Deacon J. Nemchick

Scientist – Laboratory Studies and Atmospheric Observation Group
Jet Propulsion Laboratory – California Institute of Technology
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Formal Education:

Yale University (New Haven, CT)	Ph.D. in Physical Chemistry	2017
Yale University (New Haven, CT)	M.S. in Physical Chemistry	2011
Oberlin College (Oberlin, OH)	B.A. Highest Honors in Chemistry	2009

Research Experience:

Jet Propulsion Laboratory	Scientist	2019-Present
Jet Propulsion Laboratory	NASA Postdoctoral Fellow	2017-2019
Yale University	Ph.D. Advisor: Professor Patrick H. Vaccaro	2009-2016

Thesis: Dual Hydrogen-Bonding Motifs in Noncovalent Complexes Formed with Tropolone

Awards and Honors:

NASA Postdoctoral Fellowship	University Space Research Association	2017
Richard Wolfgang Doctoral Thesis Prize	Yale University (Department of Chemistry)	2017
Yale University Prize Teaching Fellowship	Yale University (Graduate School of Arts and Sciences)	2011-2012
T.F. Cooke Award for Teaching Assistant Excellence	Yale University (Department of Chemistry)	2012
Ernest B. Yeager Award for Spectroscopic Research	NE Ohio ACS	2009
Outstanding presentation award for talk at 2009 ACS MIM*	NE Ohio ACS	2009
David A. Evans ('63) Chemistry Prize	Oberlin College (Department of Chemistry)	2009
Harold and Virginia Baker Scholarship	Oberlin College (Department of Chemistry)	2008
Outstanding presentation award for talk at 2008 ACS MIM*	NE Ohio ACS	2008

*Meeting in Miniature

Peer-Reviewed Publications:

D. J. Nemchick, B. J. Drouin, M. J. Cich, T. Crawford, A. J. Tang, Y. Kim, T. J. Reck, E. T. Schlecht M.-C. F. Chang, G. Virbila, A 90-102 GHz CMOS Based Pulsed Fourier Transform Spectrometer: New Approaches for *in situ* Chemical Detection and Millimeter-Wave Cavity-Based Molecular Spectroscopy, Rev. Sci. Inst., 89, 073109:1-12 (2018)

D. J. Nemchick, B. J. Drouin, A. J. Tang, Y. Kim, M.-C. F. Chang, Sub-Doppler Spectroscopy with a CMOS Transmitter, IEEE Trans. THz Sci. Technol., 8, 121-126 (2018)

D. J. Nemchick, M. K. Cohen, P. H. Vaccaro, Dual Hydrogen-Bonding Motifs in Complexes Formed Between Tropolone and Formic Acid, J. Chem. Phys. 145, 204303:1-22 (2016)

K. Chew, **D. J. Nemchick**, & P. H. Vaccaro, Isotopic Dependence of Excited-State Proton-Tunneling Dynamics in Tropolone Probed by Polarization-Resolved Degenerate Four-Wave Mixing Spectroscopy, J. Phys. Chem. A 117(29), 6126-6142 (2013)

N. C. Craig, Y. Chen, Y. Lu, C. F. Neese, **D. J. Nemchick**, & T. A. Blake, Analysis of the Rotational Structure in the High-Resolution Infrared Spectra of cis,cis- and trans,trans-1,4-Difluorobutadiene-1,4-d_2, J. Mol. Spectrosc. 288, 18-27 (2013)

N. C. Craig, C. C. Easterday, **D. J. Nemchick**, D. F. K. Williamson, & R. L. Sams, Rotational Analysis of Bands in the High-Resolution Infrared Spectra of cis,cis- and trans,trans-1,4-Difluorobutadiene-2-d_1, J. Mol. Spectrosc. 272, 2-10 (2012)

D. C. McKean, B. van der Veken, W. Herrebout, M. M. Law, M. J. Brenner, **D. J. Nemchick**, & N. C. Craig, Infrared Spectra of $^{12}CF_2{=}^{12}CH_2$ and $^{12}CF_2{=}^{13}CH_2$, Quantum-Chemical Calculations of Anharmonicity, and Analyses of Resonances, J. Phys. Chem. A 114(18), 5728-5742 (2010)

N. C. Craig, D. Feller, P. Groner, H. Y. Hsin, D. C. McKean, & **D. J. Nemchick**, Vibrational Spectroscopy of 1,1-Difluorocyclopropane-d_0, -d_2, and -d_4: The Equilibrium Structure of Difluorocyclopropane, J. Phys. Chem. A 111, 2498-2506 (2007)

Public Presentations:

73nd International Symposium on Molecular Spectroscopy — Urbana-Champaign, IL July 2018
Oral: Pulsed Millimeter-Wave *in situ* Sensor with 65 nm CMOS Transmitter and Heterodyne Receiver Electronics

73nd International Symposium on Molecular Spectroscopy — Urbana-Champaign, IL July 2018
Oral: A USB - to - W-Band Transmitter: Millimeter-Wave Molecular Spectroscopy with CMOS Technology

101st Canadian Chemistry Conference and Exhibition — Edmonton, Canada May 2018
Oral: SpecChip: An Ultra-Portable Cavity-Based Millimeter Wave Spectrometer for *in situ* Chemical Detections

The 2018 28th IEEE International Symposium on Space Terahertz Technology — Pasadena, CA March 2018
Oral: A CMOS-Based 90 - 105 GHz Pulsed-Echo Spectrometer: New Approaches for Highly-Mobile and Low-Power *in situ* Chemical

Detections

The 2018 28th IEEE International Symposium on Space Terahertz Technology — Pasadena, CA March 2018
Poster: Pure-Rotational Molecular Spectroscopy with a Low- Power CMOS-Based W-Band Transmitter

72nd International Symposium on Molecular Spectroscopy — Urbana-Champaign, IL July 2017
Oral: High-Resolution THz Measurements of BrO Generated in an Inductively Coupled Plasma

Thesis Defense — New Haven, CT December 2016
Oral: Tropolone Complexes Formed with Amphoteric Ligands: Structure and Dynamics as Viewed Across the Vibronic Landscape

70th International Symposium on Molecular Spectroscopy — Urbana-Champaign, IL July 2015
Oral: Dispersion-Dominated -Stacked Complexes Constructed on a Dynamic Scaffold

69th International Symposium on Molecular Spectroscopy — Urbana-Champaign, IL July 2014
Oral: Hydrogen Bound Complexes with Tropolone: Binding Motifs, Barrier Heights, and the Search for Bifurcating Systems

68th International Symposium on Molecular Spectroscopy — Columbus, OH July 2013
Oral: Tropolone Complex Formed with Amphoteric Ligands: Structure and Dynamics as Viewed Across the Vibronic Landscape

Annual Bristol-Myers Squibb Symposium — New Haven, CT August 2012
Oral: Vibronic Spectroscopy of Hydrogen-Bound Tropolone Complexes: A Gateway for the Study of Multiple Proton-Transfer Processes?

Gordon Research Conference on Electronic Spectroscopy & Dynamic — Lewiston, ME July 2012
Poster: Vibronic Spectroscopy of Hydrogen-Bound Tropolone Complexes: A Gateway for the Study of Multiple Proton-Transfer Processes?

66th International Symposium on Molecular Spectroscopy — Columbus, OH July 2011
Oral: Hydrogen-Bound Complexes of Tropolone: Gateways for the Interrogation of Multiple Proton-Transfer Events

ACS Regional Meeting (CERMACS) — Cleveland, OH May 2009
Oral: Semi-Experimental Structures from High-Resolution Infrared Spectroscopy and Quantum Chemical Calculations

Cleveland ACS Meeting-in-Miniature — Cleveland, OH March 2009
Oral: Structural Effects of Fluorine Substitution in the Isomers of 1,4-Difluorobutadiene

Cleveland ACS Meeting-in-Miniature — Cleveland, OH March 2008
Oral: Synthesis of the Isotopomers of 1,4-Difluorobutadiene