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EDUCATION:

1982	Ph.D.	Bioengineering University of Utah, Salt Lake City, Utah
1979	M.S.	Bioengineering University of Utah, Salt Lake City, Utah
1977	B.S.	Biomedical Electronics and Electrical Engineering Dept. of Electrical Engineering University of Rhode Island, Kingston, RI

PROFESSIONAL EXPERIENCE:

2003- present	Professor of Electrical Engineering, University of Maine, Orono
2003- present	Adjunct Professor of Electrical Engineering, University of California, Davis
1995 - 2003	Professor of Electrical Engineering, University of California, Davis
1997 & 1999	Summer Faculty Fellow, NASA/ASEE, Goddard Space Flight Center
1990 - 1995	Associate Professor of Electrical Engineering, University of California, Davis
1988 - 1990	Assistant Professor of Electrical Engineering, University of California, Davis
1986 - 1988	Sinclair Visiting Assistant Professor of Electrical Engineering, MIT, Cambridge, MA
1984 - 1986	Visiting Scientist, Centre Suisse d'Electronique et Microtechnique, Switzerland
1982 - 1984	Assistant Professor of Electrical Engineering, Drexel University, Philadelphia, PA

Teaching:

- Microsystems Design and Fabrication (EEC 248, ECE 598)
- Semiconductor Materials and Devices (EEC 140A &B, ECE 462)
- SSEI IGERT: Sensor Fundamentals (INT 598), UMaine
- Intro. to Electronic Circuit Theory (E 17), UCDavis
- Semiconductor Device Physics (EEC 220), UCDavis
- Solid State physics (ECE 565), UMaine
- Integrated Circuit Manufacturing Technology (EEC 146 and EEC 246), UCDavis
- Industrial Short Course on Silicon Micromachining

Service:

- Co-director, Institute for Molecular Biophysics, UMaine, 2006-07
- Graduate Coordinator, Dept. ECE, UMaine, 2004-07
- Graduate Board Representative, Dept. ECE, UMaine, 2004-06
- Grant Proposal Review: *NSF, DOE, NIH, UCMICRO, UCSMART*
- Program Review: *The National Academies,* US Airforce Science and Technology Board, Committee on Implications of Emerging Micro And Nano Technologies, 2001-02
- Site Visit/ Program Review: *NSF* National Nanotechnology Infrastructure Network (NNIN), 2006
- Site Visit/ Review: NSF MERSEC, Michigan State University, 2000
- Journal Review: *Sensors & Actuators, IEEE Trans. ED, Biomed. Microdevices, J. Appl. Physics, J. Electrochem. Soc., J. Micromech. Microengr., Lab-on-a-Chip*
- Graduate Student Advisor, UCDavis Biomedical Graduate Group, 1990-2000
- Faculty Advisor, Davis Student Chapter of IMAPS, 1991-98
- Chair, Faculty of the College of Engineering, UCDavis 1997-98

- Chair, Solid State and Microfabrication Laboratory Committee, UCDavis, 1997-1999
- Executive Committee, Biomedical Engineering Graduate Group, UCDavis, 1996-2000
- Member, Editorial Board, Journal of Biomedical Microdevices, 1999- present
- Member, Editorial Board, IEEE Sensors, 2003- present
- Member, Campus Committee on Research, UCDavis 1999-00

Conference Organizing Committees

- IEEE Transducers '91 Intern. Conference, North America Technical Program Committee Member
- IEEE Transducers '93 Intern Conference, Technical Program Committee Member
- UC Campus-Lab Collaboration, Workshop on Microfabricated Sensors, Instruments and Systems for Biological and Medical Applications, Workshop Organizer and Chair, UCDavis, 1996
- IEEE Transducers '97 Intern Conference, Technical Program Committee Member
- 1997 Symp. on Micro and Nanofabricated Electro-Optical-Mech Systems for Biomedical and Environmental Applications (SPIE-BiOS), Technical Committee Member
- 1997 Symp. on Micro and Nanofabricated Electro-Optical-Mech Systems for Biomedical and Environmental Applications (SPIE-BiOS), Technical Committee Member

PROFESSIONAL AND HONOR SOCIETY MEMBERSHIP:

- Institute of Electrical and Electronic Engineers (IEEE), Senior Member
- Eta Kappa Nu, Electrical Engineering Honor Society
- Tau Beta Pi, Engineering Honor Society

PEER REVIEWED PUBLICATIONS in Journals and Conference Proceedings

1. R. L. Smith, J. Janata and R. J. Huber. TRANSIENT PHENOMENA IN ION SENSITIVE FIELD EFFECT TRANSISTORS. *J. of the Electrochemical Society*, **127(7)**: 1599-1603(1980).

1. E. Fleischacker, R. L. Smith and E. Fromm. TELEMETERED MEASUREMENT OF INTRAORAL PLAQUE pH, Proc. IEEE Frontiers of Engineering and Computing in Health Care, pp. 708-710 (1984).

2. R. L. Smith and D. C. Scott. A SOLID STATE MINIATURE REFERENCE ELECTRODE. Proc. of IEEE /NSF Symposium on Biosensors, pp. 61-62(1984).

3. R. L. Smith, R. J. Huber and J. Janata. ELECTROSTATICALLY PROTECTED ION SENSITIVE FIELD EFFECT TRANSISTORS. *Sensors and Actuators*, **5**: 127-136 (1984).

4. R. L. Smith and D. C. Scott. AN INTEGRATED SENSOR FOR ELECTROCHEMICAL MEASUREMENTS. *IEEE Transactions on Biomedical Engineering*, Special Issue on Biosensors, **BME-33(2)**: 83-90(1986).

5. R. L. Smith, B. Kloeck, N. de Rooij and S. D. Collins. THE POTENTIAL DEPENDENCE OF SILICON ANISOTROPIC ETCHING IN KOH AT 60° C, *J. Electroanal. Chem. and Interfac. Electrochem.*, **238**: 103-113 (1987).

6. R. L. Smith and S. D. Collins. KINETICS OF SILICON ANODIC PASSIVATION IN KOH. Proceedings 2nd Symposium on Electrode Materials and Processes for Energy Conversion and Storage, Electrochemical Society Spring Meeting(1987).

7. R. L. Smith and S. D. Collins. THE KINETICS OF ANODIC OXIDE FORMATION ON <111> SILICON IN KOH. Extended Abstracts, Physical Electrochemistry General Session, Electrochemical Society Fall Meeting, **87(2)**: 2003-2004 (1987).

8. R. L. Smith and S. D. Collins. THE KINETICS OF ANODIC OXIDE FORMATION ON <111> SILICON IN KOH. Proceedings Physical Electrochemistry General Session, Electrochemical Society Fall Meeting (1987).

9. R. L. Smith and S. D. Collins. THE POTENTIAL DEPENDENCE OF SILICON ANISOTROPIC ETCHING IN KOH. Proceedings Physical Electrochemistry General Session, Electrochemical Society Fall Meeting (1987).

10. R. L. Smith and S. D. Collins. THE POTENTIAL DEPENDENCE OF SILICON ANISOTROPIC ETCHING IN KOH. Extended Abstracts, Physical Electrochemistry General Session, Electrochemical Society Fall Meeting, **87(2)**: 1994-1995 (1987).

11. S. D. Senturia and R. L. Smith. MICROSENSOR PACKAGING AND SYSTEM PARTITIONING. Sensors and Actuators, Vol. 15, pp. 221-234(1988).

12. R. L. Smith and S. D. Collins. MICROMACHINED PACKAGING FOR CHEMICAL MICROSENSORS, *IEEE Transactions on Electron Devices*, **ED-35(6)**: 787-792(1988).

13. M. Young, J. E. Goldsberry, J. H. Haritonidis, R. L. Smith and S. D. Senturia. A TWIN-INTERFEROMETER FIBER-OPTIC READOUT FOR DIAPHRAGM PRESSURE TRANSDUCERS. Technical Digest of IEEE Workshop on Sensors and Actuators, pp. 19-22(1988).

14. R. L. Smith. INTEGRATED MICROSENSORS: DESIGN AND FABRICATION CONSTRAINTS. Proceedings SPIE, Vol. 904, Microsensors and Catheter-Based Imaging Technologies, Los Angeles, California, pp. 3-5(1988).

15. S. F. Chuang and R. L. Smith. PREFERRED CRYSTALLOGRAPHIC DIRECTIONS OF PORE PROPAGATION IN POROUS SILICON LAYERS. Technical Digest of IEEE Workshop on Sensors and Actuators, Hilton Head Island, SC, June 1989, pp. 151-153(1988).

16. R. L. Smith, B. Kloeck and S. D. Collins, ANODIC PASSIVATION OF {111} SILICON IN KOH, *Journal of the Electrochemical Society*, **135(8)**: 2001-2008(1988).

17. R. L. Smith, S.-F. Chuang and S. D. Collins, A THEORETICAL MODEL OF THE FORMATION MORPHOLOGIES OF POROUS SILICON, *Journal of Electronic Materials*, **17(6)**: 533-541(1989).

18. K. E. Crowe and R. L. Smith, A NEW TECHNIQUE FOR DETERMINATION OF TENSILE STRESS IN THIN FILMS, *J. of the Electrochemical Society*, **136(5)**: 1566-1568(1989).

19. X. G. Zhang, S. D. Collins and R. L. Smith, POROUS SILICON FORMATION AND ELECTROPOLISHING OF SILICON BY ANODIC POLARIZATION IN HF SOLUTION, *J. of the Electrochemical Society*, **136(5)**: 1561-1565(1989).

20. Kloeck, S. D. Collins, N. F. de Rooij and R. L. Smith, STUDY OF ELECTROCHEMICAL ETCH-STOP FOR HIGH-PRECISION THICKNESS CONTROL OF SILICON MEMBRANES, *IEEE Transactions on Electron Devices*, **36(4)**: 663-669 (1989).

21. M. G. Allen, M. Scheidel, and R. L. Smith, DESIGN AND FABRICATION OF MOVABLE SILICON PLATES SUSPENDED BY FLEXIBLE SUPPORTS, Proc. of the Microelectromechanical Workshop, Salt Lake City, Utah, February 1989, pp. 76-81.

22. R. L. Smith and S. D. Collins, MATERIALS AND TECHNOLOGIES FOR MICROSTRUCTURE ENGINEERING, Proc. SPIE, Microsensors and Catheter-Based Imaging Technologies, Los Angeles, CA, vol. 1068: 10-17 (1989).

23. M. Young, J. E. Goldsberry, J. H. Haritonidis, R. L. Smith, and S. D. Senturia, A TWIN-INTERFEROMETER FIBER-OPTIC READOUT FOR DIAPHRAGM PRESSURE TRANSDUCERS, Technical Digest of IEEE Workshop on Sensors and Actuators, Hilton Head Island, SC, June 1989, pp. 19 – 22 (1989) .

24. R. L. Smith, R. W. Bower and S. D. Collins, MAGNETICALLY ACTUATED, MICROMACHINED FLOW VALVE, Digest of the 4th International Conference on Solid State Sensors and Actuators, Transducers '89 , Montreux, Switzerland, 1989.

25. M. G. Allen, M. Scheidl, R. L. Smith and A. Nikolich. MOVABLE MICROMACHINED SILICON PLATES WITH INTEGRATED POSITION SENSING, Digest of the 4th International Conference on Solid State Sensors and Actuators, Transducers '89 , Montreux, Switzerland, 1989.

26. S. F. Chuang, S. D. Collins, and R. L. Smith, POROUS SILICON MORPHOLOGIES AND FORMATION MECHANISM, Technical Digest of the 4th International Conference on Solid State Sensors and Actuators, Transducers '89, Montreux, Switzerland , 1989.

27. R L. Smith, S. D. Collins and S. -F. Chuang, ENGINEERING POROUS SILICON MORPHOLOGIES, Abstract No. TC3-TuM9, American Vacuum Society, 36th National Symposium, p. 109 (1989).

28. R. L. Smith and S. D. Collins. THICK FILMS OF SILICON NITRIDE, Technical Digest of the 4th International Conference on Solid State Sensors and Actuators, Transducers '89, Montreux, Switzerland , 1989.

29. R. L. Smith and S. D. Collins. GENERALIZED MODEL FOR THE DIFFUSION-LIMITED AGGREGATION AND EDEN MODELS OF CLUSTER GROWTH. *Physical Review A*, **39(10)**, 5409-5413 (1989).

30. S.-F. Chuang, S. D. Collins and R. L. Smith. PREFERENTIAL PROPAGATION OF PORES DURING THE FORMATION OF POROUS SILICON: A TRANSMISSION ELECTRON MICROSCOPY STUDY, *Applied Physics Letters*, **55(7)**: 675-677 (1989).

31. S.-F. Chuang, S. D. Collins and R. L. Smith, POROUS SILICON MICROSTRUCTURE AS STUDIED BY TRANSMISSION ELECTRON MICROSCOPY, *Applied Physics Letters*, **55 (9)**: 1540-1542 (1989).

32. R. L. Smith and S. D. Collins. A WAFER-TO-WAFER ALIGNMENT TECHNIQUE. *Sensors and Actuators*, **20**: 315-316 (1989).

33. M. G. Allen, M. Scheidl, R. L. Smith and A. Nikolich. MOVABLE MICROMACHINED SILICON PLATES WITH INTEGRATED POSITION SENSING, *Sensors and Actuators*, **A21-A23**: 211-214 (1990).

34. R. L. Smith and S. D. Collins, THICK FILMS OF SILICON NITRIDE, *Sensors and Actuators*, **A21-A23**: 830-834 (1990).

35. R. L. Smith, R. W. Bower and S. D. Collins, THE DESIGN AND FABRICATION OF A MAGNETICALLY ACTUATED MICROMACHINED FLOW VALVE, *Sensors and Actuators*, **A24**: 47-53 (1990).

36. R. L. Smith, S.-F. Chuang and S. D. Collins. POROUS SILICON MORPHOLOGIES AND FORMATION MECHANISM. *Sensors and Actuators*, **A21-A23**: 825-829 (1990).

37. S. Chang, W. Eaton, J. Fulmer, C. Gonzalez, B. Underwood, J. Wong and R. L. Smith, MICROMECHANICAL STRUCTURES IN AMORPHOUS SILICON, 1991 International Conference on Solid State Sensors and Actuators Digest of Technical Papers, Transducers '91, pp. 751-754 (1991).

38. R. L. Smith, D. J. Fulmer and S. D. Collins, APPLICATIONS OF POROUS SILICON TO MICROSTRUCTURE ENGINEERING, (Extended Abstract) Fall Meeting of the Electrochemical Society, Vol. 91-2, pp. 506-507 (1991).

39. R. L. Smith, D. J. Fulmer and S. D. Collins, APPLICATIONS OF POROUS SILICON TO MICROSTRUCTURE ENGINEERING, Proceedings of the 1st International Symposium on Electrochemical Microfabrication, 180th Meeting of the Electrochemical Society, Phoenix, AZ, 1991.

40. W. P. Eaton, S. H. Risbud and R. L. Smith, WAFER BONDING BY LOW TEMPERATURE GLASS. (Extended Abstract) Fall Meeting of the Electro-chemical Society, Vol. 91-2, pp. 693-694 (1991).

41. W. P. Eaton, S. H. Risbud and R. L. Smith, WAFER BONDING USING LOW TEMPERATURE MELTING GLASS, Proceedings of the 1st International Symposium on Wafer Bonding Science and Technology, 180th Meeting of the Electrochemical Society, V92-7, pp. 146-152 (1991).

42. J. D. Richards, P. Garabedian, A. Knoesen, R. Spencer, R. S. Smith and S. D. Collins, MICROFABRICATED SURFACE PLASMON SENSOR, Abstract of 1991 Optical Society of America Annual Meeting, 1991 Technical Digest Series, Vol. 17, p. 112 (1991).

43. R. L. Smith and S. D. Collins, POROUS SILICON FORMATION MECHANISMS, *Journal of Applied Physics*, **71(8)**: R1-R22 (1992).

44. J. D. Richards, R. Garabedian, C. Gonzalez, A. Knoesen, R. L. Smith, R.Spencer, and S. D. Collins. SURFACE-PLASMON EXCITATION USING A POLARIZATION-PRESERVING OPTICAL FIBER AND AN INDEX-MATCHING FLUID OPTICAL CELL. *Applied Optics*, **32(16)**: 2901-2906 (1992).

45. K. Nishimura, R. L. Smith, and S. D. Collins, POROUS SILICON MEMBRANES, Materials Research Society Spring Meeting, Symposium IV: Materials for Separation Technology, San Francisco, Late News substitution (1993).

46. K. Nishimura and R. L. Smith, POROUS SILICON MEMBRANES FOR BIOCHEMICAL ANALYSIS, Abstract A6.6, in Abstracts of the Biomedical Engineering Society Third Annual Fall Meeting, Salt Lake City, Utah, October 16-18,1992.

47. R. Garabedian, C. Gonzales, J. Richards, A. Knoesen, R. L. Smith, R. Spencer, and S. Collins, MICROMACHINED OPTICAL BENCH FOR A SURFACE PLASMON SENSOR, Summaries of papers presented at the Integrated Photonics Research Topical Meeting, Optical Society of America, Technical Digest Series, Vol. 10, pp. 76-79 (1993).

48. M. A. Chan, S. D. Collins, and R. L. Smith, MICROMACHINED, FIBER OPTIC PRESSURE SENSOR FOR IN VIVO BIOMEDICAL APPLICATIONS, SPIE, Vol. 1886, Proc. of the Fiber Optic Sensors in Medical Diagnostics, pp. 128-137 (1993).

49. M. A. Chan, S. D. Collins, and R. L. Smith, A MICROMACHINED BIOMEDICAL PRESSURE SENSOR WITH FIBER-OPTIC INTERFEROMETRIC READOUT, The 7th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '93, pp. 580-583 (1993).

50. R. Garabedian, C. Gonzales, J. Richards, A. Knoesen, R. Spencer, S. D. Collins, and R. L. Smith, MICROMACHINED SURFACE PLASMON SENSING MICROSYSTEM, The 7th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '93, pp. 1070-1072 (1993).

51. S. Berhane, S. M. Kauzlarich, K. Nishimura, R. L. Smith, J. E. Davis, H. W. H. Lee, M. L. S. Olsen, and L. L. Chase, INVESTIGATION of COLLOIDAL SI PREPARED from POROUS SILICON, Proc. of the Spring Meeting, Materials Research Society, **298**: 99-102 (1993).

52. J. Penczek and R. L. Smith, THE RELATIONSHIP OF POROUS SILICON FILM MORPHOLOGY TO THE PHOTOLUMINESCENCE SPECTRA, Proc. of the Spring Meeting, Materials Research Society, Silicon-based Optoelectronic Materials Symposium, **298**: 193-198 (1993).

53. M. A. Chan, S. D. Collins, and R. L. Smith, A MICROMACHINED PRESSURE SENSOR WITH FIBER-OPTIC INTERFEROMETRIC READOUT, *Sensors and Actuators A*, Elsevier Sequoia, Lausanne, Switzerland, **43**: 196-201 (1994).

54. R. Garabedian, C. Gonzales, J. Richards, A. Knoesen, R. Spencer, S. D. Collins, and R. L. Smith, MICROFABRICATED SURFACE PLASMON SENSING SYSTEM, *Sensors and Actuators A*, **43**:202-207 (1994).

55. J. Senna and R. L. Smith, GALLIUM DOPING FOR SILICON ETCH STOP, Symposium on Micromachining, Electrochemical Society Spring Meeting, San Francisco, CA, 1994.

56. R. L. Smith, APPLICATIONS OF POROUS SILICON TO MICRO AND NANOSTRUCTURE FABRICATION, Symposium on Electochemical Microfabrication, Electrochemical Sociey Fall Meeting, Miami, Florida ,1994.

57. J. Penczek, A. Knoesen, H.W. H. Lee, and R. L. Smith, NEAR-INFRARED EMISSION FROM A POROUS SILICON DEVICE, Materials Research Society, Fall Meeting, Nov. 29- Dec. 2, 1994, Pittsburgh, PA. Symposium on Microcrystalline and Nanocrystalline Semiconductors, pp. 641-645 (1994).

58. J. Penczek, I-W. Chao, A. Knoesen, H. Lee, J. E. Davis, and R. L. Smith, VISIBLE TO NEAR-INFRARED EMISSION FROM A POROUS SILCON DEVICE, IEEE LEOS Annual Meeting, Boston, MA. Proceedings of LEOS '94, Oct. 31-Nov. 3, vol. 2, pp. 13-14 (1994).

59. R. L. Smith, S. D. Collins and S. Farrens, Low Temperature, MULTI-SUBSTRATE BONDING FOR PACKAGING OF MICROSENSORS, Fall Meeting of the Chemical Engineering Society, Symposium on Synthesis and Processing, November 15, San Francisco, 1994.

60. B. Taheri, R. T. Knight, and R. L. Smith, A DRY ELECTRODE FOR EEG RECORDING, *Electroencephalography and Clinical Neurophysiology Journal*, **90**: 376-383 (1994).

61. W. P. Eaton, S. H. Risbud, and R. L. Smith, SILICON WAFER-TO-WAFER BONDING AT T<200 °C WITH POLYMETHYLMETHACRYLATE, *Applied Physics Letters*, **65**: 439-441 (1994).

62. J. Han, R. Lander, R.L. Smith, MICROFABRICATED HIGH ENERGY PARTICLE DETECTOR, The 8th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '95, Stockholm, Sweden, 1995.

63. Y-T. Hsueh, M.A. Northrup and R. L. Smith, A MICROFABRICATED ELECTRO-CHEMILUMINESCENCE CELL FOR PCR AMPLIFIED DNA DETECTION AND QUANTIFICATION, The 8th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '95, Stockholm, Sweden, 1995.

64. B. Taheri, R. Knight and R. L. Smtih, A MICROFABRICATED, ACTIVE, DRY EEG ELECTRODE ARRAY, The 8th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '95, Stockholm, Sweden, 1995.

65. Y-T. Hsueh, R. L. Smith and M. A. Northrup, A MICROFABRICATED CELL FOR ELECTROCHEMILUMINESCENCE ANALYSIS, Proc. of the Fall Meeting of the Electrochemical Society, Chicago, October 1995.

66. J. Han, R. Lander, R.L. Smith, MICROFABRICATED HIGH ENERGY PARTICLE DETECTOR, *Sensors and Actuators A*, **54**: 594-600 (1996).

67. Y-T. Hsueh, M.A. Northrup and R. L. Smith, A MICROFABRICATED ELECTRO-CHEMILUMINESCENCE CELL FOR PCR AMPLIFIED DNA DETECTION AND QUANTIFICATION, *Sensors and Actuators B*, **V33**: 110-114 (1996).

68. W. Mow, C. Gonzalez, R. Garabedian, S. D. Collins and R. L. Smith, IMMUNOSENSING VIA SURFACE PLASMON RESONANCE DETECTION WITH A MICRO-OPTICAL BENCH, UC Workshop on Microfabricated Sensors, Instruments and Systems for Biological and Medical Applications, UCDavis, May 6-8, 1996.

69. Y-T. Hsueh, R. L. Smith and M. A. Northrup, A MICROFABRICATED ELECTROCHEMILUMINESCENCE CELL FOR QUANTIFICATION OF DNA, Late News Abstracts, Hilton Head Workshop on Sensors and Actuators (1996).

70. B. Alizadehtaheri, R. Knight and R. L. Smith, AN ACTIVE, MICROFABRICATED, SCALP ELECTRODE ARRAY FOR EEG RECORDING, *Sensors and Actuators A,* **54**: 606-611 (1996).

71. R. L. Smith, Y-T. Hsueh, S. D. Collins, J.-C. Jiaccabrino and M. Koudelka, ELECTRO-CHEMILUMINESCENCE AT MICROELECTRODES FOR BIOSENSING, BIOS '97, Symposium on Micro and Nanofabricated Electro-Optical Mechanical Systems for Biomedical and Environmental Applications. San Jose, February 10-11, 1997.

72. S. Jamasb, S. D. Collins and R. L. Smith, A PHYSICALLY BASED MODEL FOR DRIFT IN Al2O3 GATE ISFET's, The 9th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '97, Chicago, 1997.

73. S. Jamasb, S. D. Collins and R. L. Smith, CORRECTION OF INSTABILITY IN ION-SELECTIVE FIELD EFFECT TRANSISTORS (ISFETS) FOR ACCURATE CONTINUOUS MONITORING OF PH, Proc. of the 19th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. `Magnificent Milestones and Emerging Opportunities in Medical Engineering' (Cat. No.97CH36136) Part 5, pp.2337-40 (1997).

74. Y.-T. Hsueh, S. D. Collins and R. L. Smith, DNA QUANTIFICATION USING A MICROMACHINED ELECTROCHEMILUMINESCENCE DETECTION CELL, The 9th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '97, Chicago, 1997.

75. Gonzalez, R. J. Welty, R. L. Smith, and S. D. Collins, MICROJOINERY FOR OPTOMECHANICAL SYSTEMS, Miniaturized Systems with Micro-Optics and Micromechanics II, San Jose, CA, USA, 10-12 Feb. 1997, Proc. of the SPIE - The International Society for Optical Engineering, **3008:** 171-8 (1997).

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77. S. D. Collins, C. Gonzalez, R. L. Smith, MICROFABRICATION CREATES MESOSCOPIC OPTICAL SYSTEMS, *Laser Focus World*, **33(5)**: 187(1997).

78. L.-S. Huang, B. Sridharan, C.-J. Kim, S. D. Collins, C. Gonzalez, and R. L. Smith, SELF-ASSEMBLED MICROSLIDER FOR MICROJOINERY, Proc. of the ASME Int. Mechanical Engineering Congress and Exposition, Anaheim, CA., Nov. 1998 , pp. 499-504, 1998.

79. C. Gonzalez, S. D. Collins and R. L. Smith, MODULAR ASSEMBLY AND INTERCONNECTS FOR FLUIDIC MICROSYSTEMS, Proc. of the Symposium on Micro and Nanofabricated Electro-Optical Mechanical Systems for Biomedical and Environmental Applications, BiOS '98, Photonics West, San Jose, January 26-27, 1998.

80. S. Jamasb, S. D. Collins and R. L. Smith, A PHYSICAL MODEL FOR THRESHOLD VOLTAGE INSTABILITY IN H+ SENSITIVE FIELD EFFECT TRANSISTORS (pH ISFET's), *IEEE Transactions on Electron Devices*, **45(6)**:1239-1245 (1998).

81. S. Jamasb, S. D. Collins and R. L. Smith, A PHYSICAL MODEL FOR DRIFT IN ISFET's, *Sensors and Actuators B*, **B49**: 146-155 (1998).

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83. Y.-T. Hsueh, S. D. Collins and R. L. Smith, DNA QUANTIFICATION USING A MICROMACHINED ELECTROCHEMILUMINESCENCE DETECTION CELL, *Sensors and Actuators B*, **B49**: 1-4 (1998).

84. C. Gonzalez, S. D. Collins and R. L. Smith, FLUIDIC INTERCONNECTS FOR CHEMICAL ANALYSIS MICROSYSTEMS, *Sensors and Actuators B*, **B49**: 40-45 (1998).

85. S. D. Collins, R. L. Smith, and C. Gonzalez, MICROJOINERY: CONCEPT, DEFINITION, AND APPLICATIONS TO MICROSYSTEM DEVELOPMENT, *Sensors and Actuators A*, **66(1-3)**: 315-332 (1998).

86. J.-C. Jiacciabrino, M. Koudelka-Hep, Y.-T. Hsueh, S. D. Collins, and R. L. Smith, ELECTROCHEMILUMINESCENCE OF TRIS 2'2' RUTHENIUM BIPYRIDENE IN WATER AT CARBON MICROELECTRODES, *Analytical Chemistry*, **70(19)**: 4157-4161(1998).

87. S. D. Collins, C. Gonzalez, D. Howard, S. Hsia and R. L. Smith, MICROFABRICATED TRANSLATION STAGES FOR MICROROBOTICS, Proc. of the International Advanced in Robotics Program (IARP), 2nd International Workshop on Micro Robotics and Systems, Beijing, China, October 22-23, pg. 166-171 (1998).

88. S. Jamasb, J. N. Churchill, S. D. Collins, R. L. Smith, ACCURATE CONTINUOUS MONITORING USING ISFET-BASED BIOSENSORS BASED ON CHARACTERIZATION AND MODELING OF DRIFT AND LOW FREQUENCY NOISE. Proc. of the 20th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. Vol. 20 Biomedical Engineering Towards the Year 2000 and Beyond (Cat. No.98CH36286). Part 6, pp. 2864-7 (1998).

89. S. D. Collins, R. L. Smith, C. Gonzalez, K. P. Stewart, J. G. Hagopian, and M. J. Sirota, FOURIER TRANSFORM OPTICAL MICROSYSTEMS, *Optics Letters*, **24(12)**: 844-846 (1999).

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1. E. Sullivan and R. L. Smith. A PARAMETRIC SENSITIVITY STUDY OF PLANAR ARRAY BEAM PATTERN SYMMETRY. TM No. SB324-4420-75, U.S. Dept. of the Navy, 1977.

2. S. D. Senturia, R. T. Howe and R. L. Smith. M.I.T. SUMMER SESSION, 6.77s MICROSENSORS, COURSE NOTES. Chapter 5: Materials for Microfabriation, Chapter 7: Case Study – A CMOS Process, Chapter 8: Bulk Micromachining, Chapter 12: Technology Constraints on Microsensor Design, Chapter 13: Electrochemical Microsensors, and Chapter 14: Case Study – The Microsensor Clark Cell, Version 1.1 (1986), Version 2.1 (1987), 396 pages, 1986.

3. S. D. Senturia, R. T. Howe, R. L. Smith and M. A. Schmidt. MIT SUMMER SESSION, 6.77s MICROSENSORS COURSE NOTES. Version 3.1, 396 pages, 1988.

4. R. L. Smith. MICROMACHINING FOR SENSORS. (Invited short course), notes, Sensors Magazine, 100 pages, March, 1990.

5. R. L. Smith and S. D. Collins. SILICON MICROMACHINING. (Invited short course), revised notes, 100 pages, March, 1991.

6. J. Tu and R. L. Smith. SINGLE CRYSTAL SILICON FILAMENTS FABRICATED IN SOI. NASA project report, 15 pages, October, 1995.

7. R. Smith. SURFACE PLASMON IMMUNO-SENSING MICROSYSTEM. UC Campus - Laboratory Collaboration Program and UC Davis Biotechnology Program. MICROFABRICATED SENSORS, INSTRUMENTS AND SYSTEMS FOR BIOLOGICAL APPLICATIONS (Organized by R. Smith), 1996.

8. C. Gonzalez, K. Grace, B. Swanson, S. D. Collins and R. L. Smith. A MESOSCOPIC OPTICAL INSTRUMENT FOR DETECTION OF TNT, UC Research Partnership Initiative (UCRPI) Progress Report, Project # 9759, in UC Directed Research and Development (UCDRD) Activities for Fiscal Year 1997, pp. 166-167, 1997.

9. N. Kobylk, K. Grace, K. Shrouf, X. Yang, D Kelly, B. Swanson, S. D. Collins and R. L. Smith. A MESOSCOPIC OPTICAL INSTRUMENT FOR DETECTION OF TNT, UC Research Partnership

Initiative (UCRPI) Progress Report, Project # 9849, in UC Directed Research and Development (UCDRD) Activities for Fiscal Year 1998, pp. 185-187.

10. D. W. Howard, R. L. Smith and S. D. Collins, A MICROMACHINED SILICON TRANSDUCER FOR THE SIMULTANEOUS MEASUREMENT OF PRESSURE AND TEMPERATURE OF GAS IN THE COMPRESSED NATURAL GAS (CNG) TANK, UC MICRO Final Report, Project # 97-164, 1998. http://www.ucop.edu/research/micro/97_98/97rep1.html

11. C. Byl, D. W. Howard, S. D. Collins, and R. L. Smith, MICROMACHINED, 6-AXIS ACCELEROMETER WITH LIQUID PROOF MASS, UC MICRO Final Report, Project # 98-145, 1999. http://www.ucop.edu/research/micro/98_99/98reports.html

12. X. Ma, B. Gierhart, D. W. Howard, S. D. Collins, and R. L. Smith, LOW TEMPERATURE BONDING FOR WAFER SCALE PACKAGING AND ASSEMBLY OF MICROMACHINED SENSORS, UC MICRO Final Report, Project # 98-144, 1999. http://www.ucop.edu/research/micro/98_99/98reports.html

13. N. Kobylk, K. Grace, K. Shrouf, X. Yang, B. Swanson, S. D. Collins and R. L. Smith. "A Mesoscopic Optical Instrument for Detection of TNT", UC Research Partnership Initiative (UCRPI) Progress Report, Project # 9939, in UC Directed Research and Development (UCDRD) Activities for Fiscal Year 1999, pp. 122-123.

14. D. Howard, S. D. Collins and R. L. Smith. "Wafer Surface Temperature Mapping during RIE" , Small Feature Reproducibility, UCSMART Major Program Award, First Annual Workshop, UCBerkeley, May 13, 1999.

15. R. Leung, D. Howard, S. D. Collins and R. L. Smith. "Microsensors for Monitoring Wafer Uniformity of Plasma Processes", Small Feature Reproducibility, UCSMART Major Program Award, Annual Review, UCB, November 8, 1999.

16. N. Kobylk, K. Grace, K. Shrouf, X. Yang, B. Swanson, S. D. Collins and R. L. Smith. "A Mesoscopic Optical Instrument for Detection of TNT", UC Research Partnership Initiative (UCRPI) Final Report, Project # 9939, in UC Directed Research and Development (UCDRD) Activities for Fiscal Year 1999, pp. 131-132.

17. R. Leung, D. Howard, S. D. Collins and R. L. Smith. "Microstructures for Monitoring Wafer Uniformity of Plasma Processes" , Small Feature Reproducibility, UCSMART Major Program Award, Second Annual Workshop, UCBerkeley, April 20, 2000.

18. R. Leung, D. Howard, S. D. Collins and R. L. Smith. "Microstructures for Uniformity Mapping during PECVD", Small Feature Reproducibility, UCSMART Major Program Award, Annual Review, UCBerkeley, November 8, 2000.

19. E. Mukerjee, M. Kurth, M. Nantz, S. D. Collins and R. L. Smith. "A Fluidic MicroInstrument with Biomolecular Pump", DARPA BioFLIPS, PI Kick-off Meeting, Park City, Utah, Aug 2-4th 2000.

20 E. Mukerjee, M. Kurth, M. Nantz, S. D. Collins and R. L. Smith. "A Fluidic MicroInstrument with Biomolecular Pump", DARPA PI Meeting, Isle of Palms, SC, February 21-23, 2001.

20. R. Leung, D. Howard, S. D. Collins and R. L. Smith. "Microstructures for Monitoring Wafer Uniformity of Plasma Processes" , Small Feature Reproducibility, UCSMART Major Program Award, Third Annual Workshop, UCBerkeley, May 24, 2001.

21. E. Lee, D. Howard, S. D. Collins and R. L. Smith. “Microstructures for Uniformity Mapping during PECVD”, Small Feature Reproducibility, UCSMART Major Program Award, Annual Review, UCBerkeley, November 8, 2001.

22. E. Mukerjee, P. Kim, M. Kurth, M. Nantz, S. D. Collins and R. L. Smith. “A Fluidic MicroInstrument with Biomolecular Pump”, Joint DARPA BioFLIPS/SIMBIOSYS PI Meeting, Honolulu, HI, August 8-10, 2001.

23. E. Mukerjee, M. Kurth, M. Nantz, S. D. Collins and R. L. Smith. “A Fluidic MicroInstrument with Biomolecular Pump”, DARPA PI Meeting, Miami, Florida, February 21-23, 2002.

24. R. Arya, D. Howard, S. D. Collins and R. L. Smith. “MEMS devices for Termperature Uniformity Mapping during PECVD”, Small Feature Reproducibility, UCSMART Major Program Award, Annual Review, UCBerkeley, April 10, 2002.

25. E. Mukerjee, G. Berger, M. Kurth, M. Nantz, S. D. Collins and R. L. Smith. “A Fluidic MicroInstrument with Biomolecular Pump”, Joint DARPA BioFLIPS/SIMBIOSYS PI Meeting, Portland, OR, August 8-10, 2002.

26. E. Mukerjee, P. Kim, M. Kurth, M. Nantz, S. D. Collins and R. L. Smith. “A Fluidic MicroInstrument with Biomolecular Pump”, Joint DARPA BioFLIPS/SIMBIOSYS PI Meeting, San Diego, CA, February 8-10, 2003.

GRADUATE THESIS SUPERVISION: 18 MS and 13 PhD

1. Patrick Spinney, “Nanofabrication of Nanopore Gene Sequencer”, PhD candidate, Electrical Engineering, UMaine, expected completion: August 2010.

2. Janice Duy, “Nanoparticle Agglutination BioSensor”, PhD candidate, Functional Genomics, UMaine, expected completion: August 2011.

3. Robert Baron, “Microcoils for NMR Spectroscopy”, PhD candidate, Chemistry, UMaine, expected completion: August 2009.

4. Guixiong Zhong, “WOx thin film gas sensor based on work function”, MS candidate, Engineering Physics, UMaine, expected completion: December 2006.

5. Brian Gierhart, "Nanopore DNA sequencing", PhD candidate, Electrical Engineering, UC Davis, expected completion: December 2006.

6. Ranju Arya, “Micro-thermo-mechanical Actuator Array for Temperature Mapping”, MS, Electrical Engineering, UCDavis, December 2002

7. Erik Mukerjee, "Microneedles for transdermal biochemical analysis", PhD, Biomedical Engineering, UCDavis, June 2003.

8. Bonnie Gray, “Microfluidic Systems and Interconnect Technology”, PhD, Electrical Engineering, UC Davis, September 2001.

9. Erik Mukerjee, “Microneedle Probes for Transdermal Biopotential Recording”, MS, Electrical Engineering, UC Davis, September 2001.

10. Andrew Wallace, “Long Range, Electromagnetic Actuation of a Micromirror for a Miniature FTIR MicroInstrument”, MS, Electrical Engineering, UC Davis, September 2000.

11. Xiaosong Ma, "Room Temperature Substrate Bonding for Sealing Fluidic Microsystems", MS, Electrical Engineering, UC Davis, March 2001.

12. Ribi Leung, “Microsensor Arrays for RIE Process Monitoring”, MS, Electrical Engineering, UCDavis, September, 2000.

13. John Penczek, "Electroluminescing Porous Silicon Device", PhD, Electrical Engineering, UC Davis, June 1999.

14. Shahriar Jamasb, "A Physical Model for the Instability of ISFETs", PhD, Biomedical Engineering, UC Davis, December 1998.

15. Yun-Tai Hsueh, "Microfabricated Electrochemiluminescence Cell for the Quantification of Amplified DNA", PhD, Electrical Engineering, UC Davis, January 1998.

16. Carlos Gonzalez, "New Technology for the Modular Assembly of Microsystems", PhD, Electrical Engineering, UC Davis, September 1997.

17. Juliana Tu, “Silicon Filament IR Source Fabricated in SOI for Spectrophotometric Measurement of CO2”, MS, Electrical Engineering, UC Davis, September 1996.

18. Jun Han, "High Energy Atomic Particle Detector", PhD, Electrical Engineering, UC Davis, January 1995.

19. Babak Taheri, "Microfabricated EEG, Dry Skin Electrode Array", PhD, Biomedical Engineering, UC Davis, December 1994.

20. Athena Mui, "Interferometric Pressure Sensor for Diagnosis of Ischemia in Bone Tissue", MS, Biomedical Engineering, UC Davis, December 1993.

21. Raffi Garabedian, "A Microfabricated Surface Plasmon Sensor", MS Degree, Electrical Engineering, UC Davis, September 1993.

22. Karen Nishimura, "Ion Transport in Porous Silicon Membranes", MS Degree, Biomedical Engineering, UC Davis, March 1993.

23. William Eaton, "Low Temperature Wafer to Wafer Bonding", MS Degree, Material Science and Engineering, UC Davis, January 1993.

24. Carlos Gonzalez, "Fiber -optic Coupling to Electrostatically Controlled Micromirrors", MS Degree, Electrical Engineering, UC Davis, June 1993.

25. Jeffrey Wong, " Electromagnetic and Electrostatic Actuation of Micromechanical Mirrors", MS Electrical Engineering, UC Davis, June 1992.

26. Johnny Kuei, " Formation of Silicon Carbide by Carbidization of Porous Silicon", MS Degree, Electrical Engineering, UC Davis, June 1990.

27. Shih-Fang Chuang, "The Formation and Morphologies of Porous Silicon " PhD Degree, Materials Science and Engineering, MIT, December 1989.

28. Keith Crowe, "Methods of Determination of the Mechanical Properties of Thin Films with High Residual Stress", MS Degree, Mechanical Engineering, MIT, June 1988.

29. Andrew E. Fleischacker, "An Implantable Telemetry System for the Measurement of Intra-oral Plaque pH", MS Degree, Biomedical Engineering, Drexel University, September 1984.

30. Timothy A. Margraf, "Ion Selective K+ Sensitive Electrodes: Extracellular K+ Measurement in the Myocardium", MS Degree, Biomedical Science, Drexel University, March 1984.

31. Rafael Rios, "Process Modeling of SOS Devices", MS Degree, Electrical Engineering, Drexel University, June 1985.

Undergraduate Research Advisees (28)

Linda Yee	Electrical & Computer Engineering, UCDavis F91, W92
William Mao	Electrical & Computer Engineering, UCDavis, S93
Bijaya Ojha	Electrical & Computer Engineering, UCDavis S92
Brian Underwood	Electrical & Computer Engineering, UCDavis W91, S91
Jim Bryant	Electrical & Computer Engineering, UCDavis F91
Ed Conway	Electrical & Computer Engineering, UCDavis, S92
John Sekiya	Electrical & Computer Engineering, UCDavis, W92
Pam Tassey	Electrical & Computer Engineering, UCDavis, F92
Carina Fang	Electrical & Computer Engineering, UCDavis, W95, S95
Kiet Jonathan Ly	Electrical & Computer Engineering, UCDavis, W95, S95
Rebecca Welty	Electrical & Computer Engineering, UCDavis, F96, W97
Daniel Reed,	Electrical & Computer Engineering, UCDavis, F97
Connie Kong	Electrical & Computer Engineering, UCDavis, W97
Matt Hammond	Electrical & Computer Engineering, UCDavis,1996
Dennis Skolquist	Electrical & Computer Engineering, UCDavis, W97, S97
Hoang Dao,	Electrical & Computer Engineering, UCDavis, W97
Carolyn Byl	Biological Engineering, UCDavis, 1997-98
Charles Massin	Electrical & Computer Engineering, UCDavis, F98, W99
Michelle Yee	Electrical & Computer Engineering, UCDavis, S 99
Biddy Cheng	Electrical & Computer Engineering, UCDavis, S 99, S00
Gary Nunes	Electrical & Computer Engineering, UCDavis, 1998-99
Alex Castro	Electrical & Computer Engineering, UCDavis, F99,W00
Marcus Greer	Electrical & Computer Engineering, UCDavis, F99
Tina Do	Electrical & Computer Engineering, UCDavis, 2000
Tim Wu	Electrical & Computer Engineering, UCDavis, S00
Brian Geirhart	Electrical & Computer Engineering, UCDavis, 2000
Janice Duy	Electrical & Computer Engineering, UMaine, 2005-06

Ryan Cota, Electrical & Computer Engineering, UMaine, 2005-06

ORAL PRESENTATIONS

1. TRANSIENT PHENOMENA IN ISFETS. Electrochemical Society of America Conference, Ion Selective Electrodes Session, Los Angeles, October, 1979.

2. APPLICATION OF ISFETS TO ORAL BIOCHEMISTRY MEASUREMENTS. (Invited talk) American Dental Association Research Institute, Chicago, February, 1984.

3. A SOLID STATE MINIATURE REFERENCE ELECTRODE. IEEE/NSF Symposium on Biosensors, Los Angeles, September, 1984.

4. RADIO TELEMETRY SYSTEM FOR INTRA-ORAL pH MEASUREMENT EMPLOYING pH ISFETS. IEEE Bio-Medical Engineering Conference, Los Angeles, September, 1984.

5. AN INTEGRATED ELECTROCHEMICAL SENSOR REALIZED IN SILICON. 15th European Solid State Device Research Conference (ESSDERC '85), Aachen, Germany, September, 1985.

6. M.I.T. SUMMER SESSION, 6.77s MICROSENSORS, SHORT COURSE. Lecture 5: Materials for Microfabriation, Lecture 7: Case Study – A CMOS Process, Lecture 8: Bulk Micromachining, Lecture 12: Technology Constraints on Microsensor Design, Lecture 13: Electrochemical Microsensors, and Lecture 14: Case Study – The Microsensor Clark Cell; also given in 1987, 1986.

7. THE POTENTIAL DEPENDENCE OF SILICON ANISOTROPIC ETCHING IN KOH. Physical Electrochemistry General Session, Electrochemical Society Fall Meeting, Honolulu, Hawaii, October, 1987.

8. INTEGRATED MICROSENSORS: DESIGN AND FABRICATION CONSTRAINTS. (Invited talk) SPIE, Los Angeles, California, January, 1988.

9. PACKAGING FOR BIOSENSORS. (Invited talk) IEEE Second Workshop on Synthetic Microstructures in Biological Research, March, 1988.

10. THE ELECTROCHEMISTRY OF POROUS SILICON FORMATION. (Invited talk) Gordon Research Conference on Physical Chemistry, August, 1988.

11. POROUS SILICON: FORMATION AND MORPHOLOGIES. (Invited talk) University of Michigan, Ann Arbor, Center for Intergrated Sensors and Circuits, Jan; also invited talk at the Berkeley Center for Sensors and Actuators, March; and presented at Transducers ‘89, Montreux, Switzerland, 1989.

12. MATERIALS AND TECHNOLOGIES FOR MICROSTRUCTURE ENGINEERING. (Invited talk) SPIE, Microsensors and Catheter-Based Imaging Technologies, January, 1989.

13. ELECTROCHEMICAL ETCHING OF SILICON. (Invited talk) Novasensor, May, 1989.

14. THICK FILMS OF SILICON NITRIDE. Presented at Transducers ‘89, Montreux, Switzerland, 1989.

15. MOVABLE MICROMACHINED SILICON PLATES WITH INTEGRATED POSITION SENSING. Presented at Transducers '89, the Fifth International Conference on Solid-State Sensors and Actuators, Montreux, Switzerland , 1989.

16. THE DESIGN AND FABRICATION OF A MAGNETICALLY ACTUATED MICROMACHINED FLOW VALVE. Presented at Transducers '89, the Fifth International Conference on Solid-State Sensors and Actuators, Montreux, Switzerland, 1989.

17. ENGINEERING POROUS SILICON MORPHOLOGIES. (Invited talk) Presented at the Topical Conference on Surface Microengineering, the American Vacuum Society and the 36th National Symposium, Boston, MA, October 24, 1989.

18. SILICON MICROMACHINING. (Invited short course) Presented at SENSORS EXPO WEST, March 12, 1990; also presented March 11, 1991, Sensors Expo West, 1990.

19. APPLICATIONS OF POROUS SILICON TO MICROSTRUCTURE ENGINEERING. (Invited talk) Presented at the Symposium on Electrochemical Microfabrication 180th Meeting of the Electrochemical Society, Oct. 13-17, 1991, Phoenix, AZ, 1991.

20. WAFER BONDING USING LOW TEMPERATURE MELTING GLASS. (Invited talk) Presented at the 1st International Symposium on Wafer Bonding Science and Technology, 180th Meeting of the Electrochemical Society, Oct. 13-17, 1991, Phoenix, AZ, 1991.

21. MICROMECHANICAL STRUCTURES IN AMORPHUS SILICON. Presented at Transducers '91, the Sixth International Conference on Solid-State Sensors and Actuators, San Francisco, CA, 1991.

22. POROUS SILICON MEMBRANES. Presented at the Materials for Separation Technology Symposium, Materials Research Society Spring Meeting, San Francisco, April 1992.

23. POROUS SILICON MEMBRANES FOR BIOCHEMICAL APPLICATIONS. (Invited) Presented at the Third Annual Fall Meeting of the Biomedical Engineering Society, Salt Lake City, October 1992.

24. OPTICAL FIBER COUPLED, MICROMACHINED PRESSURE SENSOR FOR BIOMEDICAL APPLICATIONS. (Invited) Presented at NASA/Ames Research Center, Moffett Field, July 1992.

25. MICROMACHINED, FIBER OPTIC PRESSURE SENSOR FOR IN VIVO BIOMEDICAL APPLICATIONS. Presented at the Fiber Optic Sensors in Medical Diagnostics Symposium, SPIE Conference, Los Angeles, January 1993.

26. SILICON SENSOR RESEARCH. (Invited) Presented to the Signal Products Division, Motorola, Inc., Phoenix, March 1993.

27. MICROSENSOR RESEARCH AT UCDAVIS. Presented to Applied Biosystems, Division of Perkin Elmer, Foster City, March, 1994.

28. LOW TEMPERATURE, MULTI-SUBSTRATE BONDING FOR PACKAGING OF MICROSENSORS. Presented at the Fall Meeting of the Chemical Engineering Society, Symposium on Synthesis and Processing, San Francisco, November, 1994.

29. GALLIUM DOPING FOR SILICON ETCH STOP. Presented at the Symposium on Micromachining Electrochemical Society Spring Meeting, San Francisco, May, 1994. (Invited)

30. APPLICATIONS OF POROUS SILICON TO MICRO AND NANOSTRUCTURE FABRICATION. Presented at the Symposium on Electrochemical Microfabrication, Electrochemical Society Fall Meeting, Miami, October, 1994. (Invited)

31. A MICROFABRICATED ELECTROCHEMILUMINESCENCE CELL FOR PCR AMPLIFIED DNA DETECTION AND QUANTIFICATION. Presented at the 8th International Conference on Solid-State Sensors and Actuators, Transducers '95, Stockholm, June, 1995.

32. MICROFABRICATED HIGH ENERGY PARTICLE DETECTOR. Presented at the 8th International Conference on Solid-State Sensors and Actuators, Transducers '95, Stockholm, June, 1995.

33. DESIGN AND FABRICATION OF MICRO SYSTEMS FOR CHEMICAL ANALYSIS. (Invited) Presented at the Biology & Biotechnology Research Group, Human Genome Center, LLNL, Livermore, CA, 1995.

34. IMMUNOSENSING VIA SURFACE PLASMON RESONANCE DETECTION WITH A MICRO-OPTICAL BENCH. UC Workshop on Microfabricated Sensors, Instruments and Systems for Biological and Medical Applications, UCDavis, 1996.

35. ELECTROCHEMILUMINESCENCE AT MICROELECTRODES FOR BIOSENSING. BIOS '97, Symposium on Micro and Nanofabricated Electro-Optical Mechanical Systems for Biomedical and Environmental Applications, San Jose, CA, 1997.

36. DNA QUANTIFICATION USING A MICROMACHINED ELECTROCHEMI-LUMINESCENCE DETECTION CELL. The 9th International Conference on Solid-State Sensors and Actuators, Digest of Technical Papers, Transducers '97, Chicago, IL, 1997.

37. MICROMACHINING: APPLICATIONS TO MICROINSTRUMENTS. NASA Goddard Space Flight Center, Goddard Park, Maryland, 1997.

38. MODULAR ASSEMBLY AND INTERCONNECTS FOR FLUIDIC MICROSYSTEMS. Symposium on Micro and Nanofabricated Electro-Optical Mechanical Systems for Biomedical and Environmental Applications, BiOS '98, Photonics West, San Jose, CA, 1998.

39. MICROSENSORS TO MICROSYSTEMS (invited). University of Illinois, Chicago, Electrical and Biomedical Engineering Departments Joint Seminar, 1998.

40. MICROINSTRUMENTS FOR BIOCHEMICAL ANALYSIS (invited). Medical Technology Group, Lawrence Livermore National Laboratory, Livermore, CA, 1998.

41. ECL MICROINSTRUMENT FOR DNA ANALYSIS (invited). Pharmaceutical and Diagnostics Divisions, Joint Seminar, Abbott Laboratories, Abbott Park, IL, 1998.

42. MICROFLUIDIC INSTRUMENTS AND INTERCONNECT (invited). Presented to prospective Industrial Members of a proposed NSF Center for Biomedical Microsystems, U. Minnesota, Minneapolis, MN, April 26, 1999.

43. MICROINSTRUMENTS, HERE AND NOW (invited). Electrical Engineering Seminar, U. Washington, Seattle, WA, February 23, 1999.

44. BIOMEDICAL MICRODEVICES. Biomedical Engineering Graduate Group presentation to representatives of the ARCS, College of Engineering, UC Davis, February 24, 1999.

45. MICROINSTRUMENTS FOR BIOCHEMICAL ANALYSIS. (invited) Presentation to the MEMS Journal Club, San Jose, CA, April 7, 1999.

46. BIOCHEMICAL MICROINSTRUMENTS (invited). Combined Biomedical and Electrical Engineering Department Seminar, Virginia Commonwealth University, Richmond, VA, April 27, 1999.

47. WAFER TEMPERATURE MAPPING. Presented at the UCSMART Workshop on Small Feature Reproducibility, UC Berkeley, May 4, 1999.

48. BIOMEDICAL MICROSYSTEMS. Presented to members of the Detectors Branch, NASA-Goddard Space Flight Center, Greenbelt, MD, July 28, 1999.

49. MICROTHRUSTERS FOR ATTITUDE CONTROL OF MICROSPACE CRAFT. Summer Faculty Seminar, NASA-Goddard Space Flight Center, Greenbelt, MD, June 25, 1999.

50. SILICON MICROMACHINING AND MICROSENSOR PACKAGING. Invited Lecturer, Short Course, University of Utah, MEMS Bootcamp, May 24-25, 1999.

51. MICROINSTRUMENTS FOR ANALYTICAL BIOCHEMISTRY (invited). Solid State Seminar, Dept. of ECE, UCSD, February 22, 1999.

52. OPTICAL MICROINSTRUMENT FOR CHEMSENSING APPLICATIONS, The 8th International Meeting on Chemical Sensors, Basil, Switzerland, July 3, 2000.

53. MICROINSTRUMENT FOR WOUND POTENTIAL MEASUREMENTS, BioMEMS 2000, Columbus, OH, September 2000.

54. MICROSTRUCTURES FOR WAFER MAPPING OF ETCH RATE AND TEMPERATURE DURING RIE. MEMSV Symposium, Meeting of the Electrochemical Society, Phoenix, AZ, October 2000.

55. MICROSYSTEMS FOR MOLECULAR AND CELLULAR ANALYSIS ,(Invited Seminar Speaker) Georgia Technical Institute, Dept. of Mechanical Engineering, MEMS Center, Atlanta, Georgia, November 6, 2000.

56. MICROSYSTEMS FOR MOLECULAR AND CELLULAR ANALYSIS, Invited Seminar, Lawrence Livermore National Laboratory, Livermore, CA, January 2001.

57. MICROSENSORS AND INSTRUMENTS, Invited Seminar Speaker, Laboratory for Surface Science and Technology (LASST), University of Maine, Orono, Maine, January 2001.

58. ELECTROCHEMILUMINESCENCE MICROINSTRUMENT, Invited Seminar, Sandia National Laboratory, Livermore, CA, June 2001.

59. MICROSYSTEMS FOR MOLECULAR AND CELLULAR ANALYSIS , Invited Seminar, The Jackson Laboratory, Bar Harbor, Maine, October 2001.

60. MICROINSTRUMENTS FOR CELL-LEVEL INVESTIGATIONS, Invited Speaker, Biomedical Engineering Seminar, Ohio State University, Columbus, Ohio, October 19, 2001.

61. MICROINSTRUMENTS FOR BIOLOGICAL AND CHEMICAL ANALYSIS, (invited), IEEE Chapter of Southern Maine, May 31, 2002.

62. TECHNICAL ADVANCES IN MICROFABRICATED DRUG DELIVERY DEVICES AND SYSTEMS (invited). IBC's BioMEMs & Microfluidics Conference, San Diego, CA, May 1, 2003.

63. THE POWER OF SMALL (invited). Autonomous and Lagrangian Platforms and Sensors (ALPS) Workshop, San Diego, CA, April 1, 2003.

64. FABRICATION STRATEGIES FOR MICROINSTRUMENTATION (invited), Gordon Research Conference, Chemical Sensors & Interfacial Design, Salve Regina University Newport, RI, August 3-8, 2003.

65. MICROFABRICATION: WHY, WHEN, AND HOW (invited), ACS Prospectives, Emerging Opportunities in Chemical and BioSensing, , Santa Fe, New Mexico, May 16-19, 2004

66. SENSORS AND MICROFABRICATED INSTRUMENTS (invited), Materials Science Colloquium, University of New Hampshire, April 7, 2005.

67. BIOMEDICAL MICRODEVICES AND NANOTECHNOLOGY, (invited) IEEE Student Paper Conference, Orono, ME, April 30, 2006.

68. MICRONEEDLE ARRAY FOR MEASURING WOUND GENERATED ELECTRIC FIELDS, 28th IEEE EMBS Annual International Conference, New York City, Sept. 2, 2006.