

Patrick John McCann

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Education

- 1984 - **MIT** Cambridge, MA
1990 Ph.D. Electronic Materials, June 1990. Thesis Advisor: Clifton G. Fonstad
Thesis Title: "Heteroepitaxial Growth of IV-VI Semiconductors on Barium Fluoride"
- 1978 - **UC Berkeley** Berkeley, CA
1981 B.S. Engineering Physics, June 1981. Tau Beta Pi
President and Founder of Society of Engineering Sciences

Experience

- 1990 to **University of Oklahoma** Norman, OK
Present *Professor*, School of Electrical and Computer Engineering
Research Interests: IV-VI Semiconductor Crystal Growth, Tunable Diode Laser (TDL) Fabrication, Heteroepitaxial Growth Mechanisms, Interface Chemistry, TDL Spectroscopy, Luminescence from Rare-Earth Doped Fluorides, Laser and Detector Integration on Silicon Substrates.
- Summer **IBM** Essex Junction, VT
1988 *Device Design Engineer*
Developed a computer program to retrieve and analyze static RAM test data. Investigated process-induced threshold voltage shifts. Developed a technique to eliminate electrostatic discharge through the gate dielectric for a CMOS process technology that is presently being used to fabricate the Power PC™ microprocessor.
- Summer **IBM** Essex Junction, VT
1985 *Device Design Engineer*
Built a computer-controlled probe station to electrically stress thin dielectric regions of 1 Megabit DRAMs. Designed optimal dielectric structure for 4 Megabit DRAMs. Modeled short-channel FET devices and characterized silicide contacts to assess feasibility of a proposed CMOS process.
- 1981 - **IBM** Essex Junction, VT
1984 *Process Development Engineer*
Responsible for thin dielectric development program. Developed a novel LPCVD process for silicon nitride growth. Developed storage node dielectric for world's first 1 Megabit DRAM. Modeled effects of alpha particle radiation in static and dynamic RAMs. Demonstrated possible influence of cosmic ray background as source of soft errors in memory chips.
- 1980 - **UC Berkeley College of Chemistry** Berkeley, CA
1981 *Machinist*
Designed and fabricated hardware for Lawrence Berkeley Laboratory and the College of Chemistry.
- 1977 - **Lindsey Manufacturing, Inc.** Azusa, CA
1978 *Machinist/Tool Maker*
Designed and fabricated tooling for drilling, milling, and welding operations. Trained and supervised a tool crib attendant.

Recent Publications (out of over 100 refereed papers and patents)

- [1] Y. F. Li, P. J. McCann, A. Sow, C. Yao, and P. C. Kamat, "Improvement of Heat Dissipation Through Transfer of IV-VI Epilayers From Silicon to Copper", *IEEE Photonics Technology Letters* **16**, 2433 (2004).
- [2] I. I. Zasavitskii, E. A. de Andrada e Silva, E. Abramof, and P. J. McCann, "Optical Deformation Potentials for PbSe and PbTe", accepted by *Physical Review B* **70**, 115302 (2004).
- [3] P. J. McCann, "IV-VI Semiconductor Materials, Devices, and Applications", State-of-the-Art Program on Compound Semiconductors and Narrow Bandgap Optoelectronic Materials and Devices, p. 218, edited by D. Buckley et al., The Electrochemical Society (ISBN 1-56677-407-1), New Jersey (2004).
- [4] U. P. Schiessl, J. John, and P. J. McCann, "Lead-Chalcogenide-based Mid-Infrared Diode Lasers", Long-Wavelength Infrared Semiconductor Lasers, p. 145, edited by H. K. Choi, Wiley (ISBN 0-471-39200-6), New Jersey (2004).
- [5] J. D. Jeffers, C. B. Roller, K. Namjou, M. A. Evans, L. McSpadden, J. Grego, and P. J. McCann, "Real-time diode laser measurements of vapor phase benzene", *Analytical Chemistry* **76**, 424 (2004).
- [6] P. H. O. Rappl and P. J. McCann, "Development of a Novel Epitaxial Layer Segmentation Method for Optoelectronic Device Fabrication", *IEEE Photonics Technology Letters* **15**, 374 (2003).
- [7] C. B. Roller, K. Namjou, J. Jeffers, M. Camp, P. J. McCann, and J. Grego, "Nitric Oxide Breath Testing Using Tunable Diode Laser Absorption Spectroscopy: Application in Respiratory Inflammation Monitoring", *Applied Optics* **41**, 6018 (2002).
- [8] C. Roller, K. Namjou, J. Jeffers, W. Potter, P. J. McCann, and J. Grego, "Simultaneous NO and CO₂ Measurements in Human Breath Using a Single IV-VI Mid-Infrared Laser", *Optics Letters* **27**, 107 (2002).

Issued Patents

- [9] P. J. McCann, T. Chatterjee, and X. M. Fang, "Europium-Containing Group IIa Fluoride Epitaxial Layer on Silicon", *U. S. Patent Number* 5,932,964, Issued August 4, 1999.
- [10] P. J. McCann, "Method for Fabricating Semiconductor Laser", *U. S. Pat. Number* 5,776,794, July 7, 1998.
- [11] P. J. McCann, "Apparatus for Fabricating Semiconductor Lasers", *U. S. Pat. Number* 5,629,097, May 13, 1997.
- [12] P. J. McCann, "High Temperature Semiconductor Diode Laser", *U. S. Pat. Number* 5,454,002, Sept. 26, 1995.
- [13] P. J. McCann and C. G. Fonstad, "A Chemical Method for the Modification of Substrate Surface to Accomplish Heteroepitaxial Crystal Growth", *U. S. Patent Number* 5,310,696, Issued May 10, 1994.

Recent Collaborators

Peter Möck, Portland State University
Pallab K. Bhattacharya, University of Michigan
Ivan Zasavitskii and Yurii Selivanov, Lebedev Physical Institute, Moscow, Russia

Graduate Students and Postdocs (last ten years only)

Graduate Students: Srinath Aanegola (M.S. 1994), Tathagata Chatterjee (M.S., 1994, Ph.D. 1998), Eric Lin Lee (M.S., 1996), Majed Khodr (Ph.D., 1994), Atul Joshi (M.S., 1996), Kevin Lewelling (Ph.D., 1997), Brian Strecker (Ph.D., 1998), David Bowen (M.S., 1997), Alice Lu (M.S., 1998), Harpreet Sachar (M.S., 1998), I-Na Chao (M.S. 1996, Ph.D., 1999), Shabbir Topiwala (M.S., 1999), Sidharth Krishnama (M.S., 1999), Chun-Pang Li (M.S., 1999), James Jeffers (M.S., 2001), Chad Roller (M.S. 2001), Terry Welch (M.S. 2002), Arnaud Sow (M.S. 2003), Anand Gattu (M.S. 2004), Saurabh Godhwani (M.S. 2004)
Postdocs: Xue-Sen Wang, Shu Yuan, Xiao-Ming Fang, Khosrow Namjou, Huizhen Wu, Yuefa Li, Frank Zhao

Graduate Advisor

Ph.D. Thesis Advisor: Clifton G. Fonstad, Electrical Engineering and Computer Science Department, MIT

Professional Activities, Awards, and Recognitions

Science & Technology Working Group for NASA's Advanced Environmental Monitoring and Control Program.
Founder of Ekips Technologies, Inc. (www.breathmeter.com)
State of Oklahoma's Economic Development Generating Excellence (EDGE) task force member
1996 and 1997 College of Engineering: Engineering Excellence Distinguished Lectureship Award.
Member: Tau Beta Pi, Eta Kappa Nu, Materials Research Society, IEEE.