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Current Position • *Postdoctoral Researcher, Department of Chemistry, University of California, Riverside* June 2001 - present (Laboratories of Professor Leonard J. Mueller)

Education • *Ph.D., Chemistry, California Institute of Technology* January 2003
Thesis: "Force-Detected Nuclear Magnetic Resonance Independent of Field Gradients" (supervisor: Daniel P. Weitekamp)

• *S.B., Chemistry, Massachusetts Institute of Technology* June 1988

Research & Professional Experience • *Postdoctoral Research University of California, Riverside*
Research in liquid- and solid-state nuclear magnetic resonance. Electric field effects, pulse modeling and design. Demonstrated first implementation of quantum information processing in a single crystal.

• *Graduate Research California Institute of Technology*
Invented a new force-detection method and apparatus for observing nuclear magnetic resonance with increased sensitivity and resolution relative to prior-art methods for microscopic samples. Analyzed method of suppressing quantum-statistical noise in measurements using time-correlated observables.

• *Applications Engineer* 1988 - 1990
Galileo Electro-Optics, Inc. / IRIS Fiber Optics, Inc. (contract consulting in '91)

Developed custom sensors and methods for fiber-optic remote infrared spectroscopy for industrial customers' applications, including process-stream solvent mixtures, photographic films, layered polymer composites, "smart materials," medical sensors, epoxy curing, and multicomponent gas mixtures. Wrote software for operation of industrial process-hard Fourier-transform infrared spectrometer system for use in real-time remote quantitative analysis. Characterized fiber optics and fiber cable assemblies.

• *Undergraduate Research Massachusetts Institute of Technology*
Organo-transition metal chemistry of tungsten-based polymerization catalyst.

• *Summer Research* Summer 1985
State University of New York at Stony Brook
Designed protocols and prepared samples for multicomponent serum-lipid analysis using Fourier-transform infrared spectroscopy. Developed software to assess costs of physicians' clinical laboratory use.

- Teaching Experience**
- *University of California, Riverside* 2001 - Present
Lecturer and teaching assistant for survey of physical chemistry and undergraduate course in quantum mechanics. Guest lecturer in general chemistry.
 - *California Institute of Technology* 1992 - 1998
Teaching assistant for advanced quantum mechanics and advanced topics course in magnetic resonance. Guest lecturer in undergraduate quantum mechanics. Supervised undergraduate chemistry laboratory.
 - *Harvard University* 1991 - 1992
Head Teaching Fellow, coordinated the work of 8 graduate teaching assistants for undergraduate general chemistry course.
 - *Massachusetts Institute of Technology* Summers, 1988, 1991, 1992
Teaching assistant and part-time lecturer for course of 60 students in general chemistry and materials science.
 - *Hyperlearning, Inc., Westwood, CA* 1995 - 1996
Taught lectures in general chemistry to 24-student classes preparing for Medical College Admissions Test (MCAT).
 - *Private Tutoring* 1995 - present
Tutored more than 10 students on a regular basis in chemistry, physics, and mathematics in grade levels 6-11.
- Affiliations**
- *American Physical Society*
- Honors**
- *Herbert Newby McCoy Award for Graduate Research* 1999
 - *Student Travel Award, 38th Experimental NMR Conference* 1997
 - *Student Travel Award, American Physical Society, March Meeting* 1997
- References** Available upon request
- Publications**
- "Observation of Force Detected Nuclear Magnetic Resonance in a Homogeneous Field,"* L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *Proc. Natl. Acad. Sci.*, submitted May, 2003.
- "Three-Qubit Quantum Information Processing in a Single-Crystal Solid,"* G. M. Leskowitz, R. A. Olsen, N. Ghaderi, and L. J. Mueller, *J. Chem Phys.*, accepted for publication May, 2003.
- "MEMS-Based Force-Detected Nuclear Magnetic Resonance Spectrometer for In Situ Planetary Exploration,"* T. George, L. A. Madsen, W. Tang, A. Chang-Chien, G. M. Leskowitz, and D. P. Weitekamp, *Aerospace Conference: IEEE Proceedings* **1**, 273-278 (2001).
- "Force-Detected Magnetic Resonance Without Field Gradients,"* G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *Sol. St. Nucl. Magn. Reson.* **11**, 73 (1998).

"Multiplexed Sensor Systems in Quantitative FTIR Process Spectroscopy," R. D. Driver, M. L. Brubaker, J. N. Downing, G. M. Leskowitz, and J. D. Stark, *Proc. SPIE 1591*, 263, Infrared Fiber Optics III, James A. Harrington and Abraham Katzir, eds., 1992.

"Evanescent-Wave Spectroscopy Down Infrared Transmitting Optical Fibers," R. D. Driver, J. N. Downing, and G. M. Leskowitz, *Proc. SPIE 1591*, 168, Infrared Fiber Optics III, James A. Harrington and Abraham Katzir, eds., 1992.

"Applications of IR-Transmitting Optical Fiber in the Chemical Industry," R. D. Driver, G. M. Leskowitz, and L. E. Curtiss, *Proc. SPIE 1228*, 233, Infrared Fiber Optics II, James A. Harrington and Abraham Katzir, eds., 1990.

"Fiber Optic Chemical Sensing with Infrared-Transmitting Optical Fiber," R. D. Driver, G. M. Leskowitz, and L. E. Curtiss, *Proc. SPIE 1172*, 60, Chemical, Biochemical, and Environmental Fiber Sensors, Robert A. Lieberman and Marek T. Wlodarczyk, eds., 1990.

"Fourier Transform Infrared (FTIR) Fiber Optic Monitoring of Composites During Cure in an Autoclave," M. A. Druy, L. Elandjian, W. A. Stevenson, R. D. Driver, and G. M. Leskowitz, Fiber optic smart structures and skins II, *Proceedings of the Meeting of the Society of Photo-Optical Instrumentation Engineers*, Boston, MA, p. 150-159, 1989.

Patents

"A Method for Suppressing Noise in Measurements," P. J. Carson, L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, U. S. Patent No. 6,081,119 and No. 6,087,872, filed June 1998, issued June 2000.

"Force-Detected Magnetic Resonance Independent of Field Gradients," G. M. Leskowitz and D. P. Weitekamp, U. S. Patent No. 6,100,687, filed June 1997, issued August 2000.

Presentations

"Three-Qubit Quantum Information Processing in a Single-Crystal Solid," G. M. Leskowitz and L. J. Mueller, *44th Experimental NMR Conference*, Savannah, GA, 2003.

"The Law of Not-So-Large Numbers," Workshop on Limits of Detection in Nuclear Magnetic Resonance, International Society for Magnetic Resonance in Medicine, University of California at Berkeley, June 2001.

"Scaling Down BOOMERANG NMR Spectroscopy for High-Throughput Analysis Using Microfabrication," L. A. Madsen, G. M. Leskowitz, P. J. Carson, D. P. Weitekamp, T. George, and W. Tang, *42nd Experimental NMR Conference*, Orlando, FL, 2001.

"Force Detection with BOOMERANG and the Prospects for Ultrasensitive NMR," L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, Gordon Conference on Magnetic Resonance, Bristol RI, June 2001.

"Progress with BOOMERANG Force-Detected Nuclear Magnetic Resonance," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **45**, 105 (2000).

"Probing Structure and Dynamics at Surfaces Using Polarization Enhanced Force Detected NMR," L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *Abs. Pap. ACS* **219**, 333 (2000).

"Spectroscopy in the 21st Century: Noise as Signal, Massive Parallelism, and Single-Molecule Force Sensitivity," L. A. Madsen, G. M. Leskowitz, B. M. Lambert, P. J. Carson, and D. P. Weitekamp, *Abs. Pap. ACS* **219**, 214 (2000).

"Observation of Force-Detected Nuclear Magnetic Resonance in a Homogeneous Magnetic Field," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **44**, 543 (1999).

"Correlated Observation Narrows Quantum Uncertainty Enhancing Spectroscopic Transients," P. J. Carson, L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **44**, 541 (1999).

"BOOMERANG Returns: Observation of Force-Detected Nuclear Magnetic Resonance in a Homogeneous Magnetic Field," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *40th Experimental NMR Conference*, Orlando, FL, 1999.

"Correlated Observation Narrows Quantum Uncertainty Enhancing Spectroscopic Transients," P. J. Carson, L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *40th Experimental NMR Conference*, Orlando, FL, 1999.

"Observation of Force-Detected Nuclear Magnetic Resonance with the Inverse Stern-Gerlach Effect," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *217th American Chemical Society Meeting*, Anaheim, CA, 1999.

"Building Coherent Spectroscopy From Noise," P. J. Carson, L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *217th American Chemical Society Meeting*, Anaheim, CA, 1999.

"Force-Detected Measurement of Magnetic Moments in a Homogeneous Magnetic Field," L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *217th American Chemical Society Meeting*, Anaheim, CA, 1999.

"Experimental Progress in Force-Detected Magnetic Resonance Without Field Gradients," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **43**, 937 (1998).

"Design Principles for a Force-Detected Magnetic Susceptometer," L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **43**, 937 (1998).

"Taming Spin Noise by Detecting Multiple Time-Correlated Operators," P. J. Carson, L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **43**, 171 (1998).

"Scaling Relations and Sample Conductivity Effects in NMR Sensitivity: Faraday Induction vs. BOOMERANG Force Detection," D. M. Daigdigan, G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **43**, 434 (1998).

"BOOMERANG Force-Detected Nuclear Magnetic Resonance," G. M. Leskowitz, L. A. Madsen, T. George, W. Tang, and D. P. Weitekamp, *39th Experimental NMR Conference*, Pacific Grove, CA, 1998.

"Spin Noise: Measure Twice, Cut Once," P. J. Carson, L. A. Madsen, G. M. Leskowitz, and D. P. Weitekamp, *39th Experimental NMR Conference*, Pacific Grove, CA, 1998.

"Better Observation of Magnetization, Enhanced Resolution, and No Gradients," invited talk, G. M. Leskowitz, L. A. Madsen and D. P. Weitekamp, invited talk, Meeting of the Southern California American Chemical Society, Irvine, California, October, 1997.

"Nuclear Magnetic Resonance of Small Samples on Mars and Earth," T. George, G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, invited talk, In Situ Sensor Program for Potential Mars Exploration, Jet Propulsion Laboratory, July, 1997.

"Better Observation of Magnetization, Enhanced Resolution, and No Gradients," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, Gordon Conference on Magnetic Resonance, Bristol RI, June 1997.

"Nuclear Magnetic Resonance of Small Samples on Mars and Earth," T. George, G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, invited talk, Jet Propulsion Laboratory, April 1997.

"Better Observation of Magnetization, Enhanced Resolution, and No Gradients," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *38th Experimental NMR Conference*, Orlando, FL, 1997.

"Force-Detected Magnetic Resonance Without Field Gradients," G. M. Leskowitz, L. A. Madsen, and D. P. Weitekamp, *Bull. Am. Phys. Soc.* **42**, 115 (1997).

"Can We Beat the Heat in NMR?" G. M. Leskowitz and D. P. Weitekamp, *37th Experimental NMR Conference*, Pacific Grove, CA, 1996.

"Designs for Mechanical Detection of High-Resolution Magnetic Resonance Spectra," G. M. Leskowitz and D. P. Weitekamp, *Abs. Pap. ACS* **209**, part 2, p. 222, 1995.

"Faraday vs. Lorentz vs. Stern-Gerlach: New and Used NMR Detection Methods," G. M. Leskowitz and D. P. Weitekamp, *36th Experimental NMR Conference*, Boston, MA, 1995.

"Driving Oscillators with Spin-Dependent Forces," G. M. Leskowitz and D. P. Weitekamp, *35th Experimental NMR Conference*, Pacific Grove, CA, 1994.