

David J. Aurentz
Curriculum Vitae

Penn State Berks College
Division of Science
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Education

The Pennsylvania State University (1993-1998), Ph.D., Physical Chemistry
Thesis Title: *Application of High-Resolution Solid-State NMR to Complex Materials
and the Analysis of Dipolar Time-Domain Signals by New Transform Methods*
Research advisor: Professor Karl T. Mueller

Ursinus College (1987-1991), B.S. chemistry, ACS accredited; minor in physics
Independent research involved the development of a vacuum ultraviolet photoionization
source for time-of-flight mass spectrometry.

Continuing Education

Alvernia College (2004), Reading, PA
Course: Foundations of Education

Professional Experience

- 2005 to present **Penn State Berks College**, Reading, PA
Assistant Professor of Chemistry, Division of Science
- Teaching undergraduate chemistry curriculum
 - Research discipline: spectroscopy including NMR and FTIR
 - Serving Berks College as an academic advisor, research technician supervisor, member of the Berks Faculty Senate, and member of Division of Science governing committees
- 1998-2005 **Air Products and Chemicals, Inc.**, Allentown, PA
Senior Research Chemist in Corporate Analytical Technology Center
- Interpretation of solid- and liquid-state NMR spectra
 - Development of NMR based approaches to the study of microporous catalytic adsorbents, polymer systems and advanced materials
 - Implementation of new NMR experimental methodologies
 - Responsible for collaboration of NMR and FTIR analyses
 - Chair of Analytical Chemistry Roundtable seminar series
 - Team leader of Journal Subscription Review committee
 - Member of a research committee for Chemical Characterization group
 - Responsible for growing and managing relationships with universities and equipment vendors
 - Interaction with a broad range of R&D platforms

Professional Experience continued

- 1994-1996 **The Pennsylvania State University**, State College, PA
Supervisor of general chemistry laboratories and Teaching Assistants
- Orchestrated Teaching Assistant training and management
 - Created all testing material for laboratory course
 - Worked with Professor Joseph Keiser to help implement Chemtrek (small scale approach) in the general chemistry laboratories
- 1993-1994 **The Pennsylvania State University**, State College, PA
Teaching Assistant, general chemistry laboratory
- Instructed multiple 30 student sections of general chemistry laboratories using Chemtrek lab manual small scale approach
- 1992-1993 **Wengert's Dairy**, Lebanon, PA
Quality Control Specialist
- Responsible for both product and sanitation quality
- 1991-1992 **United Technical Associates**, Camp Hill, PA
Bench Chemist
- Analyzed ground and water samples in wet chemistry laboratory

Awards and Fellowships

- Travel Stipend Award for 39th Experimental NMR Conference, 1998
Dan Waugh Memorial Teaching Award, Penn State University, 1994
Undergraduate Summer Research Fellowship, Lehigh University, Department of Chemistry,
Conducted an IR study of the 14 microm band of acetylene in collaboration with the
Laboratory for Extraterrestrial Physics at NASA, Advisors: Prof. Roland W. Lovejoy and
Dr. John J. Hillman, 1990

Professional Affiliations

- American Chemical Society (ACS), 1991-present
Materials Research Society (MRS), 2005-present
Collegiate Magnetic Resonance Consortium (CMRC), member of organizing/steering
committee, 2007-present
The CMRC is a national group motivated to strengthen research in NMR spectroscopy at
primarily undergraduate institutions.
Association of Managers in Magnetic Resonance Laboratories (AMMRL), 2003-present

Pending Research Support

- “IGERT: Cyber-enabled Learning and Innovation in Chemistry (CLIC)” Full Proposal,
National Science Foundation Graduate Education - Integrative Graduate Education and
Research Traineeship, 7/1/2010 – 6/30/2015, \$3,093,806, (K.T. Mueller, PI; B.J. Garrison,
C.L. Giles, J.D. Kubicki, P. Mitra, co-PIs; S. Adair, D.J. Aurentz, S.L. Brantley, C.J. Duffy,
D. Lee, P. Raghavan, B.K. Smith, J.O. Sofo, A.M. Thompson, and J.Z. Wang, Investigators
or Associates).

Past Research Support

1. "Rapid Detection and Characterization of *Bacillus Subtilis* Spores and Filamentous Food-Borne Fungi by Fourier Transform Infrared Spectroscopy" Faculty Project Fund, Penn State Berks College, 10/01/2008 – 6/31/2009, \$1,309
2. "Deuterium NMR of $^2\text{H}_2\text{O}$ -Hydrated Zeolite Y Materials", Research Development Grant, Penn State Berks College, Division of Science, 7/01/2008 – 6/30/2009, \$3,000
3. " ^{27}Al NMR Quadrupolar Coupling Parameters on Model Zeolites." Research Development Grant, Penn State Berks College, Division of Science, 7/01/2006 – 6/30/2007, \$2,000
4. "Broadening Interdisciplinary Undergraduate Science through Acquisition of a Moderate Field NMR: Adapting and Implementing Previously Developed Activities." National Science Foundation, Course, Curriculum, and Laboratory Improvement, 8/1/2003 – 7/31/2007, \$134,400 (D.J. Aurentz, PI; T.L. Avila, R.C. Forrey, M.A. Fidanza, co-PIs).

Peer-Reviewed Publications (^S indicates undergraduate student coauthor)

1. K. T. Mueller, T.P. Jarvie, D. J. Aurentz, and B. W. Roberts, "The REDOR Transform: Direct Calculation of Internuclear Couplings from Dipolar-Dephasing NMR Data", *Chemical Physics Letters*, **1995**, 242, 535-542.
2. K. T. Mueller, T.P. Jarvie, D. J. Aurentz, and B. W. Roberts, Erratum and Comment on "The REDOR Transform: Direct Calculation of Internuclear Couplings from Dipolar-Dephasing NMR Data", *Chemical Physics Letters*, **1996**, 254, 281-282.
3. A. N. Parikh, M. A. Schivley, E. Koo, K. Seshadri, D. J. Aurentz, K. T. Mueller, D. L. Allara, "*n*-alkylsiloxanes: From Single Monolayer to Layered Crystals. The Formation of Crystalline Polymers from the Hydrolysis of *n*-Octadecyltrichlorosilane", *Journal of the American Chemical Society*, **1997**, 119, 3135-3143.
4. L. C. Brousseau, III, D. J. Aurentz, A. J. Benesi, T. E. Mallouk, "Molecular Design of Intercalation-Based Sensors. 2. Sensing of Carbon Dioxide in Functionalized Thin Films of Copper Octanediylbis(phosphate)", *Analytical Chemistry*, **1997**, 69, 688-694.
5. F. G. Vogt, D. J. Aurentz, and K. T. Mueller, "Determination of Internuclear Distances from Solid-State Nuclear Magnetic Resonance: Dipolar Transforms and Regularization Methods", *Molecular Physics, Special Issue: Richard R. Ernst to Celebrate his Sixty-fifth Birthday*, **1998**, 95, 907-919.
6. D. J. Aurentz, F. G. Vogt, K. T. Mueller, A. J. Benesi, "Multiple-Rotor-Cycle QPASS Pulse Sequences: Separation of Quadrupolar Spinning Sidebands with an Application to ^{139}La NMR", *Journal of Magnetic Resonance*, **1999**, 138, 320-325.
7. F. G. Vogt, J. M. Gibson, D. J. Aurentz, K. T. Mueller, A. J. Benesi, "Multiple-Rotor-Cycle 2D PASS Experiments with Applications to ^{209}Pb NMR Spectroscopy", *Journal of Magnetic Resonance*, **2000**, 143, 153-160.
8. Frank Rittig, David J. Aurentz, Charles G. Coe, Ronald J. Kitzhoffer and John M. Zielinski, "Pure and Mixed Gas Sorption Measurements on Zeolitic Adsorbents via Gas-Phase NMR", *Industry and Engineering Chemistry Research*, **2002**, 41, 4430-4434.
9. Tami H. Mysliwicz, Anthony F. Tierno^S, and David J. Aurentz, "Characterization of *Bacillus subtilis* sporulation and bacteriophage infection via FT-IR spectroscopy", *Spectroscopy*, **2009**, 23, 165-174.
10. David J. Aurentz, Anthony F. Tierno^S, and Kevin J. Sutovich, "Characterization of Aluminum in Cation-Exchanged NH_4NaY and USY Zeolites by ^{27}Al MAS NMR Spectroscopy", *Catalysis Letters*, **2009**, 132, 133-137.

Peer-Reviewed Publications continued

11. Stanley D. Furrow and David J. Aurentz, "Reactions of Iodomalonic Acid, Diiodomalonic Acid, and Other Organics in the Briggs-Rauscher Oscillating System", *Journal of Physical Chemistry A*, **2010**, 114, 2526-2533.
12. Michael A. Fidanza, David L. Sanford, David M. Beyer, and David J. Aurentz, "Analysis of Fresh Mushroom Compost", *HortTechnology*, **2010**, 20(2), 449-453.
13. Ivan A. Shibley Jr., Katie E. Amaral, David J. Aurentz, and Ronald J. McCaully, "Oxidation and reduction reactions in organic chemistry", *Journal of Chemical Education*, submitted 2009, accepted **2010**.
14. David J. Aurentz, Stefanie L. Kerns, and Lisa R. Shibley, "Broadening Awareness in Science Through the Use of State-of-the-Art Instrumentation in General Chemistry Laboratory", *Journal of College Science Teaching*, accepted **2010**.

Non-Peer-Reviewed Publications

1. S. A. Monie, D. J. Aurentz, and C. G. Pantano, "CP-MAS NMR and In-Situ FTIR Study of AlN Surface Reactivity", *Materials Research Society Symposium Proceedings*, **1996**, 410, 389-392.

Submitted Manuscripts (^S indicates undergraduate student coauthor)

1. Hassan Gourama, David J. Aurentz, Jason M. Wyse^S, and Gary L. Johnson, "Identification and Characterization of Food-borne Fungi by FTIR Spectroscopy", *Spectroscopy*, submitted **2010**.

Manuscripts in Preparation

1. David J. Aurentz, Rebecca L. Sanders, James D. Kubicki, and Karl T. Mueller, "Aluminum Speciation on Alumina and Clay Surfaces via Solid-State NMR Spectroscopy" to be submitted to *Langmuir* **2010**.
2. David J. Aurentz, Gary McGeorge, and Robert M. Wenslow, "Solid-State NMR for the Analysis of Polymorphic Pharmaceuticals", to be submitted to the *Encyclopedia of Analytical Chemistry* **2010**.

Presentations (^S indicates undergraduate student coauthor)

1. D. J. Aurentz, T. P. Jarvie, and K. T. Mueller, "Alternatives to Fourier Analysis in Solid-State NMR: the REDOR Transform", *American Chemical Society 30th Middle Atlantic Regional Meeting*, Villanova, Pennsylvania, 22 May 1996.
2. D. J. Aurentz, J. M. Gibson, M. D. Karra, F. G. Vogt, and K. T. Mueller, "Multiple Internuclear Couplings, Isotropic Transforms, and Pure Dipolar Spectra", *39th Rocky Mountain Conference on Analytical Chemistry*, Denver, Colorado, 3-7 August 1997.
3. D. J. Aurentz, J. M. Gibson, M. D. Karra, F. G. Vogt, and K. T. Mueller, "Multiple Internuclear Couplings, Isotropic Transforms, and Pure Dipolar Spectra", *36th Eastern Analytical Symposium*, Somerset, New Jersey, 16-21 November 1997.
4. D. J. Aurentz, F. G. Vogt, and K. T. Mueller, "New Methods for Extracting Dipolar Frequencies from Solid-State NMR Experiments", *39th Experimental Nuclear Magnetic Resonance Conference*, Asilomar, California, 22-27 March 1998.
5. F. G. Vogt, D. J. Aurentz, J. M. Gibson, K. T. Mueller, "Determination of Internuclear Distances from Solid-State NMR: Dipolar Transforms and Regularization Methods", *41th Rocky Mountain Conference on Analytical Chemistry*, Denver, Colorado, 1-5 August 1998.

Presentations continued

6. David J. Aurentz, Kevin J. Sutovich, and Anthony F. Tierno^S, "The Study of Quadrupolar Coupling Parameter Trends in Zeolites Using ²⁷Al NMR in Undergraduate Research", *Conference on Undergraduate Research and Education in Nuclear Magnetic Resonance*, Bucknell University, Lewisburg, Pennsylvania, 29 September 2007.
7. David J. Aurentz, Kevin J. Sutovich, and Anthony F. Tierno^S, "²⁷Al NMR Study of Quadrupolar Coupling parameters in Y Zeolites", *49th Experimental Nuclear Magnetic Resonance Conference*, Asilomar, California, 9-14 March 2008.
8. Anthony F. Tierno^S and David J. Aurentz, "²⁷Al NMR Analysis of Quadrupolar Coupling Parameters in Interactions of K, La, and Zn with Acidic Sites in Y and USY Zeolite Systems", *9th Annual Undergraduate Research & Creativity Conference*, Kutztown University, Kutztown, Pennsylvania, 26 April 2008.
9. David J. Aurentz, Stefanie L. Kerns, and Lisa R. Shibley, "Introduction of NMR Spectroscopy in General Chemistry Laboratory: Assessing the Effects of Instrumentation on Students", *236th American Chemical Society (ACS) National Meeting*, Philadelphia, Pennsylvania, 17-21 August 2008.
10. Anthony F. Tierno^S, Kevin J. Sutovich, and David J. Aurentz, "Patterns of Activity in Cation Exchanged Y and USY Zeolites Characterized by ²⁷Al MAS NMR Spectroscopy", *237th American Chemical Society (ACS) National Meeting*, Salt Lake City, Utah, 22-26 March 2009.
11. Anthony F. Tierno^S, Kevin J. Sutovich, and David J. Aurentz, "²⁷Al NMR Analysis of Quadrupolar Coupling Parameters in Interactions of K, La, and Zn with Acidic Sites in Y and USY Zeolite Systems", *The 10th Annual Undergraduate Research & Creativity Conference*, Reading Area Community College, Reading, Pennsylvania, 18 April 2009.
12. Jason M. Wyse^S, David J. Aurentz, Gary L. Johnson, and Hassan Gourama, "Characterization and Identification of Foodborne Fungi by FT-IR Spectroscopy", 109th General Meeting, *American Society for Microbiology*, Philadelphia, Pennsylvania, 17-21 May 2009.
13. Tami H. Mysliwiec, Anthony F. Tierno^S, D. J. Aurentz, "Cell Surface Changes in Wild-Type, Mutant, and Phage Infected *Bacillus subtilis* Cultures", 109th General Meeting, *American Society for Microbiology*, Philadelphia, Pennsylvania, 17-21 May 2009.
14. Hassan Gourama, David J. Aurentz, Jason M. Wyse^S, and Gary L. Johnson, "Characterization and Identification of Foodborne Fungi by FT-IR Spectroscopy", *International Society for Mycotoxicology Conference*, Tulln, Austria, 9-11 September 2009.
15. David J. Aurentz and Kevin J. Sutovich, "Characterization of cation-exchanged NH₄NaY and USY zeolites by ²⁷Al MAS NMR spectroscopy", *American Chemical Society 41st Middle Atlantic Regional Meeting*, Wilmington, Delaware, 10-13 April, 2010.

Supervision of Undergraduate Thesis

Honors Thesis Advisor, Schreyer Honors College of the Pennsylvania State University, Anthony F. Tierno, "Spectroscopic Analysis of Biological and Inorganic Systems: Characterization of Aluminum Cation-Exchanged NH₄NaY and USY Zeolites by ²⁷Al MAS NMR Spectroscopy, and Characterization of *Bacillus subtilis* Sporulation via FT-IR Spectroscopy", accepted spring 2009, supervised 2007-2009

Service to Berks College and Division of Science

Chair, Berks College Faculty Senate Physical Facilities and Safety Committee, 2006-2008
Chair, Search Committee for Research Technician III in chemistry and biology, 2009
Member, Science Division Colloquium Series Committee, 2007-present
Member, Search Committee for a tenure-track faculty in chemistry, 2006-2007
Member, Division of Science Safety Committee, 2005-present

Service to Profession

Reviewed Manuscripts for the following:

Journal of Pharmaceutical and Biomedical Analyses

The Chemical Educator

ACS Symposium Series Book, *Modern NMR in Undergraduate Education*

Participation in Workshops

Attendee, "National Science Foundation Undergraduate Funding Workshop," presented by Dr. Deborah Allen, Program Director NSF DUE, East Stroudsburg University of Pennsylvania, East Stroudsburg, Pennsylvania, 12 May 2010

Attendee, "Assesment at Penn State: Sharing and Creating Assessment Stories," Schreyer Institute for Teaching Excellence Assessment Conference, Penn State Berks, Reading, Pennsylvania, 11 May 2009

Participant, "Integrative Learning Workshop: Teaching Citizenship in Science Courses," presented by Matt Fisher, Carnegie Fellow, Penn State Berks, Reading, Pennsylvania, 18 October 2008

Participant, "Facilitating Student Learning, A Primer for Faculty Members" course taught by Dr. Ike Shibley, Penn State Berks, Reading, Pennsylvania, Spring semester 2006

List of Courses Taught at Penn State Berks College

<u>Course Number</u>	<u>Course Title</u>	<u>Enrollment</u>	<u>Semester</u>
Chem 12	Chemical Principles I	43	Fall 2005
Chem 14	Experimental Chemistry I	19	Fall 2005
Chem 14	Experimental Chemistry I	20	Fall 2005
Chem 36	Laboratory in Organic Chemistry	13	Spring 2006
Chem 389	Special Problems and Research	1	Spring 2006
PSU 005	First-Year Seminar	20	Fall 2006
Chem 11	Introductory Chemistry	52	Fall 2006
Chem 14	Experimental Chemistry I	15	Fall 2006
Chem 14	Experimental Chemistry I	15	Fall 2006
Chem 439	Structural Analysis of Organic Compounds	1	Fall 2006
Chem 11	Introductory Chemistry	31	Spring 2007
Chem 35	Fundamentals in Organic Chemistry II	7	Spring 2007
Chem 36	Laboratory in Organic Chemistry	14	Spring 2007
Chem 389	Special Problems and Research	2	Spring 2007
PSU 005	First-Year Seminar	21	Fall 2007
Chem 101	Introductory Chemistry	53	Fall 2007
Chem 111	Experimental Chemistry I	9	Fall 2007
Chem 494	Chemical Research	2	Fall 2007
Chem 203	Fundamentals in Organic Chemistry II	3	Spring 2008
Chem 213	Laboratory in Organic Chemistry	12	Spring 2008
Chem 430	Structural Analysis of Organic Compounds	4	Spring 2008
Chem 494	Chemical Research	2	Spring 2008
Chem 495	Internship	1	Spring 2008
PSU 005	First-Year Seminar	15	Fall 2008
Chem 101	Introductory Chemistry	57	Fall 2008
Chem 111	Experimental Chemistry I	9	Fall 2008
Chem 111	Experimental Chemistry I	22	Fall 2008
Chem 494	Chemical Research	2	Fall 2008
Chem 111	Experimental Chemistry I	24	Spring 2009
Chem 203	Fundamentals in Organic Chemistry II	3	Spring 2009
Chem 213	Laboratory in Organic Chemistry	13	Spring 2009
Chem 494	Chemical Research	2	Spring 2009
PSU 005	First-Year Seminar	11	Fall 2009
Chem 101	Introductory Chemistry	70	Fall 2009
Chem 111	Experimental Chemistry I	20	Fall 2009
Chem 111	Experimental Chemistry I	24	Spring 2010
Chem 203	Fundamentals in Organic Chemistry II	3	Spring 2010
Chem 213	Laboratory in Organic Chemistry	15	Spring 2010