

# Karl J. Feierabend

The College of Wooster  
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## Employment

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### 2009 – Associate Professor of Chemistry

*The College Of Wooster, Wooster, OH*

Courses Taught

- General Chemistry I and II (CHEM 111, 112)
- Physical Chemistry I and II (CHEM 318, 319)
- Senior Independent Study (CHEM 451, 452)
- Introduction to Independent Study (CHEM 401)
- First-Year Seminar
- Environmental Chemistry (CHEM 216)

### 2006 – 2009 Research Scientist, Cooperative Institute for Research in the Environmental Sciences (CIRES)

*National Oceanic and Atmospheric Administration (NOAA), Chemical Sciences Division*

## Education

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### 2006 Ph.D., Physical Chemistry

*University of Colorado - Boulder, CO*

Dissertation: "Spectroscopy of Atmospherically Relevant Inorganic Acids"

### 2001 Bachelor of Science, Chemistry

*Furman University - Greenville, SC*

## Awards

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### Primary Investigator

2011 – 2014, Single-Investigator Cottrell College Science Award, Research Corporation for Scientific Advancement, "Self-association of dicarboxylic acids in solution using incoherent broadband cavity-enhanced absorption spectroscopy," \$45,000

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## Contributor

2022 – 2028, Lead Applicant & Co-Program Director, Howard Hughes Medical Institute Inclusive Excellence 3 (IE3) Grant, "LCC5: Working Collectively to Understand, Promote, and Evaluate Inclusive Teaching," L. Sirof, M. Pollock, K. Feierabend, M. Schen, A. J. Stavnezer, \$475,000 (institutional)

2020 – 2023, Senior Personnel, National Science Foundation Major Research Instrumentation, "Acquisition of a LC/Q-ToF Mass Spectrometer to Enhance Undergraduate Research and Education in the Chemical and Biochemical Sciences," P. Edmiston (PI), J. Faust (co-PI), \$232,158

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## Publications

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Allison, J. M.; Olson, K. S.; Bowers, B. B.; Krul, S. E.; Hoehn, S. J.; Feierabend, K. J. Photochemistry of aqueous warfarin and 4-hydroxycoumarin. **In preparation (2024).**

Krul, S. E.; Hoehn, S. J.; Feierabend, K. J.; Crespo-Hernández, C. E. Excited state dynamics of 7-deazaguanosine and guanosine 5'-monophosphate. *J. Chem. Phys.* **2021**, *154* (7), 075103. DOI: 10.1063/5.0038123

Kuen, D. S.; Feierabend, K. J. Cavity-enhanced overtone spectroscopy of methanol in aprotic solvents: probing solute-solvent interactions and self-associative behavior. *J. Phys. Chem. A* **2014**, *118* (16), 2942-2951. DOI: 10.1021/jp502465j

Talukdar, R. K.; Zhu, L.; Feierabend, K. J.; Burkholder, J. B. Rate coefficients for the reaction of methylglyoxal (CH<sub>3</sub>COCHO) with OH and NO<sub>3</sub> and glyoxal (HCO)<sub>2</sub> with NO<sub>3</sub>. *Atmos. Chem. Phys.* **2011**, *11* (21), 10837-10851. DOI: 10.5194/acp-11-10837-2011

Baasandorj, M.; Feierabend, K. J.; Burkholder, J. B. Rate coefficients and ClO radical yields in the reaction of O(<sup>1</sup>D) with CClF<sub>2</sub>CCl<sub>2</sub>F, CCl<sub>3</sub>CF<sub>3</sub>, CClF<sub>2</sub>CClF<sub>2</sub>, and CCl<sub>2</sub>FCF<sub>3</sub>. *Int. J. Chem. Kinet.* **2011** *43* (8), 393-401. DOI: 10.1002/kin.20561

Papanastasiou, D. K.; Feierabend, K. J.; Burkholder, J. B. Cl<sub>2</sub>O photochemistry: ultraviolet/vis absorption spectrum temperature dependence and O(<sup>3</sup>P) quantum yield at 193 and 248 nm. *J. Chem. Phys.* **2011** *134* (20), 204310. DOI: 10.1063/1.3592662

Feierabend, K. J.; Papanastasiou, D. K.; Burkholder, J. B. ClO radical yields in the reaction of O(<sup>1</sup>D) with Cl<sub>2</sub>, HCl, chloromethanes, and chlorofluoromethanes. *J. Phys. Chem. A* **2010**, *114* (45), 12052-12061. DOI: 10.1021/jp107761t

- Feierabend, K. J.; Flad, J. E.; Brown, S. S.; Burkholder, J. B. HCO quantum yields in the photolysis of HC(O)C(O)H (glyoxal) between 290 and 420 nm. *J. Phys. Chem. A* **2009**, *113* (27), 7784-7794. DOI: 10.1021/jp9033003
- Feierabend, K. J.; Zhu, L.; Talukdar, R. K.; Burkholder, J. B. Rate coefficients for the OH+HC(O)C(O)H (glyoxal) reaction between 210 and 390 K. *J. Phys. Chem. A* **2008**, *112* (1), 73-82. DOI: 10.1021/jp0768571
- Vaida, V.; Feierabend, K. J.; Rontu, N.; Takahashi, K. Sunlight-initiated photochemistry: excited vibrational states of atmospheric chromophores. *Int. J. Photoenergy* **2008**, 138091. DOI: 10.1155/2008/138091
- Havey, D. K.; Feierabend, K. J.; Takahashi, K.; Skodje, R. T.; Vaida, V. Experimental and theoretical investigation of vibrational overtones of glycolic acid and its hydrogen bonding interactions with water. *J. Phys. Chem. A* **2006**, *110* (20), 6439-6446. DOI: 10.1021/jp060602q
- Feierabend, K. J.; Havey, D. K.; Brown, S. S.; Vaida, V. Experimental absolute intensities of the  $4\nu_9$  and  $5\nu_9$  O-H stretching overtones of H<sub>2</sub>SO<sub>4</sub>. *Chem. Phys. Lett.* **2006**, *420* (4-6), 438-442. DOI: 10.1016/j.cplett.2006.01.013
- Feierabend, K. J.; Havey, D. K.; Varner, M. E.; Stanton, J. F.; Vaida, V. A comparison of experimental and calculated spectra of HNO<sub>3</sub> in the near-infrared using Fourier transform infrared spectroscopy and vibrational perturbation theory. *J. Chem. Phys.* **2006**, *124* (12), 124323. DOI: 10.1063/1.2180248
- Hintze, P. E.; Feierabend, K. J.; Havey, D. K.; Vaida, V. High-resolution spectroscopy of H<sub>2</sub>SO<sub>4</sub>, HDSO<sub>4</sub>, and D<sub>2</sub>SO<sub>4</sub> vapor in the region 1200-10,000 cm<sup>-1</sup>. *Spectrochim. Acta, Part A* **2005**, *61* (4), 559-566. DOI: 10.1016/j.saa.2004.05.006
- Havey, D. K.; Feierabend, K. J.; Vaida, V. Temperature-dependent infrared spectra of torsional vibrations in acetic acid. *J. Mol. Spectrosc.* **2005**, *229* (2), 151-157. DOI: 10.1016/j.jms.2004.09.009
- Havey, D. K.; Feierabend, K. J.; Vaida, V. Vapor-phase vibrational spectrum of glycolic acid, CH<sub>2</sub>OHCOOH, in the region 2000 – 8500 cm<sup>-1</sup>. *J. Phys. Chem. A* **2004**, *108* (42), 9069-9073. DOI: 10.1021/jp0474881
- Feierabend, K. J.; Havey, D. K.; Vaida, V. Gas phase spectroscopy of HNO<sub>3</sub> in the region 2000-8500 cm<sup>-1</sup>. *Spectrochim. Acta, Part A* **2004**, *60* (12), 2775-2781. DOI: 10.1016/j.saa.2004.01.016
- Havey, D. K.; Feierabend, K. J.; Vaida, V. Ab initio study of H<sub>2</sub>SO<sub>4</sub> rotamers. *J. Mol. Struct.: THEOCHEM.* **2004**, *680* (1-3), 243-247. DOI: 10.1016/j.theochem.2004.04.048

Vaida, V.; Kjaergaard, H. G.; Feierabend, K. J. Hydrated complexes: relevance to atmospheric chemistry and climate. *Int. Rev. Phys. Chem.* **2003**, *22*(1), 203-219. DOI: 10.1080/0144235031000075780

Bordelon, J. A.; Feierabend, K. J.; Siddiqui, S. A.; Wright, L. L.; Petty, J. T. Viscometry and atomic force microscopy studies of the interactions of a dimeric cyanine dye with DNA. *J. Phys. Chem. B* **2002**, *106* (18), 4838-4843. DOI: 10.1021/jp014680j

## Presentations

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### Talks

Feierabend, K. J.; Karazsia B. K. Interteaching: an active learning approach for the STEM classroom, *Ohio Project Kaleidoscope: Increasing STEM Success in Higher Education*, May 16, 2015

In the OH-Me stretch: probing noncovalent interactions using cavity-enhanced spectroscopy and computational chemistry, John Carroll University, December 10, 2014

Understanding solute-solvent interactions with spectroscopy, Mt. Union University, November 2, 2012

### Posters (2013 – Present)

Allison, J. M.; Feierabend, K. J. Aqueous warfarin and 4-hydroxycoumarin photodegradation products and yields from UV-B exposure, *Ohio Photochemical Society Meeting*, July 2023

Feierabend, K. J.; Karazsia B. Interteaching in the general chemistry classroom: a low-tech alternative to the conventional "flipped" approach, *Abstracts of the Papers of the American Chemical Society* 255:184-CHEN, April 2018

Feierabend, K. J.; Bowers B. Solvent dependence of the H- $\pi$  equilibrium constant, *Abstracts of the Papers of the American Chemical Society* 255:522-PHYS, April 2018

Kuen, D.; Feierabend, K. J. Alcohol-solvent interactions probed using cavity-enhanced absorption spectroscopy of O-H stretching vibrational overtones, *Abstracts of Papers of the American Chemical Society* 245: 309-PHYS, April 2013

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## **Service and Professional Training**

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### **Institutional Leadership**

Chair, Department of Chemistry, 2020-2023

Chair, STEM Success Initiative Advisory Board, 2017-2018

Elected Committee Service:

Strategic Planning and Priorities Advisory Committee, 2019-2022

Chair, Committee on Committees, 2015-2017

Financial Advisory Committee, 2012-2013

### **Professional Training**

Facilitating Collaborative Innovation, CoCreative, October 2023

Advancing Inclusive Mentoring, California State University Long Beach, February 2023