Curriculum Vitae
Christopher J. Stromberg

Home Address:
416 Birmingham Dr.
Frederick, MD 21701
(507) 993-1680

Work Address:
401 Rosemont Ave.
Frederick, MD 21701
(301) 696-3678

E-mail Address: stromberg@hood.edu
https://www.hood.edu/academics/faculty/christopher-j-stromberg

Appointments

8/2018 – Present	Professor of Chemistry, Hood College, Frederick, Maryland
5/2016 – Present	Adjunct Professor, Engineering Innovations Program, Johns Hopkins University, Baltimore, Maryland
8/2011 – 7/2018	Associate Professor of Chemistry, Hood College, Frederick, Maryland
8/2011 – 7/2015	Chair, Department of Chemistry and Physics, Hood College, Frederick, Maryland
8/2005 – 7/2011	Assistant Professor of Chemistry, Hood College, Frederick, Maryland

Education

7/2003 – 6/2005	**Pomona College**, Claremont, California Robbins Teaching/Research Fellow Teaching Post-doc
9/1998 – 6/2003	**Stanford University**, Stanford, California Ph.D. in Physical Chemistry
8/1994 – 6/1998	**Gustavus Adolphus College**, St. Peter, Minnesota B.A. Summa Cum Laude Majors in Chemistry and Computer Science Minors in Mathematics and Music

Teaching Experience

Hood College

CHEM 100 – The Chemical World
CHEM 101 – General Chemistry I
CHEM 102 – General Chemistry II
CHEM 270 – Chemical Literature
CHEM 405 – Inorganic Chemistry
CHEM 431 – Quantum Mechanics
CHEM 432 – Thermodynamics & Statistical Mechanics
CHEM 433 – Quantum Mechanics Lab
CHEM 434 – Thermodynamics & Statistical Mechanics Lab
CHEM 470 – Senior Seminar
FYS 101 – First Year Seminar: Science in Art and Archaeology
FYS 101 – First Year Seminar: STEMing the Tide: Tackling Environmental Issues with STEM
HON 328 – STEM and the Environment
HON 470 – Food as Culture, Cooking as Science
LLC 101, 102 – Living Learning Community: Science Behind the Scenes

Research Experience

Hood College

My current research program involves the spectroscopic study of novel bio-mimetic catalysts for the production of molecular hydrogen. These compounds are analogs to the Fe-Fe hydrogenases found in certain archaebacteria. We are synthesizing and studying these compounds using infrared and Raman spectroscopies to investigate the vibrational frequencies in the molecules. Varying the ligands around the active site of these catalysts changes their electronic properties (and thus their catalytic behavior). In addition, we are using ultrafast time-resolved vibrational spectroscopy to study the redistribution of energy in these molecules when pumped with UV or visible light. These time-resolved techniques will give further insight into the electronic properties of the active site and, therefore, insight into the catalytic properties of the molecules. We are carrying out these time-resolved studies in conjunction with Dr. Edwin Heilweil at the National Institute of Standards and Technology.

Pomona College

With Professor Fred Grieman

At Pomona College, Professor Grieman and I, along with three undergraduate researchers, studied the electronic spectrum of dimethyl metal ions (primarily dimethylcadmium and dimethylzinc). The gaseous metal compounds were vibrationally and rotationally cooled through a free jet expansion. They were then ionized by an electron beam, and the subsequent emission was dispersed in a monochromator and collected on a CCD.

The spectra were quite complicated, but assignments were facilitated by comparison with spectra that were further rotationally cooled, due to the presence of helium in the system. Gaussian calculations were also used to assist in the assignments.

Stanford University

Advisor: Professor Michael Fayer

At Stanford, I studied complex systems using ultrafast infrared laser techniques. For this, I used two laser systems. The first, used to perform pump-probe experiments on tungsten hexacarbonyl in the collisionless gas phase, was a home-built Rhodamine 610 dye laser pumped with a home-built mode-locked, Q-switched Nd:YAG laser.

The second laser system used a diode-pumped Ti:Sapphire oscillator to seed a YLF pumped Ti:Sapphire regenerative amplifier. The output of the regen was then sent to an OPA, where ultrafast (<50 fs at 4 microns) tunable infrared laser pulses were generated. We then used these ultrafast pulses to perform multi-dimensional IR experiments that are the vibrational equivalent of multi-dimensional NMR techniques. We studied vibrational dynamics in hydrogen-bonded systems such as methanol and water. I also gained significant experience doing data analysis, computer calculation, and computerized instrument control through LabView.

Dissertation

Vibrational Dynamics in Complex Systems Investigated with Non-Linear Ultrafast Infrared Techniques

Advisor: Professor Michael D. Fayer

Honors and Distinctions

4/2015	**Awarded Mortar Board Excellence in Teaching Award** For providing excellent instruction, challenging students, and inspiring them to greater heights.
3/2009	**Elected to Alpha Lambda Delta**
5/2008	**Elected to Phi Kappa Phi** Phi Kappa Phi is the nation's oldest, largest, and most selective all-discipline honor society.
6/2003	**Annual Reviews Prize in Physical Chemistry**
9/2000-8/2001	**Stanford Chemistry Department Fellowship**

5/2000	**Graduate Service Award** For outstanding commitment to enhancing graduate student life and for fostering a spirit of community among graduate students at Stanford University.
4/2000	**Alpha Phi Omega – Zeta Chapter Distinguished Service Key** For extraordinary and longstanding commitment to the principles of Leadership, Friendship, and Service within the Chapter.
4/1997	**Elected to Phi Beta Kappa** In recognition of high attainments in liberal scholarship.

University and Community Service

Hood College

8/2017 – Present	**Faculty Parliamentarian** Advising the Faculty Executive Committee and the Faculty as a whole on parliamentary procedures.
3/2025 – 5/2026	**Member, Restructuring Committee** This committee is consulted on major changes to the academic structure of the college.
8/2021 – 5/2022	**Member, Curriculum Committee**
8/2013 – 12/2013	The curriculum committee is charged with overseeing the curriculum at Hood
8/2010 – 5/2012	College, including reviewing and approving course proposals and recommending new majors and programs to the Faculty.
8/2017 – 6/2019	**Member, Secondary Education Committee**
8/2011 – 7/2015	Review progress of candidates for secondary education certification.
8/2017 – 7/2021	**Member, Enrollment Management Advisory Committee**
10/2010 – 6/2016	**Co-Chair, Phi Beta Kappa Exploratory Committee** A group of current Phi Beta Kappa members were asked to research the possibility of applying for a Phi Beta Kappa Chapter at Hood.
3/2013 – 7/2015	**Ad-hoc Advising Group** Assisting Center for Academic Achievement and Retention with planning summer and freshman/sophomore advising.
8/2011 – 7/2015	**Chair, Department of Chemistry and Physics**
8/2010 – 7/2015	**Advisor, Gamma Sigma Epsilon** Gamma Sigma Epsilon is the Chemistry Honors Society at Hood College.
8/2012 – 6/2014	**Faculty Representative to Board of Trustees Institutional Advancement Committee**
3/2021 – 5/2022	**President, Hood College Chapter of Phi Kappa Phi**
9/2009 – 5/2011	
9/2008 – 9/2009	**Faculty Vice President, Hood College Chapter of Phi Kappa Phi** The Hood College Chapter of Phi Kappa Phi promotes high scholastic standards at Hood College, as well as overseeing the Phi Kappa Phi Research Grant for students performing honors research.
8/2006 – 5/2010	**Member, Academic Judicial Council** Council is responsible for overseeing the Hood Honor Code and adjudicating Honor Code cases.
8/2006 – 5/2010	**Advisor, Free Radicals** The Free Radicals is Hood College's Chemistry Club and American Chemical Society affiliate.
4/2007 – 6/2008	**Member, Academic Standards and Policy Committee** Committee monitors the academic progress of students and reviews requests for changes in academic policies and procedures throughout the college.
2/2006 – 5/2007	**Member, Quantitative Reasoning Task Force** Task force is responsible for recommending changes to the curriculum to reinforce quantitative reasoning and quantitative literacy across the curriculum

2/2006 – 5/2006 **Outside Member, Computer Science Search Committee**
Assisted the Computer Science Department in searches to fill multiple tenure-track positions.

Evangelical Lutheran Church, Frederick, MD

5/2026 – Present **Chair, Call Committee** – Appointed to review, interview, and recommend candidates for Lead Pastor position.

12/2006 – 6/2020 **Member, Youth and Family Ministry Committee** – Coordinates and oversees all youth activities for the church, setting and monitoring budgets for these activities, and providing assistance to the Youth and Family Ministry staff.

6/2020 – 1/2024 **Chair, Capital Campaign Committee** – Manage a $1.8 million capital campaign to fund repairs to the church's historic spires.

1/2013 – 6/2018 **Chair, Youth and Family Ministry Committee** – Set agenda and preside over Youth and Family Ministry Committee meetings.

10/2007 – 10/2009 **President** – Served as President of both Church Council and Congregation. Set agenda for and presided over Council and Congregational meetings.

10/2006 – 10/2009 **Member, Church Council** – Oversight body for all aspects of congregational life, including responsibilities for setting and overseeing congregational budget.

Alpha Phi Omega (National, Co-educational Service Fraternity)

7/2007 – 7/2020 **Member of National Leadership Development Training Staff**
Train new presenters for leadership development courses.

12/2002 – 7/2020 **Member of National Leadership Development Staff**
Present leadership development workshops to members of the Fraternity.

11/2013 – 12/2016 **APO LEADS Revisions Coordinator**
Responsible for overseeing the revisions to the five APO LEADS national leadership development courses. This includes personal responsibility for revising two of the courses.

7/2006 – 2/2009 **Explore Coordinator**
Organized the presentations of Explore leadership development courses nationwide.

External Grants and Awards

9/2022 – 5/2023 **NIST Measurement, Science, and Engineering Research Grant**
PI, Cooperative Agreement 70NANB22H143, Award Amount: $57,603
Developing a THz s-SNOM Spectrometer for Nanoscale Device Characterization
Funded sabbatical project to design and build a THz scattering-type scanning near-field optical microscope at NIST. This instrument will be used to measure the electronic properties of semiconductor materials and devices on a tens of nanometer distance scale.

7/2016 – 6/2024 **NSF Robert Noyce Teacher Scholarship Program**
Co-PI, DUE-1660640, Award Amount: $1,449,086
Recruiting, Preparing and Retaining Excellent STEM Teachers
Collaborative project with Frederick County Public Schools and Frederick Community College to provide scholarships and additional training for students interested in teaching in STEM disciplines at the secondary level.

1/2015 – 12/2018 **NSF Improving Undergraduate STEM Education Research Grant**
PI, DUE-1431522, Award Amount: $330,975
Expanding Instrumentation Access at Multiple Institutions Using Portable IR, Raman, and XRF Spectrometers
Collaborative grant with Frederick Community College and Mount Saint Mary's University. Purchase portable IR, Raman, and XRF spectrometers to be shared between the three institutions. The instruments will be used to develop demonstrations, experiments, and research experience for the undergraduate curriculum at all three sites.

7/2013 – 7/2016 **NIST Measurement, Science, and Engineering Research Grant**
PI, Cooperative Agreement 60NANB13D143, Award Amount: $83,010
Ultraviolet/Visible Pump, Time-Resolved Infrared Probe Spectroscopy of [FeFe]-Hydrogenase Model Compounds
Continued work with undergraduate students on [FeFe]-hydrogenase model compounds, extending the work to include additional trimethylphosphine derivatives.

8/2012 – 8/2013 **NIST Measurement, Science, and Engineering Research Grant**
PI, Cooperative Agreement 60NANB12D272, Award Amount: $5,000
Ultrafast Vibrational Spectroscopy of Bio-Mimetic Catalysts for Hydrogen Production
Continued work with undergraduate students on [FeFe]-hydrogenase model compounds, extending the work to include trimethylphosphine derivatives.

7/2009 – 6/2012 **NIST Measurement, Science, and Engineering Research Grant**
PI, Cooperative Agreement 70NANB9H9125, Award Amount: $35,000
Time-Resolved Vibrational Spectroscopy of Bio-Mimetic Catalysts for Hydrogen Production
Extended previous work with undergraduates on [FeFe]-hydrogenase model compounds to include additional compounds and wavelength regions.

2/2007 – 1/2010 **NSF-Course, Curriculum, and Laboratory Improvement Program**
PI, DUE-0632829, Award Amount: $150,000
Introduction of Raman Spectroscopy to the Undergraduate Curriculum
Purchased a Raman spectrometer and implemented experiments using this instrument in courses from General Chemistry to Physical Chemistry. Experiments build off of each other and increase in depth and complexity through the program.

7/2007 – 6/2009 **NIST Measurement, Science, and Engineering Research Grant**
PI, Cooperative Agreement 70NANB7H6135, Award Amount: $22,000
Time-Resolved Vibrational Spectroscopy of Bio-Mimetic Catalysts for Hydrogen Production
Worked with undergraduate students to study model compounds of [FeFe]-hydrogenases using IR, Raman, THz, and ultrafast UV- or visible-pump, IR-probe techniques.

Peer Reviewed Publications (undergraduate co-authors underlined)

(1) Stromberg, C. J. Heavy Metal Concentrations in Soils: A CURE Experience for Sophomore Chemistry Majors. In *CUREs across the Chemistry Disciplines: Engaging Undergraduates in Research-Based Learning*, Stone, K. L., Shaner, S. E., Silverberg, L. J., Gourley, B. L. Eds.; Vol. 1530; American Chemical Society, 2026; pp 177-200. DOI: 10.1021/bk-2026-1530.ch009.

(2) Stromberg, C. J. Using 3D Printing to Enhance Student Learning in Inorganic Chemistry. In *3D Printing for Chemical Education: Tools for Active Learning*, Porter, J. L. A., Klosterman, J. K. Eds.; Vol. 1526; American Chemical Society, 2026; pp 147-175. DOI: 10.1021/bk-2026-1526.ch006.

(3) Stromberg, C. J.; Heilweil, E. J. Practical considerations for the amplification of electro-optically detected THz signals. *J. Opt. Soc. Am. B* **2024**, *41* (10), 2350-2357. DOI: 10.1364/JOSAB.535012.

(4) Meyers, A.; Heilweil, E. J.; Stromberg, C. J. Photodynamics of Asymmetric Di-Iron-Cyano Hydrogenases Examined by Time-Resolved Mid-Infrared Spectroscopy. *The Journal of Physical Chemistry A* **2021**, *125* (7), 1413-1423. DOI: 10.1021/acs.jpca.0c08921.

(5) Thornley, W.; Wirick, S. A.; Riedel-Topper, M.; DeYonker, N. J.; Bitterwolf, T. E.; Stromberg, C. J.; Heilweil, E. J. Photodynamics of [FeFe]-Hydrogenase Model Compounds with Bidentate Heterocyclic Ligands. *J. Phys. Chem. B* **2019**, *123* (33), 7137-7148. DOI: 10.1021/acs.jpcb.9b04675.

(6) Riedel-Topper, M.; Wirick, S.; Hadler, J. A.; Alberding, B. G.; Stromberg, C.; Heilweil, E. J. Femtosecond laser eyewear protection: Measurements and precautions for amplified high power applications. *Journal of Laser Applications* **2018**, *30* (4), 042003. DOI: 10.2351/1.5041760.

(7) Stromberg, C. J.; Ellis, D.; Wood, P. A. D.; Bennett, K. H.; Patterson, G. E.; Bradley, C. Using Strategic Collaborations To Expand Instrumentation Access at Two-Year Colleges. In *Strategies Promoting Success of Two-Year College Students*, ACS Symposium Series, Vol. 1280; American Chemical Society, 2018; pp 59-79. DOI: 10.1021/bk-2018-1280.ch004.

(8) Stromberg, C. J.; Heilweil, E. J. Ultrafast Photodynamics of Cyano-Functionalized [FeFe] Hydrogenase Model Compounds. *J. Phys. Chem. A* **2018**, *122* (16), 4023-4030. DOI: 10.1021/acs.jpca.8b00661.
(9) Meyer, R. L.; Zhandosova, A. D.; Biser, T. M.; Heilweil, E. J.; Stromberg, C. J. Photochemical dynamics of a trimethyl-phosphine derivatized [FeFe]-hydrogenase model compound. *Chemical Physics* **2018**, *512*, 135-145. DOI: https://doi.org/10.1016/j.chemphys.2017.12.014.
(10) Stromberg, C. J.; Hadler, J. A.; Alberding, B. G.; Heilweil, E. J. Ultrafast laser eyewear protection: Measurements and precautions. *Journal of Laser Applications* **2017**, *29* (4), 042003. DOI: 10.2351/1.5004090.
(11) Johnson, M.; Thuman, J.; Letterman, R. G.; Stromberg, C. J.; Webster, C. E.; Heilweil, E. J. Time-Resolved Infrared Studies of a Trimethylphosphine Model Derivative of [FeFe]-Hydrogenase. *J. Phys. Chem. B* **2013**, *117* (49), 15792-15803. DOI: 10.1021/jp4067873.
(12) Bingaman, J. L.; Kohnhorst, C. L.; Van Meter, G. A.; McElroy, B. A.; Rakowski, E. A.; Caplins, B. W.; Gutowski, T. A.; Stromberg, C. J.; Webster, C. E.; Heilweil, E. J. Time-Resolved Vibrational Spectroscopy of [FeFe]-Hydrogenase Model Compounds. *J. Phys. Chem. A* **2012**, *116* (27), 7261-7271. DOI: 10.1021/jp2121774.
(13) Borgsmiller, K. L.; O'Connell, D. J.; Klauenberg, K. M.; Wilson, P. M.; Stromberg, C. J. Infrared and Raman Spectroscopy: A Discovery-Based Activity for the General Chemistry Curriculum. *J. Chem. Educ.* **2012**, *89* (3), 365-369. DOI: 10.1021/ed2002835.
(14) Stromberg, C. J.; Kohnhorst, C. L.; Van Meter, G. A.; Rakowski, E. A.; Caplins, B. C.; Gutowski, T. A.; Mehalko, J. L.; Heilweil, E. J. Terahertz, infrared and Raman vibrational assignments of [FeFe]-hydrogenase model compounds. *Vib. Spectrosc.* **2011**, *56* (2), 219-227. DOI: 10.1016/j.vibspec.2011.02.012.
(15) Asbury, J. B.; Steinel, T.; Stromberg, C.; Corcelli, S. A.; Lawrence, C. P.; Skinner, J. L.; Fayer, M. D. Water Dynamics: Vibrational Echo Correlation Spectroscopy and Comparison to Molecular Dynamics Simulations. *J. Phys. Chem. A* **2004**, *108* (7), 1107-1119.
(16) Asbury, J. B.; Steinel, T.; Stromberg, C.; Gaffney, K. J.; Piletic, I. R.; Fayer, M. D. Hydrogen bond breaking probed with multidimensional stimulated vibrational echo correlation spectroscopy. *J. Chem. Phys.* **2003**, *119* (24), 12981-12997.
(17) Asbury, J. B.; Steinel, T.; Stromberg, C.; Gaffney, K. J.; Piletic, I. R.; Goun, A.; Fayer, M. D. Hydrogen Bond Dynamics Probed with Ultrafast Infrared Heterodyne-Detected Multidimensional Vibrational Stimulated Echoes. *Phys. Rev. Lett.* **2003**, *91* (23), 237402.
(18) Asbury, J. B.; Steinel, T.; Stromberg, C.; Gaffney, K. J.; Piletic, I. R.; Goun, A.; Fayer, M. D. Ultrafast heterodyne detected infrared multidimensional vibrational stimulated echo studies of hydrogen bond dynamics. *Chem. Phys. Lett.* **2003**, *374* (3-4), 362-371.
(19) Levinger, N. E.; Davis, P. H.; Behera, P. K.; Myers, D. J.; Stromberg, C.; Fayer, M. D. Isomerization and intermolecular solute--solvent interactions of ethyl isocyanate: Ultrafast infrared vibrational echoes and linear vibrational spectroscopy. *J. Chem. Phys.* **2003**, *118* (3), 1312-1326.
(20) Stromberg, C.; Myers, D. J.; Fayer, M. D. Vibrational dynamics of large hot molecules in the collisionless gas phase. *J. Chem. Phys.* **2002**, *116* (9), 3540-3553.
(21) Myers, D. J.; Shigeiwa, M.; Stromberg, C.; Fayer, M. D.; Cherayil, B. J. Temperature dependence of solute vibrational relaxation in supercritical fluids: experiment and theory. *Chem. Phys. Lett.* **2000**, *325*, 619-626.

Professional Affiliations

American Chemical Society
American Association for the Advancement of Science
Council on Undergraduate Research
Phi Kappa Phi
Phi Beta Kappa