

Dr. Thomas Gary Spence

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Degrees Earned

Vanderbilt University, Graduate School, Department of Chemistry, (Arts and Sciences Select Scholar) Nashville, Tennessee. Admitted to candidacy July 1995, Ph.D. in Physical Chemistry December 1997. Dissertation research advisor: Professor Lynmarie A. Posey. Dissertation: Investigation of solvent effects on metal-to-ligand charge transfer using multiply charged gas-phase clusters prepared via electrospray ionization.

Birmingham-Southern College, Birmingham, Alabama. B. S. in Chemistry with a minor in Physics, *cum laud*, Honors Program. American Chemical Society Certified Degree, May 1992.

Employment

Loyola University New Orleans

Chair, Department of Chemistry, 2007 – Present
Associate Professor of Chemistry, 2004 – Present
Assistant Professor of Chemistry, 1999 – 2004

Centre National de la Recherche Scientifique, Ecole Central, Paris

Visiting Research Scientist, November – December 2007

University of New South Wales, Australian Defense Force Academy

Chancellor Research Fellow, August – November 2007

Stanford University, Postdoctoral Research Associate under the direction of Professor Richard N. Zare. August 1997 – July 1999.

Argonne National Laboratory, Research Assistant under the direction of Dr. Lester Morss. June – August 1991

Courses Taught

Introduction to Chemistry*, General Chemistry I and II, General Chemistry Lab, Physical Chemistry I and II, Integrated Laboratory I and II*, Molecular Symmetry and Group Theory*, Modern Analytical Chemistry, Chemistry Seminar, Freshman Seminar

*New Courses Developed

Directed Student Research

Since Joining Loyola University in 1998 I have overseen over 30 undergraduate research projects including 8 honors theses in the areas of experimental physical chemistry and analytical chemistry.

Grants to Support Research, Teaching, and Infrastructure

National Institute of Standards and Technology, Advanced Technology Program (subcontractor) Mid-IR Cavity Ring-down Spectroscopy, \$254,000.

Blue Leaf Networks Inc. Subcontractor, Gas-phase ion mobility used in drug and explosives detection, \$60,000.

Defense Advanced Research Projects Agency's Defense Science Office, Breath Analysis to Diagnose CWA and BWA Exposure Using Scanning Cavity Ringdown Spectroscopy, \$30,000

Louisiana Board of Regents, Photonics Laboratory for an Integrated Approach to Teaching Spectroscopy in Chemistry , \$56,963.

Rector Visitng Scientist Fellowship from the University of New South Wales at the Australian Defense Force Academy. \$12,000.

Australian Research Council in a Linkage grant with the Australian Federal Police, Molecular Fingerprinting: molecular spectroscopy of trace gases, \$155,000.

Louisiana Board of Regents Support Fund, A Suite of Instruments to Enhance Forensic Science at Loyola, \$192,085.

Publications

1. "Optical diagnostics of atmospheric pressure air plasmas" Laux, C. O.; Kruger, C. H.; Spence, T. G.; Zare, R. N. *Plasma Sources Science and Technology* (2003), **12**(2), 125-138.
2. "A new glow on the chromatography of M&M candies" Birdwhistell, K. R.; Spence, T. G.; *Journal of Chemical Education* (2002), **79**(7), 847.
3. "Stable isotope ratios using cavity ring-down spectroscopy: determination of $^{13}\text{C}/^{12}\text{C}$ for carbon dioxide in human breath" Crosson, E. R.; Ricci, K. N.; Richman, B. A.; Kachanov, A. A.; Chilesse, F. C.; Owano, T. G.; Paldus, B. A.; Spence, T. G.; Zare, R. N. *Analytical Chemistry* (2002), **74**(9), 2003-2007.
4. "Analog detection for cavity lifetime spectroscopy" Zare, R. N.; Harb, C. C.; Paldus, B. A.; Spence, T. G. U.S. Patent (2000).
5. "Cavity-locked ring down spectroscopy" Zare, R. N.; Paldus, B. A.; Harb, C. C.; Spence, T. G. U.S. Patent (2000).
6. "Frequency-switched heterodyne cavity ring-down spectroscopy" Levenson, M. D.; Paldus, B. A.; Harb, C. C.; Spence, T. G.; Zare, R. N.; Lawrence, M. J.; Byer, R. L. *Optics Letters* (2000), **25**, 920.
7. "A laser-locked cavity ring-down spectrometer employing an analog detection scheme" Spence, T. G.; Harb, C. C.; Paldus, B. A.; Zare, R. N.; Wilke, B.; Byer, R. L. *Review of Scientific Instruments* (2000), **71**(2, Pt. 1), 347-353.
8. "Cavity ringdown spectroscopy using mid-infrared quantum-cascade lasers" Paldus, B. A.; Harb, C. C.; Spence, T. G.; Zare, R. N.; Gmachl, C.; Capasso, F.; Sivco, D. L.; Baillargeon, J. N.; Hutchinson, A. L.; Cho, A. Y. *Optics Letters* (2000), **25**(9), 666-668.
9. "Photoacoustic spectroscopy using quantum-cascade lasers" Paldus, B. A.; Spence, T. G.; Zare, R. N.; Oomens, J.; Harren, F. J. M.; Parker, D. H.; Gmachl, C.; Capasso, F.; Sivco, D. L.; Baillargeon, J. N.; Hutchinson, A. L.; Cho, A. Y. *Optics Letters* (1999), **24**(3), 178-180.
10. "Pulse-stacked cavity ring-down spectroscopy" Crosson, E. R.; Haar, P.; Marcus, G. A.; Schwettman, H. A.; Paldus, B. A.; Spence, T. G.; Zare, R. N.; *Review of Scientific Instruments* (1999) **70**(1, Pt. 1), 4-10.
11. "Influence of sequential salvation on metal-to-ligand charge transfer in bis(2,2',2''-terpyridyl)iron(II) clustered with dimethyl sulfoxide" Spence, T. G.; Trotter, B. T.; Posey, L. A.; *Journal of Physical Chemistry A* (1998), **102**(30), 6101-6106.
12. "Optical heterodyne detection in cavity ring-down spectroscopy" Levenson, M. D.; Paldus, B. A.; Spence, T. G.; Harb, C. C.; Harris, J. S., Jr.; Zare, R. N. *Chemical Physics Letters* (1998), **290**(4,5,6), 335-340.
13. "Metal-to-ligand charge transfer in the gas-phase cluster limit" Spence, T. G.; Trotter, B. T.; Burns, T. D.; Posey, L. A.; *Journal of Physical Chemistry A* (1998), **102**(30), 6101-6106.
14. "Cavity-locked ring-down spectroscopy" Paldus, B. A.; Harb, C. C.; Spence, T. G.; Wilke, B.; Xie, J.; Harris, J. S.; Zare, R. N. *Journal of Applied Physics* (1998), **83**(8), 3991-3997.
15. "Wavelength-dependent photodissociation of $[\text{Fe}(\text{bpy})_3^*(\text{CH}_3\text{OH})_n]^{2+}$ clusters, $n = 2-6$, triggered by excitation of the metal-to-ligand charge transfer transition" Spence, T. G.; Burns, T. D.; Guckenberger, G. B.; Posey, L. A. *Journal of Physical Chemistry A* (1997), **101**(6), 1081-1092.
16. "Controlled synthesis of transition-metal ion complex/solvent clusters by electrospray ionization" Spence, T. G.; Burns, T. D.; Posey, L. A.; *Journal of Physical Chemistry A* (1997), **101**(2), 139-144.
17. "Electrospray ionization of divalent transition metal ion bipyridine complexes: spectroscopic evidence for preparation of solution analogs in the gas phase" Burns, T. D.; Spence, T. G.; Mooney, M. A.; Posey, L. A. *Chemical Physics Letters* (1996), **258**(5,6), 669-679.
18. "Determination of the enthalpies of formation of dysprosium dioxide and trioxide and estimation of the $\text{Dy}^{3+}/\text{Dy}^{2+}$ standard aqueous electrode potential" Morss, L. R.; Spence, T. G. *Zeitschrift für Anorganische und Allgemeine Chemie* (1992), **616** 162-168.