

JOHN J. STANKUS, Ph.D.

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Experienced Physical Chemist

- Broad-based experience in applying physical and materials chemistry.
- Significant experience in teaching, mentoring and developing new scientists and engineers.
- Ability to convey complex technical topics clearly to a wide variety of audiences.
- In-depth understanding of the overlap of chemistry with other disciplines.

EDUCATION

STANFORD UNIVERSITY, Stanford, CA 1993
Ph.D., Chemistry (Physical Chemistry)
Dynamics of Simple and Ordered Liquids
Optical Holographic Techniques/Ultrafast Spectroscopy
Thesis Advisor: M. D. Fayer

UNIVERSITY OF TEXAS AT AUSTIN, Austin, TX 1987
BS, Chemistry with Honors
College of Natural Sciences Dean's Scholars Program

Patents

Nine patents issued on semiconductor device structures, processing, optoelectronics integration, electro-optical modules, high-speed electrical interconnect, and optical interconnect devices.

Publications

25 technical papers and publications.

EXPERIENCE

The University of the Incarnate Word 2006 –
Department of Chemistry – School of Math, Science and Engineering
Assistant Professor of Chemistry

- Taught “Chemical Principles I” and “Chemical Principles I Laboratory” a first course in chemistry for science and engineering majors.
- Participated in UIW new faculty mentoring program
- Participated in UIW first year engagement committee

Collin County Community College Spring 2006
Mathematics and Natural Sciences Division – Associate Faculty Member

- Taught lecture and laboratory sections of “Introduction to Chemistry I”, a first course in chemistry for non-science majors.

NORTEL, Richardson, TX**2000 - 2005**

Advanced Technology Group - Project Manager - Advanced Optical Technologies

- Developed 10 Gb/s high density, low power, low cost optical transceiver technology demonstrator.
 - Prototyped 10Gb/s optical transceiver resulting in a density increase of almost 10X over the industry standard Small Footprint 10 Gigabit Transponder MSA TOMCAT module.
 - Demonstrated high performance direct connection 10 Gb/s electrical interface showing significantly better signal integrity than traditional approaches and eliminating expensive MUX/DEMUX circuitry.
 - Coordinated fabrication of prototype devices across six sites in the United States, Canada, and the United Kingdom.
- Analyzed optical backplane technologies as a replacement for copper interconnects in high performance, high density systems.
 - Analyzed system requirements, impacts, costs and adoption strategies for optical backplane technologies and contrasted with advanced copper interconnect technologies. Evaluations included impacts on design, cost, thermal design, reliability and system complexity.
 - Created a multi-company consortium to compete for a 2004 NIST Advanced Technology Program grant. Led the team, consisting of five companies and two universities, through development of a \$13 million optical backplane research and development program. The proposal successfully passed the NIST technology evaluation gate. Though it was not one of the proposals funded, the evaluators strongly suggested the consortium resubmit for the 2005 competition.
- Served on the University of Texas at Dallas Telecommunications Engineering degree program Industrial Advisory Committee (2003-2005). This committee makes recommendations and provides guidance for the development and continued accreditation of the degree plan.
- Analyzed new optical networking component technologies for technical feasibility and applicability in future networks. Technologies developed at start-up companies, universities and Nortel were evaluated. This resulted in programs for advanced development being established for the most promising technologies. For example, a photonic bandgap material (photonic crystal) based optical limiter from the University of Toronto has lead to a multiyear research engagement for which I have been the technical prime.
- Evaluated Quantum Key Distribution (Quantum Cryptography) technology and developed the product strategy.
- Developed network concepts for wavelength division multiplexing (WDM) metro access networks driven by advances in component technologies and developed advanced component concepts based on future network architectures.
- Filed multiple patent disclosures leading to 4 issued U.S. patents with additional pending.

MOTOROLA, INC., Austin, TX**1994 – 2000**Advanced Products Research and Development Laboratory
Advanced Process Development Group

- Project leader of Optical Advanced Silicon Interconnect Systems (OASIS) project including exploratory proposal, program planning and execution.

- Evaluated optical interconnect technologies for viability in interconnect application which included evaluating technology insertion tradeoff points, manufacturability, process complexity, power consumption, die space utilization and reliability.
- Developed university interactions in support of the OASIS project with the University of Texas and Vanderbilt University.
- Supported advanced lithography phase shift mask (PSM) development through optical modeling and mask modification utilizing Numerical Technologies phase shift mask software system. This work enabled lithographic printing of subwavelength sized structures on 193 nm stepper systems.
- Represented Motorola on the Semiconductor Research Corporation's Back-End-Process/Interconnect Technical Advisory Board (TAB Chairman for 2000).
- Filed multiple patent disclosures leading to 5 issued U.S. Patents.

Materials Research & Strategic Technology

Advanced Materials Group - Senior Staff Scientist

- Responsible for materials characterization, process development and process integration of low k polymer interlayer dielectrics.
- Developed polymer coat and cure processes for several promising polymer dielectrics.
- Characterized the isolated polymer film and the polymer/hard dielectric stack to be used for process integration.
- Explored innovative microwave cure processes that reduced cure cycle time from 10 hours to less than ten minutes.
- Worked closely with hard dielectric films, photolithography, etch and advanced metallization groups to develop a back end of the line (BEOL) integration method for low dielectric constant polymers with copper (high conductivity) interconnect. This was the first copper in polymer dielectric integration and reduced interconnect capacitance by 40%.
- Coordinated setup of new 3000 square foot Advanced Materials class one clean laboratory room including bay layout, tool facilitization, installation coordination and budget tracking. The project was completed on time and came in under budget.
- Primary engineering contact for Advanced Materials Group with tool vendors including leading tool source inspection teams.

IBM CORPORATION, Almaden Research Center, San Jose, CA

1993 – 1994

- Investigated organic polymeric photorefractive holographic optical storage materials.
- Explored the mechanism of the photorefractive effect through both optical and non-optical methods determining the limiting factors for speed and diffraction efficiency and the optimization of these properties for polymeric photorefractive materials.
- Developed methods to produce thick uniform films of photorefractive materials for device development.

Stanford University, Stanford CA

1987-1993

Ph.D. Thesis Research Summary

- Investigated the fast time scale rotational and librational motions of ordered liquids such as liquid crystals and their analogs. Liquid crystals have a high degree of local order that persists for an extended time period, providing an opportunity to investigate the effect of local liquid structure on the dynamics of molecules. A clear understanding of the structure

and dynamics of liquids is required for the optimization of chemical reactions, materials processing and the development of materials.

- Developed and refined a unique 200-300 femtosecond tunable pulsed laser system. This laser system has the capability to measure these material dynamics on a scale from femtoseconds to tens of nanoseconds; an improvement of four orders of magnitude over most prior experiments.
- Designed and fabricated novel instrumentation and electronic systems to facilitate the research

PROFESSIONAL AFFILIATIONS

American Chemical Society (ACS)

Institute of Electrical and Electronics Engineers (IEEE) – Senior Member

TEACHING EXPERIENCE

Assistant Professor of Chemistry – UIW

Chemical Principles I	Lecture	(3 Sections)	Fall 2006
Chemical Principles I Lab	Lab	(2 sections)	Fall 2006

Associate Faculty

Introduction to Chemistry I (Lecture and Laboratory)	Collin County Community College	Spring 2006
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Dissertation committees served on

Jeremy Schaub	Ph.D. Electrical Engineering	University of Texas at Austin	2000
Ru Li	Ph.D. Electrical Engineering	University of Texas at Austin	2000
Dhruvish Shah	M.S. Electrical Engineering	University of Texas at Dallas	2003
Kalai Narayanan	M.S. Electrical Engineering	University of Texas at Dallas	2003
Sanjeev Lakshmanan	M.S. Electrical Engineering	University of Texas at Dallas	2003

Teaching assistantships

Graduate Quantum Mechanics	Stanford University	Fall 1990*, 1989*, 1988
Introductory Organic Chemistry Laboratory	Stanford University	Spring 1988
Physical Chemistry for Biological Sciences	Stanford University	Winter 1988
Freshman Chemistry	Stanford University	Fall 1987
Introductory Chemistry Laboratory	The University of Texas	Spring 1986
Introductory Engineering Physics	Austin Community College	Summer 1984
Introductory College Physics	Austin Community College	Summer 1984

* Lead Teaching Assistant

SHORT COURSES

Kepner-Tregoe Project Management 1995.
Multilevel Interconnect Course, VMIC 1995.
CMOS Processing Course, ICE 1995.

Fundamentals of CMOS Logic Design, Motorola University 1996.

SCHOLARSHIPS

University of Texas National Merit Scholar, 1983-1987.
IBM Thomas J. Watson Memorial Scholarship, 1983-1987.
CONOCO Chemistry Scholarship, 1986,1985,1984,1983.
National Honor Society Chapter Scholarship, 1983.

COLLEGE HONORS

Phi Lambda Upsilon - Chemistry Honor Society - 1987.
Pi Mu Epsilon - Mathematics Honor Society - 1986.
Golden Key National Honor Society - 1985.
Designated College Scholar by the Dean of the College of Natural Sciences - 1985 and 1986.
Dean's Honor List, College of Natural Sciences - 1983, 1984.
Alpha Lambda Delta - Freshman Honor Society - 1984.
Phi Eta Sigma - Freshman Honor Society - 1984.
Dean's Scholars Program, College of Natural Sciences, University of Texas - 1983-1987.

Amateur Radio License – N5PEE – Extra Class.

ISSUED PATENT DETAIL

- 6,926,561 M. Handforth, **John J. Stankus**, Integrated high and low frequency connector assembly.
- 6,876,085 M. Handforth, **John J. Stankus**, Signal layer interconnect using tapered traces.
- 6,796,716 M. Handforth, **John J. Stankus**, K. Felske, Network device containing an optical module having optical and electrical connections facing one direction.
- 6,769,812 M. Handforth, **John J. Stankus**, D. Goodwill, Method and apparatus for forming an optical module with optical and electrical connections facing one direction.
- 6,417,077 **John J. Stankus**, Edge growth heteroepitaxy processes with reduced lattice mismatch strain between a deposited semiconductor material and a semiconductor substrate.
- 6,411,758 **John J. Stankus**, Method and apparatus for aligning a waveguide to a device (also Chinese patent CN1319770, and Japanese patent JP2001235661).
- 6,150,190 **John J. Stankus**, B. Fowler, Method of formation of buried mirror semiconductive device.
- 6,043,146 J. Watanabe, **John J. Stankus**, Method of forming a semiconductor device having dual inlaid structure.
- 5,920,790 J. Wetzel, **John J. Stankus**, Process of forming a semiconductor device (also Taiwanese patent TW391052, and Japanese patent JP11154705).

PUBLICATIONS

John Lehman, **John J. Stankus**, Michael Schabel, "Netcom (Networking, Datacom and Telecom) Product Emulator Chapter" in *National Electronics Manufacturing Technology Roadmaps, 2004 Edition*, NEMI 2004.

John J. Stankus, Contributions to the "Passives Components Chapter" in *National Electronics Manufacturing Technology Roadmaps 2002 Edition*, NEMI 2002.

J. J. Stankus, Optoelectronics Packaging section within "Challenges in Optoelectronics Packaging." *2001 ITRS (International Technology Roadmap for Semiconductors) Roadmap*.

Joseph Adams, Chih Shih Chang, **John J. Stankus**, Mahadevan K. Iyer, William T. Chen, "Addressing Packaging Challenges." *IEEE Circuits and Devices* 18: 4 (2002) 40.

John J. Stankus, "Material Properties in Optoelectronics Packaging and Assembly." *TechSearch International Third Optoelectronics Packaging Workshop: Reducing cost in Optoelectronic Packaging and Assembly* (2002) Invited Talk.

John J. Stankus, "Material Issues in Optoelectronics Packaging and Assembly." *TechSearch International First Optoelectronics Packaging Workshop* (2001) Invited Talk.

A. L. S. Loke, J. T. Wetzel, **J. J. Stankus**, M. S. Angyal, B. K. Mowry, S. S. Wong, "Electrical leakage at low-K polyimide/TEOS interface." *IEEE Electron Device Letters* 19, (1998) 177.

A. L. S. Loke, J. T. Wetzel, **J. J. Stankus**, S. S. Wong, C. Case, P. Kohl, T. Kikkawa, W. W. Lee, "Electrical extraction of the in-plane dielectric constant of fluorinated polyimide." *IEEE Low Dielectric Constant Materials III Symposium* (1997) 129.

C. Poga, D. M. Burland, T. Hanemann, Y. Jia, C. Moylan, **J. J. Stankus**, R. J. Tweig, W. E. Moerner, "Photorefractivity in new organic polymeric materials." *Proceedings of the SPIE 2526* (1995) 82.

J. J. Stankus, S. M. Silence, R. J. Tweig, D. M. Burland, G. C. Bjorklund, W. E. Moerner, "Stratified volume photorefractive polymer structures." *CLEO '94 - Conference on Lasers and Electro-Optics 8* (1994) 34.

S. M. Silence, **J. J. Stankus**, C. A. Walsh, J. C. Scott, R. J. Tweig, D. M. Burland, W. E. Moerner, G. C. Bjorklund, "Progress in photorefractive polymers." *IQEC '94 - International Quantum Electronics Conference 9* (1994) 63.

J. J. Stankus, S. M. Silence, R. J. Tweig, D. M. Burland, R. D. Miller, J. C. Scott, W. E. Moerner, G. C. Bjorklund, "Recent progress in photorefractive polymers: materials and structures." *Proceedings of the SPIE 2285* (1994) 204.

J. J. Stankus, S. M. Silence, W. E. Moerner, G. C. Bjorklund, "Electric field switchable stratified volume holograms in photorefractive polymers." *Optics Letters* 19 (1994) 1480.

S. M. Silence, J. C. Scott, **J. J. Stankus**, W. E. Moerner, C. R. Moylan, G. C. Bjorklund, R. J. Tweig, "Photorefractive polymers based on dual-function dopants." *Journal of Physical Chemistry* 99 (1995) 4096.

John J. Stankus "Dynamics of Simple and Ordered Liquids" Ph.D. Dissertation, Stanford University 1993.

John J. Stankus, Renato Torre, M. D. Fayer, "The influence of local liquid structure on orientational dynamics: The isotropic phase of liquid crystals." *Journal of Physical Chemistry*, 97 (1993) 9478.

John J. Stankus, Renato Torre, S. R. Greenfield, A. Sengupta, M. D. Fayer, "Ultrafast dynamics of nematic liquid crystals in the isotropic phase." *Proceedings of the SPIE* 1861 (1993) 263.

John J. Stankus, Renato Torre, C. D Marshall, S. R. Greenfield, A. Sengupta, A. Tokmakoff, M. D. Fayer, "Nanosecond time scale dynamics of pseudo-nematic domains in the isotropic phase of liquid crystals." *Chemical Physics Letters* 194 (1992) 213.

S. R. Greenfield, Abhijit Sengupta, **John J. Stankus**, M. D. Fayer, "Local Structure in Liquids: Non-Hydrodynamic Orientational relaxation of 2-ethyl naphthalene." *Chemical Physics Letters* 193 (1992) 49.

M. Johnson, N. Bluzer, M. Reizer, T. H. Geballe, S. R. Greenfield, **John J. Stankus**, M. D. Fayer, C. Herring, "Photoresponse of Nb films - Observation of biexponential recovery times of the superconducting state." *IEEE Transactions on Magnetism* 27: 2 (Mar 1991) 1523.

N. Bluzer, D. K. Fork, T. H. Geballe, M. R. Beasley, M. Y. Reizer, S. R. Greenfield, **John J. Stankus**, M. D. Fayer, "Superconducting, Transition, and Normal state photoresponse in YBCO observed at different temperatures." *IEEE Transactions on Magnetism* 27: 2 (Mar 1991) 1519.

M. Johnson, M. R. Beasley, T. H. Geballe, S. R. Greenfield, **John J. Stankus**, M. D. Fayer, "Anomalous Photoresponse of Metal Films." *Applied Physics Letters* 58: 6 (FEB. 11 1991) 568.

F. W. Deeg, S. R. Greenfield, **John J. Stankus**, Vincent J. Newell, M. D. Fayer, "Nonhydrodynamic molecular motions in a complex liquid: temperature dependent dynamics in pentylcyanobiphenyl." *Journal of Chemical Physics* 93(5) 3503 (1990).

F. W. Deeg, **John J. Stankus**, S. R. Greenfield, Vincent J. Newell, M. D. Fayer, "Anisotropic reorientational relaxation of biphenyl: transient grating optical Kerr effect measurements." *Journal of Chemical Physics* 90(12) 6893 (1989).

D. S. Coco and **J. J. Stankus**, "A Survey of Two High School Internship/Apprenticeship Programs at ARL:UT. " Technical Memorandum ARL-TM-84-6, Applied Research Laboratories, the University of Texas at Austin, 6 October 1984.