

# Dickinson

**Cindy Samet, PH.D.**  
**PROFESSOR OF CHEMISTRY**

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## EDUCATION

**B.S.** - Chemistry, magna cum laude - 1982 Dickinson College, Carlisle, PA

**Ph.D.** - Physical Chemistry – 1988 University of Virginia, Charlottesville, VA  
(thesis: Matrix-Isolation Magnetic Circular Dichroism Studies of Alkali Metals,  
Cyclooctatetraene Anions, and Lithium-Benzene Complexes; advisor - P.N. Schatz)

## EMPLOYMENT HISTORY

1988 - 1994 Assistant Professor of Chemistry, Dickinson College  
1994 - 2009 Associate Professor of Chemistry, Dickinson College  
(tenured in May 1994)  
2009 - **Full Professor** of Chemistry, Dickinson College

## PROFESSIONAL ORGANIZATIONS

American Chemical Society (member since 1988)  
including Physical Chemistry and Chemical Education Division

## HONORS

Faculty member of Wheel and Chain (initiated Spring 1991)  
Honorary member-Alpha Lambda Delta (initiated Fall 1992)  
Dickinson College Phi Beta Kappa chapter  
Honorary member – Gamma Sigma Epsilon, Chemistry Honor Society (initiated Spring 2005)  
Seniors of Old Bellaire – 25 years of service to the college (initiated September 19, 2013)

## PUBLICATIONS

### ***From my Dickinson College Research Laboratory:***

*(student coauthor graduation year in parenthesis; all publications are peer-reviewed and published in journals of the American Chemical Society. I am the primary author on all papers and coauthors are Dickinson College students)*

“Polymer Soft-Landing Isolation of Acetylene on Polystyrene and Poly(vinylpyridine): A Novel Approach to Probing Hydrogen Bonding in Polymers”, Yike Li (14) and Cindy Samet, *J. Phys. Chem. B*, Vol. 119, No. 37, **2015**, 12336-12344.

“Matrix and Polymer Soft-Landing Isolation of Selected Acids with Pyridine and Poly(4-vinylpyridine): A Comparative Infrared Spectroscopic Study of Hydrogen Bonding”, Alejo M. Lifschitz (10), Jeffrey M. Rodgers (10), and Cindy Samet, *J. Phys. Chem. B*, Vol. 116, No. 1, **2012**, 211-220.

“Matrix Isolation Infrared Spectroscopic and Density Functional Theory Study of the 1:1 Complexes of Bromocyclohexane with NH<sub>3</sub>: Evidence for a Weak C-H---N Hydrogen Bond”, K. Hess (08) and C. Samet, *Spectroscopy Letters*, Vol. 41, No. 4, **2008**, 179-188.

“Pentachlorocyclopropane/Base Complexes: Matrix Isolation Infrared Spectroscopic and Density Functional Study of C-H---N Hydrogen Bonds”, A. B. Baker (04), C. Samet, J. T. Lyon, and L. Andrews, *J. Phys. Chem. A*, Vol. 109, No. 37, **2005**, 8280-8289.

“Matrix Isolation Infrared and ab Initio Study of the 1:1 Complexes of Cyclopentadiene with Nitrogen and Oxygen Bases: C-H---N(O) Hydrogen Bonding Involving an sp<sup>3</sup> Hybridized Carbon”, C. Samet, M. A. Hilfiker (95), E. R. Mysak (01), and A. Maynard, *J. Phys. Chem. A*, Vol. 105, No. 13, **2001**, 3087-3095.

“Matrix Isolation Infrared and ab Initio Study of the 1:1 Complexes of Bromocyclopropane with NH<sub>3</sub> and (CH<sub>3</sub>)<sub>3</sub>N : Evidence for a Novel C-H---N Hydrogen Bond”, C. Samet, B.L. Bedell (98), L. Goldfarb (91), E. R. Mysak (01), and A. Maynard, *J. Phys. Chem. A*, Vol. 103, No. 23, **1999**, 4572-4579.

### ***From Collaborative Research:***

“Analysis of the Jahn-Teller Effect in Matrix Isolated Cyclooctatetraene Mononegative Ion Using Magnetic Circular Dichroism Spectroscopy”, C. Samet, Janna L. Rose, Susan B. Piepho, Joseph Laurito, Lester Andrews, P. N. Schatz, *J. Am. Chem. Soc.*, Vol. 116, No. 24, **1994**, 11109-11119.

“Magnetic Circular Dichroism and the Jahn-Teller Effect in the Potassium Atom "Blue Triplet" in Krypton and Xenon Matrices”, C. Samet, J.L. Rose, P.N. Schatz, and M.C.M. O'Brien, *Chem. Phys. Lett.*, Vol. 159, No. 5,6, **1989**, 567-572.

“Magnetic Circular Dichroism and the Jahn-Teller Effect in the  $^2S \rightarrow ^2P$  Transition of Potassium Atoms Isolated in Xenon Matrices”, C. Samet, J.L. Rose, B.E. Williamson, P.N. Schatz, *Chem. Phys. Lett.* Vol. 142, No. 6, **1987**, 557-561.

***Pedagogical Publications (all peer-reviewed and published in ACS journals)***

“Fruit and Vegetable Peels as Efficient Renewable Adsorbents for Removal of Pollutants from Water: A Research Experience for General Chemistry Students”, Cindy Samet and Suresh Valiyaveetil, *J. Chem. Educ.*, **2018**, 95, 1354-1358.

“Using Student-made Posters to Annotate a Laser Teaching Laboratory”, Cindy Samet, *J. Chem. Educ.*, 93, **2016**, 975-977.

“A Capstone Course in Nanotechnology for Chemistry Majors”, C. Samet, *J. Nano. Educ.*, 1, **2008**, 1-7.

“Napoleon’s Buttons: Teaching the Role of Chemistry in History”, Cindy Samet and Pamela J. Higgins, *J. Chem. Educ.*, 82, **2005**, 1496-1500.

“Determination of the Regiochemistry of Di-substituted Arenes Generated By Addition of a Carbanion to the ( $\eta^6$ -anisole)Cr(CO)<sub>3</sub> Complex”, A. Bengali, C. Samet, and S. Charlton (01), *J. Chem. Educ.*, 78, **2001**, 68-70.

“CACHe Molecular Modeling: A Visualization Tool Early in the Undergraduate Chemistry Curriculum”, R. David Crouch, Michael S. Holden, and Cindy Samet, *J. Chem. Educ.*, 73, **1996**, 916-917.

“Don’t STOP with Benzene: The Educational Value of the C<sub>8</sub>H<sub>8</sub> Molecule”, C. Samet, *J. Chem. Educ.*, 70, **1993**, 291-293.

**REPRESENTATIVE PRESENTATIONS**

***“What’s in a Number: Understanding Thyroid Disease and Becoming Your Own Health Advocate,”*** Dickinson College Wellness Program, Lunch and Learn Seminar, September 2016.

***“What’s in a Number: The Science of Being Your Own Health Advocate,”*** Rush Hour Seminar at Dickinson College, March 2015.

***“It’s Alive! (and well): Student-Faculty Research at Dickinson College,”*** presented on Alumni Weekend, June 11 2011, to the Class of 1956.

***“Remarks about Rector”*** - on behalf of the science faculty – Speech presented at the May 2, 2008 Trustee and Donor Dinner, Dickinson College.

***“Kinky Chemistry: How Cisplatin Works”***, presented to Chemistry 111 (Topics in Chemistry) and a small group of cancer survivors and family members, Dickinson College, April 2008.

***“Velcro, Post-it-Notes, and Gecko Glue: Understanding the Hydrogen Bond”***, presented as part of the Chemistry Department’s seminar series, April 2006.

***“From Velcro to Post-it-Notes (and Gecko Glue?!): Understanding the Hydrogen Bond”***, presented at the 18<sup>th</sup> Annual Science Dinner, Dickinson College, April 2003.

***“Learning by Doing: Thinking Like a Scientist”***, presented with Nancy Baxter at the public launch of the Campaign for Dickinson, May 6, 1994.

## DICKINSON COLLEGE RESEARCH GRANTS

### Internal Grants Received (Past Ten Years):

- Sabbatical Supplement Grant – for 2005-2006 sabbatical leave, awarded November 2004.
- In-house grants to support summer student-faculty research (summary):  
Summers 2007, 2009, 2013 – R&D
- Cottrell College Science Grant (Research Corporation) - titled “ Infrared Characterization of Matrix-isolated Hydrocarbon-ammonia Complexes”, awarded May 1990 - two year grant – principal investigator with one student researcher for summers 1991 and 1992 (supplemented with Knight Grant for student room and board).
- National Science Foundation -Instruments for Lab Improvement (ILI) Grant - titled “Integration of Molecular Modeling into the Chemistry Curriculum”, awarded April 1994.  
Co-PI at time of award, took over as PI August 1995.
- National Science Foundation - Research at Undergraduate Institutions (RUI) Grant – titled “Infrared Matrix Isolation Studies of Cyclic Hydrocarbons with Nitrogen and Oxygen Bases” (awarded \$89,764 in April 1995- for instrumentation and faculty/student stipends - 3 year grant)
- National Science Foundation - Research at Undergraduate Institutions (RUI) Grant **renewal** - titled “Infrared Matrix Isolation Studies of Cyclic Hydrocarbons with Nitrogen and Oxygen Bases, II” (awarded \$91,400 in June 2001 - for instrumentation and faculty/student stipends - 3 year grant)
- Beckman Scholars Foundation – 2003 Beckman Scholars Program Institutional Award, First time for Dickinson College - \$70, 400, for a total of 4 Beckman Scholars during a 3-year grant period.

- National Science Foundation – Division of Materials Research, Nanotechnology in Undergraduate Education Program - \$100,000 to integrate nanotechnology into the undergraduate curriculum. (co-PI with David Crouch, PI)

## COURSES ROUTINELY TAUGHT

- **Chem 131-132 (or 141):** General Chemistry with Lab - introductory chemistry for science majors
- **Chem 341: Quantum Chemistry and Spectroscopy** - physical chemistry: quantum mechanics, spectroscopy
- **Chem 347: Inorganic Chemistry with Lab** – a capstone, writing intensive course for chemistry majors
- **Chem 490: Special topics** - group theory, molecular symmetry and spectroscopy, lasers

## NEW COURSES DEVELOPED

- Chemistry 141: “Accelerated General Chemistry with Laboratory – offered Fall 2016 for the first time. See Dickinson College story at [www.dickinson.edu/news/article/2405/fruitful\\_research](http://www.dickinson.edu/news/article/2405/fruitful_research)
- Chemistry 490: “Spectroscopy Across Chemical Disciplines”, offered Spring 2011 – prerequisite Chemistry 341.
- Chemistry 490: “Modern Spectroscopy with Applications to Biological Systems” - first offering Spring 2003 - prerequisite Chem 242 (a new course for chemistry, biochemistry and molecular biology, biology, and pre-health students)
- Nonmajors Chemistry - Developed several new case studies for this course, and a course focused on the book “Napoleon’s Buttons: How 17 Molecules Changed History.” (from 2003 to present, see publication list.)
- Chemistry 352 – Integrated Laboratory – Spring 2007 offered a course based on nanotechnology, see publication list.
- Chemistry 141 – Foundations of Chemistry or “BenchChem”, a workshop approach, from 1993 to present.
- Freshman Seminars: Fall 1991, 1992 – “Natural Obsessions: Acquiring Knowledge and Searching for Truth” (explored ways of knowing, especially in the sciences); Fall 1995 – “Mountain Voices” (explored music of the Appalachian South, team-taught with Mike Holden); Fall 2009 – “Mind Meets Matter” (exploring matter across the disciplines).

## **SPECIAL TEACHING EXPERIENCE**

- Taught in the Dickinson College **FOCUS** program (chemistry component), summers of 1994-1997.
- Taught a chemistry laboratory course for local home-schooled students at Dickinson College, January 2006.

## ***Current Scholarly Activities***

### Chemical Research:

Matrix-isolation Fourier-Transform Infrared Studies of Hydrogen-bonding (at Dickinson, with students)

- Pioneering a new technique called *Polymer Soft-Landing Isolation* (2 publications thus far), which merges my hydrogen bonding research with the field of self-assembly, thus bringing my research in the area of nanotechnology.
- Thyroid Research
- Vitamin B12 Research
- Celiac Disease and Gluten Intolerance Research

### Chemical Education/Pedagogy:

- Incorporation of nanotechnology into the chemistry curriculum
- Development of an educational Laser Laboratory in Rector Science Center and use of lasers throughout the chemistry curriculum

## **Service**

### Professional Activities:

- Review manuscripts for 3 chemistry journals (*Journal of Physical Chemistry*, *Journal of Chemical Education*, *Journal of Nano Education*)
- Review grant proposals for National Science Foundation, Research Corporation, and Petroleum Research Fund.
- Review books upon request (most recent – “*Chemistry in Your Life*”, Colin Baird, W.H. Freeman, NY: 2006.)
- Member of the Board of Reviewers for a new journal titled “*Thyroid Science*”
- Tenure reviews at other institutions (most recent, Dr. Jay Amicangelo, Pennsylvania State University, The Behrend College, promotion to tenure, September 2007)
- Participation in the NSF ADVANCE Summit on the Advancement of Senior Women at Liberal Arts Colleges (began June 2-4, 2010, Washington DC at the Summit meeting)

## Campus Committees/Activities/Organizations:

### past:

- Research and Development Committee (3 years, 1989-1992)
- Science Executive Committee (2 years, 1988-1990)
- Judicial Pool (3 years, 1991-1994)
- Scholarship Committee (2 years, 1992-1994, incl. chair)
- Student Evaluation Reform Group (Fall 1994)
- Admissions liaison - Chemistry dept. (1993-1996)
- Admissions Division III Coordinator (academic year 1997-1998)
- Academic Program Committee (1998-1999)
- Science Executive Committee (Fall 2000-Spring 2003)
- **Department Chair** (Fall 2000 - Spring 2003)
- Planning Committee - Life Sciences Building (Fall 2000 – Spring 2002)
- Enrollment Management and Student Life (formerly Enrollment Management) –Fall 2001-Spring 2004, **Chair** AY 2001-2002
- Administrator for college's Beckman Scholars Foundation grant, awarded February 2003, 2003-2006
- Chemistry Club, faculty adviser (and ACS student affiliates)
- Clarke Forum Steering Committee (Fall 2008-Spring 2010)
- All College Committee on Instructional Technology (Fall 2009-Spring 2011, **Chair** AY 2010- 2011)
- Search Committee for the Science Librarian/Liaison position, Spring 2011.
- **Department Chair** (January 2012 – May 2014)
- Academic Program and Standards Committee (Fall 2014-Spring 2017, **Chair** AY 2015-2016.

### current:

- Wellness Advisory Group (F2017- )

## Miscellaneous Activities/Community Service:

- **FOCUS** Program Director - for FOCUS group beginning summer 1995 (i.e. 1995-1997)
- **Science Brochure** - wrote and designed a new version of Dickinson's science brochure titled "Sciences", Feb. 2002.
- Admissions Open House programs (coordinate faculty-student poster session and speak at science information session.
- NSF – was invited to contribute a "research nugget" summarizing current research findings for the purpose of identifying hot areas and conveying them to the public. Dickinson is the only liberal arts college listed in over 50 nuggets.

- Outreach to local elementary schools - chemistry demonstrations and activities for 4<sup>th</sup> to 6<sup>th</sup> graders.
- Thyroid disorder consultations (informal, on a personal basis)

**SUMMARY OF COLLABORATIVE PROJECTS – 1988 TO PRESENT (summers only)**

<b>Summer year</b>	<b>Student(s)</b>	<b>Funding source(s)</b>	<b>Outcome</b>
1989	Leah Goldfarb Denise Raab Christine Hannon	Whitaker Foundation Whitaker Foundation Dana Foundation	Publication (lab set-up)
1990	Leah Gold farb	Whitaker Foundation	Departmental Honors (May 1991)
1991	Kimberly Anderman	Research Corporation	
1992	Christopher Gentchos	Research Corporation	
1993	Mark Hilfiker	Knight Foundation	
1994	Mark Hilfiker	Dana Internship Program	
1995	(none)	NSF-RUI (year 1/3)	Lab set-up
1996	Brooke Bedell	NSF-RUI (year 2/3)	Publication
1998	Erin Mysak	NSF-RUI (year 3/3)	Publication
1999	Erin Mysak	Whitaker Foundation	
2000	(none) sabbatical summer		Publication NSF-RUI grant renewal
2002	Alex Baker	NSF-RUI (year 1/3)	
2003	Alex Baker	NSF-RUI (year 2/3) *see note below	>500 gallons of water in lab.
2004	Alex Baker	NSF-RUI (year 3/3)	NSF-RUI grant renewal
2007	Kyle Hess	R&D	Publication
2009 summer and AY 2009-2010	Jeff Rodgers	R&D	Jeff awarded honors!
AY 2012-2013 Summer 2013	Yike (Echo) Li	R&D	Publication



AY 2016-2017	Christin Cudahy		
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**Total number of summers of student faculty research = 17, with 9 summers supported by outside funding (60%) and 8 summers supported by in-house funds.**

\*ALSO SEE SUMMARY TABLE OF SUMMER RESEARCH AT END OF DOCUMENT

### **Student Research Collaborators**

\*= co-author of peer-reviewed publication † = presenter at a regional or national meeting. Number of years student worked in lab is given in parenthesis.

(8 out of 11 total student investigators, or 73%, are co-authors. 6 out of 8 worked in my lab for at least two years.)

Leah Goldfarb '91 (2)\* †

Kimberly Anderman '92

Christopher Gentchos '94

Mark Hilfiker '95 (2)\* †

Jeffrey Rodgers '10 (1.5)-graduated  
with honors in chemistry\*

Booke Bedell '98 (2) \*

Erin Mysak '01 (2) \* †

Alexander Baker '04 (3) \*

Kyle Hess '08 \*

Alejo Lifschitz '10 (1)\*

Yike (Echo) Li '14 (2)\*

Christin Cudahy '17