinted in *High-Temperature Electronics*, ed. Randall Kirschman, IEEE Press, pp.223-6 (1999)).
33. M. L. Naiman, F. L. Terry, Jr., J.A. Burns, J.I. Raffel, and R. Aucoin, "Properties of Thin Oxynitride Gate Dielectrics Produced by Thermal Nitridation of Silicon," IEEE IEDM Techn. Digest, p. 562-4 (Dec., 1980).

Refereed conference summaries or abstracts

1. Fred L. Terry, Jr., "Use of Multiple Real-time Sensors for Improved Process Understanding and Control: Cl2 Etching of Polycrystalline Si," invited presentation, SEMATECH AEC/APC Workshop, Ann Arbor, MI. September 29, 2009.

2. Elson Liu and Fred L. Terry, Jr., "Immersion Scatterometry for Improved Nano-Scale Topography Measurements," 4th International Conference on Spectroscopic Ellipsometry, June 11-15, 2007, Stockholm, Sweden (oral presentation by F. Terry)
3. Pete I. Klimecky and Fred L. Terry, Jr., "A multi-sensor study of Cl₂ etching of polycrystalline Si," 4th International Conference on Spectroscopic Ellipsometry, June 11-15, 2007, Stockholm, Sweden (poster presentation by F. Terry)
4. Chenan Xia, Malay Kumar, Ojas P. Kulkarni, Mohammed N. Islam, Fred L. Terry, Daniel A. Nolan, William A. Wood, "Super-Continuum Generation to 3 μm in Fused Silica Fiber with Nanosecond Diode Pumping," CLEO paper CThV5, Long Beach, CA., May 2006 (Invited Talk).
5. Fred L. Terry, Jr., "Chamber Wall Effects on Polycrystalline-Si Reactive Ion Etching in Cl₂: A Multiple Real-Time Sensors Study," Northern California American Vacuum Society Plasma Etch Users Group Meeting, September 8, 2005, Santa Clara, CA (proceedings available by web at <http://www.avsusergroups.org/>) (Invited talk)
6. Pete I. Klimecky, Jessy W. Grizzle, and Fred L. Terry, Jr., "Elimination of the RIE 1st Wafer Effect: Real-Time Control of Plasma Density," SEMATECH Advanced Equipment Control/Advanced Process Control Symposium, Snow Bird, Utah, September, 2002.
7. Hsu-Ting Huang, Ji-Woong Lee, Pete Klimecky, Pramod P. Khargonekar, and Fred L. Terry, Jr., "*In Situ* Monitoring Of Deep Sub-μm Topography Evolution And Endpoint Detection During Reactive Ion Etching," SEMATECH AEC/APC Symposium XIII, October 6-11, 2001, Banff, Alberta, Canada
8. Hsu-Ting Huang, Brooke S. Stutzman, Wei Kong, Pete Klimecky, and Fred L. Terry, Jr., "Real Time In Situ Observation of Deep Submicron Topography Evolution Using Spectroscopic Ellipsometry and Reflectometry," AVS International Conference on Metallic Coatings and Thin Films (ICMCTF), San Diego, CA., May 1, 2001. (invited talk by Fred Terry)
9. Hsu-Ting Huang, Ji-Woong Lee, Brooke S. Stutzman, Pete Klimecky, Craig Garvin, Pramod P. Khargonekar, and Fred L. Terry, Jr., "Real Time In Situ Monitoring of Deep Sub-μm Topography Evolution during Reaction Ion Etching," SEMATECH AEC/APC Symposium, Lake Tahoe, NV., September 25-28, 2000. (One of 4 best student paper awards at this conference)
10. P. Klimecky, C. Garvin, "Plasma Density & Resonant Cavity Modes vs. Chamber Condition in High Density RIE," SEMATECH AEC/APC Symposium, Lake Tahoe, NV., September 25-28, 2000. (One of 4 best student paper awards at this conference, Jessy Grizzle and I were faculty advisors on this paper but left authorship credit to the student and post-doc)
11. Hsu-Ting Huang, Wei Kong, Brooke Stutzman, and Fred L. Terry, Jr., "Use of Spectroscopic Ellipsometry for Submicron Topography Measurements," SEMATECH AEC/APC Symposium, Vail, Co., September 13-16, 1999.
12. B.S. Stutzman, H.-M. Park, P. Klimecky, C. Garvin, D. Grimard, D. Schweiger, and F.L. Terry, Jr., "In-Situ Real-Time Spectroscopic Ellipsometry Measurements on a LAM TCP 9400SE," Abs. 236, 195th Electrochemical Society Meeting, Seattle, Wa., May 2-6, 1999.
13. H.-T. Huang, W. Kong, H. Kim, W. Sun, and F. L. Terry, Jr., "Normal Incidence SE/RDS for Critical Dimension Monitoring," Abs. 244, 195th Electrochemical Society Meeting, Seattle, Wa., May 2-6, 1999.

14. H.-M. Park, T.L. Brock, D. Grimard, J.W. Grizzle, and F. L. Terry, Jr., "High-Aspect Ratio 70 nm a-Si Gate Line Etch Process Control Based on Etch Rate Estimation," Abs. 217, 195th Electrochemical Society Meeting, Seattle, Wa., May 2-6, 1999.
15. Brooke S. Stutzman, Wei Kong, Hsu-ting Huang, Hunsuk Kim, Fred L. Terry Jr., "Measurement of Evolution of Grating Structures Using Off-Normal Spectral Reflectometry," abstract SC08.09, focus session on Industrial Applications of Optical Spectroscopy, American Physical Society Centennial Meeting, Atlanta, GA, March 20-26, 1999.
16. Brooke S. Stutzman, Fred L. Terry Jr., "Characterization of Film Thickness Using Off-Normal Spectral Reflectometry," abstract KW2.07, APS 51st Annual Gaseous Electronics Conference & 4th International Conference on Reactive Plasmas, Maui, Hawaii, October 19-22, 1998.
17. Siddharth Ramachandran, S.G. Bishop, Univ. Illinois; F.L. Terry, Univ. of Michigan, "Guided-mode size control over a large range by direct-write mechanisms in chalcogenide glasses: applications for optoelectronic interconnections," CLEO/IQEC 98, San Francisco, CA, paper CTHAA4, May 7, 1998.
18. S. C. Shannon, J. P. Holloway, M. Brake, D. Grimard, and F. L. Terry, Jr., "Characterization and Optimization of Argon Sputter Etching of SiO₂ in the GEC Reference Cell," in Abstract volume for the IEEE International Conference on Plasma Science, p. 124, May 19-22, 1997.
19. T. L. Vincent, P. P. Khargonekar and F. L. Terry, Jr., "Real time estimation and feedback control of etch rate and etch depth using nonlinear filtering techniques," in: Abstracts volume for 190th Electrochemical Society Meeting, San Antonio, TX, October 6-11, p. 375 (1996).
20. Tyrone E. Benson, Arun Ramamoorthy, Leonard I. Kamlet, and Fred L. Terry, "High-Speed, High-Accuracy Optical Measurements of Polycrystalline Silicon for Process Control", Jr., Second International Conference on Spectroscopic Ellipsometry, Charleston, S. C. , May 12-15, 1997.
21. Leonard I. Kamlet and Fred L. Terry, Jr. , "Dielectric Function Modeling for Lightly Strained InAlAs," Second International Conference on Spectroscopic Ellipsometry, Charleston, S. C. , May 12-15, 1997.
22. L. I. Kamlet, F. L. Terry, Jr., and G. N. Maracas, "A Temperature-Dependent Model for the Complex Dielectric Function of GaAs for Growth Control," 38th Annual IEEE/TMS Electronic Materials Conf., Santa Barbara, Ca., June 26-8, 1996.
23. C. K. Hanish, L. I. Kamlet, S. Thomas, III, J. W. Grizzle, S. W. Pang, and F. L. Terry, Jr., "Modeling and Algorithm Development for Automatic Optical Endpointing of an HBT Emitter Etch," 38th Annual IEEE/TMS Electronic Materials Conf., Santa Barbara, Ca., June 26-8, 1996.
24. Ying Xiao, Jun-Hao Xu, Johan Jonsson, K.V. Rao, C. Uher, and F. L. Terry, Jr., "Wavelength Dependence of Kerr-Rotation in e-Beam Deposited Pd/(Pt/Co/Pt) Modulated Multilayers: Effect of Oxidized Si Substrates," Magneto-Optical Recording International Symposium (MORIS), Noordwojkerhout, Netherlands, April 29-May 2, 1996.
25. Leonard Kamlet and Fred L. Terry, Jr., "A Composition-Dependent Model for the Complex Dielectric Function of In_{1-x}Ga_xAs_yP_{1-y} Lattice-Matched to InP, TMS/IEEE Electronics Materials Conference, Charlottesville, Virginia, June 21-23, 1995.
26. Tyrone E. Benson, Leonard Kamlet, Pete Klimecky, and Fred L. Terry, Jr., "In Situ Spectroscopic Reflectometry for Polycrystalline Silicon Thin Film Etch Rate Estimation," TMS/IEEE Electronics Materials Conference, Charlottesville, Virginia, June 21-23, 1995.

27. T. E. Benson, C. K. Hanish, P. D. Hanish, L.I. Kamlet, B. A. Rashap, J. S. Freudenberg, J. W. Grizzle, P.P. Khargonekar, and F. L. Terry, Jr., "Sensor Systems for Real-Time Feedback Control fo Reactive-Ion Etching," American Vacuum Society Conf. on Plasma Processing, San Jose, Ca., May 2-3, 1995.
28. P. D. Hanish, J. W. Grizzle, M. D. Giles, and F. L. Terry, Jr., "A Model-Based Technique for Real-Time Estimation of Absolute Fluorine Concentration in a CF₄/Ar Plasma," 41st National Symposium of the AVS, Oct. 24-28, 1994, Denver, CO.
29. J. S. Herman and F. L. Terry, Jr., "Hydrogen Sulfide Plasma Passivation of Indium Phosphide," IEEE/TMS Electronic Materials Conference, Cambridge, Mass., June, 1992.
30. J. S. Herman and F. L. Terry, Jr., "Plasma Passivation of GaAs," American Vacuum Society Meeting, Chicago, Ill., Oct., 1992.
31. F. L. Terry, Jr., J. Freudenberg, M. Elta, M. Giles, J. Grizzle, S. LaFortune, P. Kabamba, P. Khargonekar, S. Meerkov, and D. Teneketzis, "Sensor-Based Control for Semiconductor Manufacturing: Plasma Etching as a Process Vehicle," IEEE Wafer Level Reliability Workshop, Lake Tahoe, Ca., October 25-28, 1992.
32. M. E. Sherwin, G. O. Munns, D. T. Nichols, P. K. Bhattacharya, and F. L. Terry, Jr., "Growth of InGaAsP by CBE for SCH Quantum Well Lasers Operating at 1.55 and 1.4 μm ," 3rd Inter. Conf. on Chemical Beam Epitaxy and Related Growth Techniques, Oxford, England, 1992.
33. M. E. Sherwin, F. L. Terry, Jr., G. O. Munns, and G. I. Haddad, "Investigation and Optimization of Interface Transition Widths for InGaAs/InP and InP/InGaAs Grown by Chemical Beam Epitaxy using Spectroscopic Ellipsometry," presented at the TMS Fifth Biennial Workshop on Organometallic Vapor Phase Epitaxy, Panama City, Fl., April 14-17, 1991.
34. H. W. Trombley, F. L. Terry, Jr., and M. E. Elta, "The Simulation of Low Pressure Argon RF Glow Discharge using a Self-Consistent Particle Model," in Abstract volume for the IEEE International Conference on Plasma Science, Williamsburg, Va., June 3-5, 1991.
35. M. E. Sherwin, G. O. Munns, E. G. Woelk, T.J. Drummond, M. E. Elta, F. L. Terry, Jr., and G. I. Haddad, "The Design of an ECR Plasma System and Its Application to InP Grown by CBE," Sixth International Conference on Molecular Beam Epitaxy, University of California, San Diego, CA, August 27-31, 1990.
36. M. E. Sherwin, G. O. Munns, M. E. Elta, E. G. Woelk, S. B. Crary, F. L. Terry, Jr., and G. I. Haddad, "The Design of an ECR Plasma System and Its Application to InP Grown by CBE," Sixth International Conference on Molecular Beam Epitaxy, University of California, San Diego, CA, August 27-31, 1990.
37. J. Mo, A. L. Robinson, D. Fitting, P. Carson, and F. L. Terry, Jr., "Improvement of Integrated Ultrasonic Transducer Sensitivity," 5th International Conference on Sensors and Actuators, Montreaux, Switzerland (June 25-30, 1989).
38. W. T. Shiau and F. L. Terry, Jr., "Reoxidized Nitrided Oxides as High Temperature MOS Gate Dielectrics," IEEE/TMS Electronic Materials Conference, Boulder, CO (1988).
39. W. T. Shiau and F. L. Terry, Jr., "Reoxidized Nitrided Oxides as High Temperature MOS Gate Dielectrics," IEEE Solid-State Sensor and Actuator Workshop, poster presentation, Hilton Head Island, SC, 1988 Solid State Sensor and Acutator Tech. Dig. pp. 100-1, (1988).
40. M. A. Schmidt, F. L. Terry, Jr., B. P. Mathur, and S. D. Senturia, "Inversion Layer Mobility of MOSFET's with Nitrided Oxide Gate Dielectrics," IEEE Device Research Conference, Boulder, CO (June, 1985).

41. F. L. Terry, Jr., P. W. Wyatt, M. L. Naiman, B. P. Mathur, C. T. Kirk, and S. D. Senturia, "High-Field Electron Capture and Emission in Nitrided Oxides," IEEE Device Research Conference, Santa Barbara, CA (June, 1984).
42. F. L. Terry, Jr., R. J. Aucoin, M. L. Naiman, P. W. Wyatt, and S. D. Senturia, "Elimination of Radiation-Induced Interface States By Nitridation," IEEE Device Research Conference, Burlington, VT (June, 1983).
43. F. L. Terry, Jr., M. L. Naiman, R. J. Aucoin, and S. D. Senturia, "Megarad-Resistant 10nm Gate Dielectrics," IEEE Nuclear and Space Radiation Effects Conference, Seattle, WA (July, 1981)
44. R. J. Aucoin, M. L. Naiman, F. L. Terry, Jr., and R. Reif, "Kinetics of Nitridation of Silica Films," Abs. 377, Electrochem. Soc. 160th Meeting, p. 913, Denver, CO (1981).

Abstracts in non-refereed conference proceedings

1. "Nanotechnology - An Overview," Fred L. Terry, Jr., presentation at the Fifth Annual Emerging Industry Symposium The Business Reality of Micro and Nano Technologies, March 31- April 1, 2005, Four Points Sheraton, Ann Arbor, sponsored by the Samuel Zell & Robert H. Lurie Institute for Entrepreneurial Studies (University of Michigan) and the Michigan Small Tech Association (MISTA). (Invited Talk)
2. "Metrology Challenges for End-of-Roadmap Nano-scale CMOS and Possible Post-CMOS Nanoelectronics," Fred L. Terry, Jr., Integrated Metrology Association Meeting, September 23, 2004 (Invited Talk).
3. "Optical Topography (Scatterometry) Research at University of Michigan," Fred L. Terry, Jr., Integrated Metrology Association Meeting, March 5, 2002 (Invited Talk).
4. "*In Situ* Spectroscopic Ellipsometry and Reflectometry for Real-Time Topography Monitoring," Hsu-Ting Huang, Ji-Woong Lee, Pete Klimecky, Pramod P. Khargonekar, and Fred L. Terry, Jr., Workshop on Spectroscopic Ellipsometry (WISE), University of Mons, Mons, Belgium, October, 2001. (Invited Talk)
5. "*In Situ* Measurements of Patterned Structures," Hsu-Ting Huang, Wei Kong, Brooke Stutzman, and Fred L. Terry, Jr., Workshop on Spectroscopic Ellipsometry (WISE), University of Michigan, Ann Arbor, May 8-9, 2000.
6. "Analysis of Reflectometry and Ellipsometry Data from Patterned Structures," Meng-En Lee, Cecilia G. Galarza, Wei Kong, Weiqian Sun and Fred L. Terry, Jr., poster presentation at Gordon Conference on Nanofabrication, Tilton, NH., June, 1998.
7. K. Khargonekar, T. L. Vincent, and F. L. Terry, Jr., "A Real-Time Etch Rate Estimation Algorithm for Single/Multiple Wavelength Reflectometry," Sematech Advanced Equipment Control/Advanced Process Control Workshop, New Orleans, Louisiana, November 5-8, 1995.
8. Tim M. Morris, Fred L. Terry, Jr., Michael E. Elta, and Hossein Etemad, "Non Destructive Optical Metrology and The Fourier Imaging System," presented at the SRC Technology Transfer Course: Scatterometry for Photoresist Process Characterization, June 30, 1993, University of New Mexico, Albuquerque, N.M.
9. E. Elta, H. Etemad, J.P. Fournier, J. S. Fruedenberg, M. D. Giles, J. W. Grizzle, P.T. Kabamba, P.P. Khargonekar, S. Lafortune, S.M. Meerkov, J.R. Moyne, B. Rashap, D. Teneketzis, and F. L. Terry, Jr., "Real-Time Feedback Control of Reactive Ion Etching," SEMATECH Workshop on Advanced Equipment Control, Dallas, TX, April 19-22, 1993.

10. Grimard, M. E. Elta, F. L. Terry, Jr., "Utilizing Fourier Imaging for Non-Destructive, Non-Contact Wafer Topography Measurements" 1992 SRC/DARPA CIM/IC Workshop, Stanford University, Palo Alto, CA, August 24, 1992.
11. Fred L. Terry, Jr. and Michael E. Elta, "Utilizing Diffraction Imaging for Non-Destructive Wafer Metrology," SEMATECH Workshop on Advanced Equipment Control, Phoenix, AZ, March 3-5, 1992.
12. E. Sherwin, G. O. Munns, D.T. Nichols, F. L. Terry, Jr., P.K. Bhattacharya, and G. I. Haddad, "Chemical Beam Epitaxy for the Growth of InP Based Electronic and Opto-Electronic Devices," Second Workshop on Electronic and Optoelectronic Materials for Tactical and Strategic Applications, Huntsville, Al., Oct. 8-10, 1991.
13. Chiao-Fe Shu, Ramesh Jain, Fred Terry, and Michael Elta, "A Real-Time Fourier Imaging System for Monitoring Plasma," the Proceedings of the Sixth Annual SRC/DARPA CIM-IC Workshop North Carolina State University, Chapel Hill, August 22-23, 1991.
14. S. Grimard, M. L. Passow, F. L. Terry, Jr., and M. E. Elta, "In Situ Monitors and Sensors for Plasma Etching," SEMICON/Southwest Technical Conference on Metrology for Advanced Materials/Processes Characterization, February 1990.
15. Dennis S. Grimard, M. E. Elta, F. L. Terry, Jr, T.J. Grimard, and H.W. Trombley, "In Situ Monitoring for Plasma Etching," SRC Technical Review Conference on Plasma Technology, MIT, Cambridge, MA (Feb. 1-2, 1989).
16. Dennis S. Grimard, M. E. Elta, F. L. Terry, Jr., T.J. Grimard, and H.W. Trombley, "In Situ Monitoring for Plasma Etching," 4th Annual SRC/DARPA Workshop on Plasma Etching, Ann Arbor, MI (August, 1989).

Industrial Presentations

1. "Real-Time Monitoring and Control of Etch Rates and Critical Dimensions in Reactive Ion Etching," Fred L. Terry, Jr., presentation at Novellus Corp., San Jose, CA, Sept. 10, 2005.
2. "Optical Metrology Research: Optical Critical Dimension & Real-Time Etch Depth Modeling," Fred L. Terry, Jr., presentation at AMD, Santa Clara, CA, May 26, 2005.
3. "Immersion Scatterometry for Improved Feature Resolution and High Speed Acquisition of Resist Profiles," Fred L. Terry, Jr. and Joseph J. Bendik, presentation at KLA-Tencor Corp., San Jose, CA, May 25, 2005.
4. "Real-Time Monitoring and Control of Etch Rates and Critical Dimensions in Reactive Ion Etching," Fred L. Terry, Jr., invited corporate seminar at Lam Research Corporation, Fremont, CA, December 10, 2004.
5. "Real Time In Situ Observation of Deep Submicron Topography Evolution Using Spectroscopic Ellipsometry and Reflectometry," Hsu-Ting Huang, Brooke S. Stutzman, Wei Kong, Pete Klimecky, and Fred L. Terry, Jr., presentation at Applied Materials Corporation, Santa Clara, CA, May 22, 2001.
6. "Recent Developments In Situ and In Line Spectroscopic Ellipsometry for Topography Measurements," Fred L. Terry, Jr., presentation at KLA-Tencor Corp., San Jose, CA, May 21, 2001.
7. "Spectroscopic Ellipsometry from Gratings for Topography Extraction," Fred L. Terry, Jr., presentation at KLA-Tencor Corp., San Jose, CA, Feb. 10, 2000.
8. "Real-Time Monitoring and Control of Reactive Ion Etching," Fred L. Terry, Jr., presentation at KLA-Tencor Corp., San Jose, CA, Feb. 10, 2000.

9. "Spectroscopic Ellipsometry for Critical Dimension Metrology and Reactive Ion Etch Control," Fred L. Terry, Jr., presentation at Defense Evaluation and Research Agency (DERA), Great Malvern, UK, May, 1999.
10. "Real-Time Feedback Control of Plasma Processes," Fred L. Terry, Jr., presentation at KLA-Tencor Corp., San Jose, CA, Feb. 9, 1998.
11. Tutorial on Spectroscopic Ellipsometry for Thin Film Measurements, Fred L. Terry, Jr., presentation at National Semiconductor Corporation, January 14, 1997.
12. "Applications of Spectroscopic Ellipsometry to III-V and Si Fabrication Problems," Fred L. Terry, Jr., presentation at IBM T.J. Watson Research Laboratories, September, 1990.

Academic Seminars

1. "Very High Accuracy Critical Dimension Measurements by Optical Diffraction for Semiconductor Manufacturing Control," Fred L. Terry, Jr., University of Michigan Applied Physics graduate seminar, January 21, 2004.
2. "Use of Reflected Light Measurements for Non-Destructive Measurement of Deep Submicron Topography and Semiconductor Manufacturing Control," Fred L. Terry, Jr., Michigan State University of Michigan, ECE Department Seminar, April 4, 2003.
3. "Use of Spectroscopic Ellipsometry and Related Reflected Light Techniques for High-Speed, Nondestructive Measurement of Nanostructures," Fred L. Terry, Jr., Cornell University, ECE Department Seminar, Jan. 30, 2001.
4. "Spectroscopic Ellipsometry for Critical Dimension Metrology and Reactive Ion Etch Control," Fred L. Terry, Jr., EECS 590 graduate seminar, fall, 2000.
5. "Reflection-based Optical Metrology for Electronics Materials Characterization and Process Control," Fred L. Terry, Jr., First Annual Michigan Materials Research Symposium (MMRS), May 6-7, 1999.
6. "MOS Devices for Hostile Environments," Center for Integrated Systems and Circuits Symposium, Dept of EECS, University of Michigan, April 4, 1989.

Patents

1. "Ultrasonic Image Sensing Array and Method," United States Patent Number 5,160,870, issued November 3, 1992, Paul L. Carson, Dale W. Fitting, Andrew L. Robinson, and Fred L. Terry, Jr.
2. "Ultrasonic Image Sensing Array and Method Extensions," U.S. Patent No. 5,406,163, Apr. 11, 1995, Paul L. Carson, Dale W. Fitting, Andrew L. Robinson, and Fred L. Terry, Jr.

Consulting

1. Dechert LLP, intellectual property consulting, fall, 2009.
2. Symyx Technologies (Sunnyvale, CA), consulting on scatterometry measurements in combinatorial chemistry characterization of photoresists, May, 2003
3. BAE System, consulting for semiconductor cleanroom operations issues at the Army Research Laboratories, Adelphia, MD, fall, 2001 and spring 2002.
4. Therma-Wave Inc. (Fremont, CA), served on corporate technical advisory board advising on long range planning, November, 2002
5. Applied Materials Corporation, confidential consulting, May, 2001
6. "Spectroscopic Ellipsometric Analysis of Proprietary Coatings on Architectural Glasses,"

- for Libbey Owens Ford, June, 1990.
7. “Refractive Index Properties of Amorphous Si Coatings on Architectural Glasses,” for Libbey Owens Ford, November, 1989.
 8. “Strategies for Optimization of Reoxidized Nitrided Oxides for Ionizing Radiation Environments,” for MIT Lincoln Laboratories, June, 1986.

Ph.D. Committees Chaired

1. Elson Yee-Hsin Liu (chairman), “Immersion Scatterometry for Nanoscale Grating Topography Extraction,” Defense on January 9, 2014.
2. Pete Ivan Klimecky (chairman), “Plasma density control for reactive ion etch variation reduction in industrial microelectronics,” Defense on August 15, 2002, now with Intel, Portland, Or.
3. Hsu-Ting Huang (chairman), “High-accuracy, high-speed measurement of deep submicron and nano-structure gratings using specular reflected light techniques,” Defense on December 13, 2001, now with Invarium Corp., San Jose, Ca.
4. Wei Kong (chairman), “Analysis of Spectroscopic Ellipsometry Data from Patterned Structures for Etching Process Monitoring and Control,” Defense on March 30, 2001, with IBM, East Fishkill.
5. Brooke S. Stutzman (chairman), “Correlation of Process with Topography Evolution During Reactive Ion Etching,” Defense on June 27, 2000, currently an assistant professor of physics, U.S. Coast Guard Academy.
6. Meng-en Lee (chairman), “High-Speed Analysis of Surface Topography on Semiconductor Wafers by Optical Diffraction Techniques,” Defense on January 6, 1999, currently assistant professor of physics, National Kaohsiung Normal University, Taiwan.
7. Tyrone Benson (chairman), “Improved Optical Methods for Characterizing Polycrystalline Silicon, with Emphasis on Optical Scattering Losses,” Defense on September 20, 1996, currently with Intel Corp, Phoenix, Ar.
8. Len Kamlet (chairman), “Phenomenological Modeling of the Optical Properties of Semiconductors for Process Characterization and Control,” Defense on May 13, 1996, currently with MKS Instruments, Andover, Ma.
9. John C. Cowles (co-chairman with Prof. G. I. Haddad), “InP-Based Heterojunction Bipolar Transistor Technology for High Speed Devices and Circuits”, Defense on April 7, 1994, Currently with Analog Devices, Portland, Or.
10. Ru-Liang Lee (chairman), “Self-Aligned-Gate Heterostructure Field Effect Transistors - Process Development and Device Comparison” Defense on August 11, 1993, currently with TMC, Camas, Wa.
11. Jonathan S. Herman (chairman), “Plasma Passivation of Compound Semiconductors for Device Applications”, Defense on January 18, 1993 Currently with Maxim Integrated

Products, Sunnyvale, CA.

12. Marc E. Sherwin (chairman), “The Application of Chemical Beam Epitaxy to InP Based Materials and Devices”, Defense on March 3, 1992, Currently with Microwave Signal, Inc., Clarksburg, MD
13. Henry Trombley (co-chairman with Dr. Michael E. Elta), “Modeling of RF Glow Discharges for Microelectronics Manufacturing Processes”, Defense on June 26, 1991, Currently with IBM.
14. Wei-Tsun Shiau (chairman), “Reliability of MOSFET Gate Insulator Layers at High Temperatures”, Defense on September 14, 1990, Currently with Texas Instruments, Dallas, TX.
15. Dennis S. Grimard (co-chairman with Dr. Michael E. Elta), “Utilizing Diffraction For Real-Time In Situ Wafer Monitoring”, Defense on August 24, 1990, Currently with Univ. of Michigan
16. Tina Jane Grimard (co-chairman with Dr. Michael E. Elta), “Computer Modeling of Plasma Processing and Equipment for Microelectronic Applications”, Defense on May 12, 1989, Currently with IBM Corp., East Fishkill, New York
17. Michael S. Barnes (co-chairman with Dr. Michael E. Elta), “Computer Modeling of RF Glow Discharges for the Study of Plasma Processing in Microelectronics”, December 21, 1987, Currently with Novellus Corporation, San Jose, Ca.

Honors and Awards

1. College of Engineering Service Excellence Award, 2006
2. Dept of EECS Faculty Achievement Award, 2002
3. Senior Member of the IEEE, 1999
4. Dept of EECS Teaching Award 1992
5. Advisor for 3 best student paper awards and 1 honorable mention at SEMATECH Advanced Equipment Control/Advanced Process Control Symposia
6. Advisor for 1 best student paper award at SRC TECHCON 98 (general conference of SRC funded programs)

Service Activities

Departmental:

1. EE Undergraduate Chief Program Advisor, F11-Su14
2. ECE Associate Chair for Undergraduate Affairs, July 1, 2011 –June 30, 2013
3. ECE Director for Undergraduate Affairs, September 1, 2009-June 31, 2011
4. EE Undergraduate Faculty Advisor, F09-W09
5. EE Undergraduate Chief Program Advisor, F04-Su08

6. EECS Curriculum Committee member F04-W14
7. EECS Undergraduate Committee member F04-?
8. Chair, SSEL Expansion Committee, January, 2004 –April, 2008
9. Director, Solid State Electronics Laboratory, Oct. 1, 2005-September, 2007
10. Solid State Electronics Laboratory Operations Committee, 1986-?
11. EE Graduate Program Financial Aid & Domestic Admissions and Chair, W02- beginning of F04
12. EE Curriculum Committee Member, F01-F02
13. EE Curriculum Committee Chairman, F98-W00
14. Solid State Graduate Program Advisor F97-September, 1999
15. Chair's Ad Hoc Program Committee on EECS BS Programs F99-W00

College of Engineering:

1. Director of Academic Programs, September, 2014-present (in charge of the first year Engineering Division program for freshmen engineers, reporting to the Associate Dean for Undergraduate Education).
2. CoE Curriculum Committee Chair, September, 2011-May, 2014
3. Review Committee for Susan Montgomery, F13
4. Promotion Committee for Jamie Phillips, F12
5. CoE Curriculum Committee Member, September 2009-May, 2011
6. Council on Undergraduate Education, September, 2009-May, 2009
7. CoE Diversity and Outreach Council, September, 2008-May, 2012?
8. CoE delegation to NRC Engineering Education Leadership Institute, Indian Lakes Resort, Il., July 23-28, 2006.
9. CoE Martin Luther King Committee (co-chair, F05-W06)
10. Tenure and Promotion Committee for Prof. Michael Flynn, F05
11. Reappointment (3 year) Review Committee for Prof. Jamie Phillips, W05
12. Faculty Advisory Committee on Undergraduate Admissions (W04-F04)
13. Tenure and Promotion Committee for Prof. Dennis Sylvester, F04
14. Reappointment Review Committee Chair for Prof. Dennis Sylvester, F03
15. Rules Committee (member 97-00, chair F99-W00)
16. CoE Curriculum 2000 Working Group (member, F99-W00)
17. Promotion Committee for Dr. James Moyne (assistant to associate research scientist) F98

National and international:

1. Associate Editor, *IEEE Transactions on Nanotechnology*, from journal's beginning in 2002 to Sept, 2007
2. Advisory Panel On Nanotechnology, National Electrical Manufacturers Association (NEMA), March, 2006-?
3. Program committee member for Emerging Metrology, AVS Second International Conference on Microelectronics and Interfaces (ICMI), Santa Clara, California, February 5 - 8, 2001
4. Workshop Chair and host, Workshop on Spectroscopic Ellipsometry (WISE), University of Michigan, Ann Arbor, MI, May 8-9, 2000.

5. Conference on Lasers and Electro-optics (CLEO) Program Committee (subcommittee on monitors for process control and environment) 1997, 98

Grants and Contracts

Sponsor	Dates	Title	Amount	PI/Co-PI's	GSRA's Supported
KLA-Tencor Corp.	1/1/06-12/31/06	Immersion Scatterometry for Enhanced-Resolution Nanotopography Measurements	\$100,000	Fred L. Terry, Jr.	1
Direct Sponsor: Omni Sciences, Inc. Prime Sponsor: DARPA	01/01/2006 to 08/31/2006	Mid-Infrared Fiber Laser Based on Super-Continuum	\$30,000	Fred L. Terry, Jr.	1
Direct Sponsor: Omni Sciences, Inc. Prime Sponsor: DARPA	09/15/2005 to 05/15/2006	Mid-Infrared Fiber Laser Based on Super-Continuum	\$37,077	Fred L. Terry, Jr.	1
Direct Sponsor: Omni Sciences, Inc. Prime Sponsor: Defense, Department of-Army, Department of the-Subcontracts	07/16/2004 to 01/15/2005 Time Extension Dt: 02/15/2005	Mid-Infrared Laser Based on Cascaded Raman Wavelength Shifting in Fibers	\$35,720	Fred L. Terry, Jr.	1
Direct Sponsor: Cornell University Prime Sponsor: National Science Foundation-Subcontracts	03/01/2004 to 02/28/2009	NNIN (National Nanotechnology Infrastructure Network)	\$6,000,000	Khalil Najafi/Fred L. Terry, Jr.	0
NIST/ATP	12/18/1998	Intelligent Control	\$1,117,388	Fred L. Terry,	3

	to 08/31/2002	of the Semiconductor Patterning Process		Jr./J. Freudenber, J. Grizzle	
ARPA/AFO SR	09/15/1995 to 09/14/2001	MURI Center for Automated Process Control	\$5,269,300	P. K. Khargonekar/F. L. Terry, Jr.,	3
Semiconduct or Research Corporation State of Michigan	09/01/1998 to 08/31/1999 7/1/93- 6/31/98	Sensor - Based Process Control and Integration Center for Display Technology and Manufacturing	\$285,000 \$20,000,000	F. L. Terry, Jr./J. Grizzle, M.E. Elta, S. Musa	2 2
NSF	9/1/96- 8/31/97	A High-Speed Ellipsometer for Semiconductor Process Control Research	\$43,000	F. L. Terry, Jr., M. Brake, P. Khargonekar	equipment grant
SRC	9/1/96- 8/31/98	Process Metrology Task in SRC Center for Automation in Semiconductor Manufacturing	\$80,000	K. D. Wise/J. Grizzle, F. L. Terry, Jr.	2
SRC	9/1/95- 8/31/96	Process Metrology Task in SRC Center for Automation in Semiconductor Manufacturing	\$160,000	K. D. Wise/J. Grizzle, F. L. Terry, Jr.	2
SRC	9/1/94- 8/31/95	Process Metrology Task in SRC Center for Automation in Semiconductor Manufacturing	\$156,416	K. D. Wise/J. Grizzle, F. L. Terry, Jr.	2
NSF	09/01/1993 to 08/31/1998	Feedback Control in Semiconductor Manufacturing: Reactive Ion Etching	\$300,000	J. Freundenberg/F. Terry	2
NSF	09/01/1992 to 08/31/1997	Combined Research/Curricul um Grant: Sensor - Based Control of Semiconductor Manufacturing	\$390,000	F. L. Terry, Jr./J. Grizzle, P. Khargonekar, M. E. Elta	3

ARPA	08/31/1992 to 01/31/1997	Equipment Smart ECR Plasma Etching	\$1,356,000 (original award \$4,355,856, cut very early due to DARPA priority shifts) \$11,103	F. L. Terry, Jr./M. E. Elta, S. Pang, J. Grizzle	4
Direct Sponsor: Honeywell International Prime Sponsor: International Sematech NSF	07/01/1992 to 09/01/1992	Project Plan for the Semiconductor Etch Equipment Controller Project		M. Elta/F. Terry	0
	9/1/86- 8/31/88	A Double Crystal X-Ray Diffractometer for Use in Solid State Electronics Research	\$57,950	A. B. Brown, F. L. Terry, Jr.	equipment grant
IBM	7/1/88- 6/30/89	RIE Etch Modeling and Characterization	\$86,710	M. E. Elta, F. L. Terry, Jr.	1
DOE (Sandia National Labs)	1/1/89- 4/1/90	AlGaAs/GaAs Superlattice Alloys as Solar Cell Window Layers	\$36,583	T. J. Drummond, F. L. Terry, Jr.	1
Hewlett Packard	5/1/88	A CV/IV Measurement System for Solid State Research and Education	\$53,000	F. L. Terry, Jr.	equipment donation
ARO	9/1/86- 8/31/93	Center for High Frequency Microelectronics	~\$80,000/year	G. I. Haddad	1
Ford Motor Company and Ford Fund	1/1/86- 8/31/92	High Temperature Microelectronics	~70,000/year	R. B. Brown, F. L. Terry, Jr.	2

Teaching

Courses taught:

Term	Course #	Enrollment	CRLT Q1	CRLT Q2
FA85	EECS 423	23	3.96	4.30
WN86	EECS 522	17	3.89	3.86
FA86	EECS 421	17	3.81	3.67
WN87	EECS 424	24	3.65	3.58
FA87	EECS 421	17	4.56	4.65
WN88	EECS 424	11	4.38	4.33
FA88	EECS 423	13	4.31	4.40
WN89	EECS 424	12	4.19	4.64
FA89	EECS 423	23	4.62	4.54
WN90	EECS 521	25	4.13	4.09
FA90	EECS 421	22	4.10	4.05
WN91	EECS 521	22	4.00	4.00
FA91	EECS 421	20	3.72	3.79
WN92	EECS 521	16	3.93	3.88
FA92	EECS 421	27	3.75	3.63
WN93	EECS 320	39	2.73	3.38
FA93	EECS 598	13	4.00	4.57
SP94	EECS 320	14	3.25	3.25
FA94	EECS 320	31	2.92	2.86
FA95	EECS 320	30	3.13	3.68
WN96	EECS 424	21	4.19	4.42
FA96	EECS 423	21	4.27	4.08
WN97	EECS 320	38	3.57	4.17
FA97	EECS 421	33	3.94	4.00
FA98	EECS211	62	3.61	3.65
WN99	EECS521	20	3.94	4.19
FA99	EECS211	60	3.88	4.00
WN00	EECS521	13	3.80	3.93
FA00	Sabbatical	Sabbatical	Sabbatical	Sabbatical
WN01	Sabbatical	Sabbatical	Sabbatical	Sabbatical
FA01	EECS215	76	3.82	3.90
WN02	EECS215	103	3.96	4.16
FA02	EECS423	30	4.67	4.40
WN03	EECS215	61	3.91	4.28
FA03	EECS423	34	4.33	4.36
WN04	EECS215	47	4.34	4.53
FA04	EECS423	33	4.54	4.33
WN05	EECS215	67	4.17	4.36
FA05	EECS423	34	4.10	3.94
WN06	Service Release(SSEL Director, Lab Expansion, Chief UG Program Advisor)			
FA06	EECS215	64	3.74	3.80
WN07	EECS215	63	3.69	3.83
FA07	EECS215	69	4.02	4.11
WN08	EECS311	29	2.67	2.90
FA08	EECS215	63	3.74	4.06
WN09	Modified Duties			
FA09	Service Release (ECE Director for UG Affairs)			
WN10	EECS215	54	4.13	4.35
FA10	Service Release (ECE Assoc. Chair for UG Affairs)			

WN11	EECS215	59	4.48	4.69
FA11	Service Release (ECE Assoc. Chair for UG Affairs)			
WN12	EECS215	60	4.38	4.83
FA12	EECS215	91	4.3	4.21
FA12	(team taught D. Wentzloff)	84	4.26	4.23
SP12	EECS320	7	4	5
WN13	Service Release (ECE Assoc. Chair for UG Affairs)			
FA13	EECS215 (with H. Hofmann, my primary section)	86	4.00	4.27
FA13	EECS215(with H. Hofmann, his primary section)	91	4.00	4.06
WN14	EECS521	15	4.00	3.38

Undergraduate Projects

1. Mr. Keng Kovitya, EECS REU program. Project on reactive ion etch processes for the creation of SiO₂ nano-imprint masks. Major assistance by Dr. Rob Hower and Mr. Brian VanDerElzen of the SSEL/MNF. (Summer, 2006).
2. Mr. Chung Jye (Asher) Ling. Supervised 499 project on an automated testing scheme using Labview for MOSFET device characterization. The code will be used in EECS 423. (Fall, 2003).
3. Mr. Pak Hin (Percy) Wong: supervised informal directed study project on numerical modeling of plasma properties. (winter, 2004)
4. Mr. Saif Hasnain (August, 1997), "Stress in PECVD a-Si and SiN_x," summer employment project. The work involved performing amorphous Si and SiN_x depositions on a large area plasma-enhanced chemical vapor deposition (PECVD) reactor, measuring the stress in the deposited thin films with substrate bowing measurements, and adjusting the deposition process to reduce the stress. Significant progress was made toward a reduced stress a-Si when an unrelated accident damaged the reactor and stopped the work for a few months.
5. Ms. Susan Okasinski (May, 1997), "Photometric Calibration of an Optical Emission Spectroscopy System", undergraduate directed study project (EECS 499). The work involved using a diffuse, commercially calibrated light source to perform photometric testing and calibration of optical emission spectroscopy systems built by our group. The student wrote instrument control software (in Labview) and performed experiments to correct our photon counting systems for non-linearities and to calibrate the measured signals vs. the reference source.
6. Ms. Randi Herdman (Fall, 1995), "Construction of an Experimental Reactive Ion Etch Chamber." Ms. Herdman performed both mechanical design work and hands on construction toward the building of an RIE system.
7. Mr. Dean Accuri and Mr. Mark Sember (May, 1994), "An Improved Mass Flow Control System for Multi-zone Process Gas Delivery," EECS 463 project (class instructor: P. K. Khargonekar), provided basic idea for the project, technical advice, and financial support (under NSF Combined Research-Curriculum Grant). The students performed bench-top experiments to learn how a commercial mass flow controller (MFC) operates, designed a new feedback control system for a multi-zone application involving MFCs in serial, and wrote Labview computer code to implement the control design.
8. Mr. Mark Sember (August, 1994), "Design and Construction of a Improved A/D Converter Module for a Spectroscopic Ellipsometer," project under part-time employment. The student

analyzed the operation of a photomultiplier preamplifier circuit and companion A/D converter, then designed and built a new A/D system to allow the use of a superior commercial preamp. Together we tested the operation of the new circuits on the ellipsometer and found superior operation. I am continuing to use the resulting hardware.

9. Mr. Len Kamlet (April, 1990), “MOSFET Threshold Voltage Extraction and Modeling”, undergraduate directed study project (EECS 499). The student performed both numerical simulations and experimental measurement of MOSFETs to test a newly proposed method to more accurately measure the threshold voltage of the device. The results suggested that the new threshold voltage measurement scheme could lead to improved measurement of the low carrier concentration mobility in MOSFETs.

Background

Born in Augusta, Georgia on July 22, 1958. Raised in Chattanooga, Tennessee. Senior Member of the IEEE, member of the American Physical Society, Sigma Xi.