Dr. Paul Blowers

ADDRESSES

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DEGREES Ph.D. Chemical Engineering, 1999, University of Illinois at Urbana-Champaign
Title: Engineering Approximations for Chemical Kinetics, Dr. Richard I. Masel, Advisor.
M.S. Chemical Engineering, 1997, University of Illinois at Urbana-Champaign
B.S. Chemical Engineering, 1994, Michigan State University, High Honors, Honors College

HONORS AND AWARDS

1) **University Distinguished Professor**, The University of Arizona, the highest teaching honor given by the University of Arizona for excellence in undergraduate instruction (2012).
2) **College of Engineering Teaching Fellow**, The University of Arizona, named as one of nine faculty for past student engagement and to enhance activities in teaching (2012).
3) Carnegie Foundation **Arizona Professor of the Year**, one of top 27 faculty in the country for educating undergraduate students at PhD granting institutions, 2011.
4) **Best Presentation**, C. Canter (speaker) and P. Blowers, *Modeling of Sustainability of Biofuels from Microalgae: Predicted Bottlenecks for Success*, Earth Week 2011 Soil, Water, and Envrionmental Science, The University of Arizona, 3-31 (2011).
5) The University of Arizona Honors College **Five-Star Faculty Award**, this award recognizes the best instructor at the U of A and is a completely student driven process, 2010.
6) The UA Foundation **Leicester and Kathryn Sherrill Creative Teaching Award for Instructional Innovation**, 2010.
7) College of Engineering **daVinci Award Winner** for Top Faculty Member in College, recognized for excellence in teaching or research combined with service, 2009-2010.
8) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2009.
9) **Outstanding Faculty Member**, 2009, University of Arizona as selected by the Center for Student Involvement and Leadership who represent the 35,000+ student body.
10) National Academic Advising Association, **Outstanding Advising Award Winner, Academic Advising Faculty Category**, 2008. Selected as one of four best faculty advisors in the United States.
11) University of Arizona Excellence in Academic Advising **Faculty Advisor Award**, top advisor from all departments on campus 2008.
12) **Best Presentation**, P. Blowers, *A Toolbox for Integrating Information Literacy into Engineering Courses: Helping Students Help Themselves*, ASEE PSW Regional Conference, Flagstaff, AZ, March 27-28 (2008).Award for Excellence at the Student

Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2008.

13) **Third Place** in 3rd Annual Salsa Festival Fundraiser for Sigma Alpha, Alpha Rho Chapter - supporting females in scholarship and leadership in agriculture, 2008.
14) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2007.
15) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2006.
16) American Society for Engineering Education Pacific Southwest Region **Outstanding Teacher of the Year**, 2006
17) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2005.
18) **Outstanding Scientific Presentation**, for outstanding scientific content, significance, and originality - X. Zheng, Blowers, *The Application of Composite Energy Method to n-Butyl Radical beta-scission Reaction Kinetic Estimations*, 10th Electronic Comp.Chem.Conf. April 2005, eccc.monmouth.edu (last accessed 5-12-05).
19) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2004.
20) The Academy's All Stars Honoree, Main Library Display, 6-25-03 through 7-25-03.
21) Certificate of Appreciation, University of Arizona Honors College, 2003.
22) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2003.
23) The University of Arizona Nominee for the Camille Dreyfus Teacher-Scholar Award, 2002.
24) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2002.
25) Mortar Board Senior Honorary Faculty Tea Honoree, 2002.
26) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2001.
27) Award for Excellence at the Student Interface, University of Arizona, Department of Chemical and Environmental Engineering, Selected by students, 2000.
28) Prokasy Award for Teaching Excellence, University of Illinois, College award, 1997.
29) University of Illinois School of Chemical Sciences Award for Excellence in Teaching, 1995 & 1996.
30) Named to the "Teachers Ranked as Excellent by Their Students List", University of Illinois, Fall1994, Spring & Fall 1995, Spring & Fall 1996, Spring & Fall 1997.

RESEARCH INTERESTS

Apply theoretical chemistry techniques to environmental problems for global evaluation
Drive pedagogical and scientific development of life cycle assessment and green engineering

TEACHING INTERESTS

Teach integrated senior design and sustainability course for chemical engineers
Integrate information literacy, computational skills, teamwork, communication, and sustainability into all core courses
To train students to approach sustainability assessment through quantifiable methods

ACADEMIC EXPERIENCE

2006-present: Associate Professor, University of Arizona, Department of Chemical and Environmental Engineering
1999-2006: Assistant Professor, University of Arizona, Department of Chemical and Environmental Engineering1999: Visiting Lecturer, University of Illinois at Urbana-Champaign
1994-1997: Led 6 discussion sessions, acted as senior design liaison, UIUC.

CONSULTING EXPERIENCE

Member of Enviropolis web of experts on chemical and environmental issues, 2003-2005.

RELATED WORK EXPERIENCE

1993-1994: Laboratory Research Assistant at Michigan State University, Dr. Kris Berglund.
1991-1993: Eastman Kodak Company Co-Op, 5 work rotations

PROFESSIONAL SOCIETIES

American Institute of Chemical Engineers, member since 1994. Associate Member since 2001.
American Society of Engineering Education, member since 1999.
The Union of Concerned Scientists, member since 2003.
Omicron Delta Kappa National Leadership Honor Society, member since 2001.
Tau Beta Pi Engineering Honor Society, member since 1993.
Omega Chi Epsilon Chemical Engineering Honor Society, member since 1993.
Phi Kappa Phi and Golden Key Nat'l Honor Societies.

ACADEMIC SERVICE

Chair of the Faculty of the College of Engineering, 2009 - present
Graduate Interdisciplinary Program in Global Change, faculty member, 2006 - present.
Institute for the Study of Planet Earth Faculty Member, 2006 - present
College of Public Health – Env. and Occupational Health faculty search committee, 2006–2007.
High Performance Computing U of A Taskforce, 2006 – 2008.
Academic Dean Search Committee, 2004-2005.Undergraduate College Committee Representative, 2001-2004, 2008-2010.Graduate Studies Committee, Chemical Engineering, University of Arizona, member, 2004-present. Chair, 2006-2008.Chemical and Environmental Engineering Computer Committee, U of A, 1999-present.Undergraduate Curriculum Committee, Chemical and Environmental Engineering,University of Arizona, member, 1999-present, chair 2001-2002, 2009 – present.
Tucson Math, Science, and Technology FunFest Planning Committee, 2005-present.
Faculty Advisor, AZ Homebrewing Club, 2011-present.
Faculty Advisor, Rube Goldberg Machine Club, 2011-present.
Faculty Advisor, Marathon Runners Club, 2008-2011.
Faculty Advisor, Omicron Delta Kappa Leadership Honorary, 2004-2008.
Faculty Advisor, Table Tennis Club Team, U of A, 2000-2005.
Faculty Advisor, Competitive Boxing and Grappling Club, 2001-2003.
Faculty Advisor, Taekwando Club, 2001-2005.
Faculty Advisor, Omega Chi Epsilon Chemical Engineering Honor Society, 2002-present.
COEM ABET Action Committee, 2001-2003.

Carnegie Conversations Campus Committee Member, 2001-2002.
Undergraduate Writing Proficiency Exam Grader, University of Arizona, 2000-2001.

PUBLICATIONS ([g] indicates graduate advisee, [u] indicates undergraduate advisee)

1) M. D. Galka[u], J. M. Lownsbury[u], P. Blowers, Greenhouse Gas Emissions for Refrigerant Choices In Room Air Conditioner Units, Env. Sci. Technol., 46, 12977-12985 (2012).
2) R. M. Handler, C. E. Canter[g], T. N. Kalnes, F. S. Lupton, O. Kholiqov[u], D. R. Shonnard, and P. Blowers, *Evaluation of environmental impacts from microalgae cultivation in open-air raceway ponds: Analysis of the prior literature and investigation of wide variance in predicted impacts*, Algal Res., 1, 83-92 (2012). (Impact Factor = first year of publication)
3) P. Blowers and B. Kim[g], *The adsorption of mercury-species on relaxed and rumpled CaO (001) surfaces investigated by density functional theory*, J. Mol. Model., 17, 505-514 (2011) (Impact Factor = 1.871).
4) A. Bundhun, P. Blowers, P. Ramasami, H. F. Schaeffer III, *Quantum mechanical modeling for the GeX_2/GeHX + GeH_4 Reactions (X = H, F, Cl, Br)*, J. Phys Chem. A, 114, 12, 4210-4223 (2010) (Impact Factor = 2.732).
5) P. Blowers and J. Lownsbury[u], *Carbon dioxide emission implications if hydrofluorocarbons are regulated: A refrigeration case study*, Env. Sci. Technol., 44, 1526-1529 (2010) (Impact Factor = 4.827). - **Featured Article**
6) P. Blowers and K. Hollingshead[u], *Estimations of Global Warming Potentials from Computational Chemistry Calculations for CH_2F_2 and other Fluorinated Methyl Species Verified by Comparison to Experiment*, J. Phys. Chem. A,, 113, 5942-5950 (2009) (Impact Factor = 2.899).
7) F. J. Torres, V. Ochoa-Herrera, P. Blowers, and R. Sierra-Alvarez, *"Response to "Comment on: Ab initio* study of the structural, electronic, and thermodynamic properties of linear perfluorooctane sulfonate (PFOS) and its branched isomers"", Chemosphere, 77, 10, 1457-1458 (2009). (Impact Factor = 3.054).
8) F. J. Torres, V. Ochoa-Herrera, P. Blowers, R. Sierra-Alvarez, and J. A. Field, *Ab initio study of the structural, electronic, vibrational, and thermodynamic properties of linear perfluorooctane sulfonate (PFOS) and its branched isomers*, Chemosphere, 76, 8, 1143-1149 (2009). (Impact Factor = 3.054).
9) B.-G. Kim[g], X. Li[g] and P. Blowers, *A density functional theory study of mercury-containing species adsorption on calcium oxide*, Langmuir, 25, 5, 2781-2789 (2009). (Impact Factor = 4.009).
10) G. Chung, K. Lansey, P. Blowers, P. Blowers, W. Ela, S. Stewart, P. Wilson, *A general water supply planning model: Evaluation of decentralized treatment*, Environ. Model. & Software, 23, 893-905 (2008) (Impact Factor = 2.099).
11) J. Farrell, P. Blowers, J. Luo, and N. Zhang[g], *Understanding trichloroethylene chemisorption to iron surfaces using density functional theory*, Env. Sci. Technol., 42, 6, 2015-2020 (2008) (Impact Factor = 4.363).
12) P. Blowers, D. M. Moline[u], K. F. Tetrault[u], R. R. Wheeler[u], S. L. Tuchawena[u], *Global Warming Potentials of hydrofluoroethers*, ES&T, 42, 4, 1201-1207 (2008) (Impact Factor = 4.363).
13) P. Blowers, K. F. Tetrault[u], and Y. Trujillo-Morehead[u], *Global Warming Potential prediction for hydrofluoroethers with two carbon atoms*, Theor. Chem. Acc., 119,4, 369-381 (2008) (Impact Factor = 2.537).

14) P. Blowers, K. F. Tetrault[u], Y. Trujillo-Morehead[u], *Estimation of heat capacities for hydrofluoroethers with two carbon atoms*, Ind. Engr. Chem. Res., 46, 6600-6604, (2007) (Impact Factor = 1.749).
15) P. Blowers, D. M. Moline[u], K. F. Tetrault[u], R. R. Wheeler[u], and S. L. Tuchawena[u], *Prediction of radiative forcing values for hydrofluoroethers using density functional theory methods*, J. Geophys. Res. Atmos., 112, D15108 (2007), doi:10.1029/2006JD008098.2-07 (Impact Factor = 2.593).
16) X. Zheng[g] and P. Blowers, *The application of composite energy methods to n-butyl radical β-scission reaction kinetic estimations*, Theor. Chem. Acc., 117, 207-212 (2007). (Impact Factor = 2.537)
17) X. Zheng[g] and P. Blowers, *Kinetic modeling of tert-butyl radical decomposition reaction:* $CH_3{}^*C(CH_3)_2 \rightarrow CH_2C(CH_3)_2 + {}^*H$, AIChE J., 52, 9, 3216-3221 (2006) (Impact Factor = 2.153).
18) X. Zheng[g] and P. Blowers, *A first principle kinetic modeling of the 1-chloroethyl unimolecular decomposition reaction*, Industrial & Engineering Chemistry Research, 45, 2981-2985 (2006) (Impact Factor = 1.518).
19) X. Zheng[g] and P. Blowers, *An investigation of methane reactions on a zeolite with a complete basis set composite energy method*, J. Molec. Catal. A, 246, 1-10 (2006). (Impact Factor = 2.511)
20) X. Zheng[g] and P. Blowers, *The reactivity of iso-butane on zeolites: A first principles study*, J. Phys. Chem. A, 110 (7) 2455-2460 (2006) (Impact Factor = 3.047).
21) X. Zheng[g] and P. Blowers, *Kinetic modeling of the propyl radical β-scission reaction: an application of composite energy methods*, Industrial & Engineering Chemistry Research, 45(2), 530-535 (2006). (Impact Factor = 1.518)
22) X. Zheng[g] and P. Blowers, *A computational study of alkane hydrogen exchange reactions on zeolites*, J. Molec. Catal. A, 242, 18-25 (2005). (Impact Factor = 2.316)
23) X. Zheng[g] and P. Blowers, *The investigation of hydrocarbon cracking reaction energetics with composite energy methods*, Molecular Simulation, 31(14-15), 979-986 (2005). (Impact Factor = 1.241)
24) X. Zheng[g] and P. Blowers, *Reactivity of alkanes on zeolites: a computational study of propane conversion reactions*, J. Phys. Chem. A, 109, 10734-10741 (2005). (Impact Factor = 2.639)
25) P. Blowers, X. Zheng[g], and N. Zhang[g], *Application of compound models for estimating rate constants of hydrocarbon thermal cracking reactions: The neopentyl radical β-scission reaction*, Molecular Simulation, 31 (9), 615-621 (2005). (Impact Factor = 1.241)
26) N. Zhang[g], J. Farrell, and P. Blowers, *Evaluation of density functional theory methods for studying chemisorption of arsenite on ferric hydroxides*, Env. Sci. Technol., 39, 4816-4822 (2005). (Impact Factor = 3.557)
27) N. Zhang[g], P. Blowers, and J. Farrell, *An ab initio study of dissociative electron transfer: carbon-chlorine bond cleavage in carbon tetrachloride*, Env. Sci. Technol., 39, 612-617 (2005). (Impact Factor = 3.557)
28) X. Zheng[g] and P. Blowers, *An ab initio study of ethane conversion reactions on zeolites using the complete basis set composite energy method*, J. Molec. Catalysis A: Chemical, 229, 77-85 (2004). (Impact Factor = 2.316)

29) J. Wilcox[g] and P. Blowers, *Decomposition of mercuric chloride and application to combustion flue gases*, Environmental Chemistry, 1, 166-171 (2004). (Factor = N/A yet - new journal)
30) P. Blowers and M. Titus[u], *Use of Life Cycle Inventory as a screening tool for environmental performance: Supercritical carbon dioxide in the semiconductor industry*, Env. Progress, 23, 284-290 (2004). (Impact Factor = 0.654)
31) J. Wang, P. Blowers, J. Farrell, *Understanding reduction of carbon tetrachloride at nickel surfaces*, Env. Sci. & Technol., 38, 1576-1581 (2004). (Impact Factor = 3.557)
32) J. Wilcox[g] and P. Blowers, *Some comments on 'A Study on the Reaction Mechanism and Kinetic of Mercury Oxidation by Chlorine Species' [J. Mol. Struct. (Theochem) 625 (2003) 277*], J. Molec. Struct. (Theochem), 674, 275-278 (2004). (Impact Factor = 1.007)
33) J. Wilcox[g] and P. Blowers, *Evaluation of basis sets and theoretical methods for estimating rate constants of mercury oxidation reactions involving chlorine*, Fuel Processing Technol., 85, 391-400 (2004). (Impact Factor = 1.149)
34) J. Wilcox[g], J. Robles[u], D. Marsden, and P. Blowers, *Theoretically predicted rate constants for mercury oxidation by hydrogen chloride in coal combustion flue gases*, Env. Sci. & Technol., 37(18) 4199-4204 (2003). (Impact Factor = 3.592)
35) P. Blowers, X. Zheng[g], and K. Homan[u], *Assessment of the suitability of using the composite G2, G3, and CBS-RAD methods for predicting activation energies*, Chem. Engr. Commun., 190 (9), 1233-1248 (2003). (Impact Factor = 0.278)
36) J. Farrell, J. Luo, P. Blowers and J. Curry, *Experimental, molecular mechanics, and ab initio investigation of activated adsorption and desorption of trichloroethylene in mineral micropores*, Env. Sci. and Tech. 36, 1524-1531 (2002). (Impact Factor = 3.123)

PUBLICATIONS BASED ON GRADUATE AND UNDERGRADUATE RESEARCH

1) P. Blowers and R. I. Masel, *Extensions of the Marcus Equation for the Prediction of Approximate Transition State Geometries in Hydrogen Transfer and Methyl Transfer Reactions*, Theoretical Chemistry Accounts, *105*, 46-54 (2000). (Impact Factor = 2.263)
2) P. Blowers and R. I. Masel, *Engineering Approximation for the Prediction of Activation Energies for Hydrogen Transfer Reactions*, A.I.Ch.E. J., *46*, 2041-2052 (2000). (Impact Factor = 1.645)
3) P. Blowers and R. I. Masel, *Calculated Vibrational Spectra for CH_nOH_m Species*, J. Phys. Chem. A, *104*, 34-44, (2000). (Impact Factor = 2.754)
4) P. Blowers and R. I. Masel, *An Ab Initio Calculation of the Potential for the Interaction of a Hydrogen Atom with an Ethane Molecule*, J. Phys. Chem. A, *103*, 7725-7729, (1999). (Impact Factor = 2.695)
5) P. Blowers and R. I. Masel, *Use of Buckingham Potentials for Engineering Approximations of Chemical Kinetic*s, A.I.Ch.E. Journal., *45*, 1794-1801, (1999). (Impact Factor = 1.537)
6) P. Blowers and R. I. Masel, *An Extension of the Marcus Equation for Atom Transfer Reactions*, J. Phys. Chem. A, *103*, 7047-7054, (1999). (Impact Factor = 2.695)
7) F. Thomas, N. Chen, I. Lee, L. Ford, P. Blowers, and R. Masel, *UV Spectroscopy of CO and Benzene on Pt(110)*, J. Vac. Sci. Technol., A, *17*, 1750-1755 (1999). (Impact Factor = 1.742)
8) P. Blowers, N. Chen, and R. I. Masel, *Hydronium and Methoxonium: Ab Initio Determination of Spectroscopically Observed Species*, J. Vac. Sci. Technol., A, *17*, 2339-2344 (1999). (Impact Factor = 1.742)

9) L. P. Ford, P. Blowers, and R. I. Masel, *The Role of Steps and Kinks in Catalytic Activity,* J. Vac. Sci. Technol., A, *17*, 1705-1709 (1999). (Impact Factor = 1.742)
10) P. Blowers, L. Ford, and R. Masel, *Ab Initio Calculations of the Reactions of Hydrogen with Methanol: A Comparison of the Role of Bond Distortions and Pauli Repulsions on the Intrinsic Barriers for Chemical Reactions,* J. Phys. Chem.A., *102*, 9267-9277, (1998). (Impact Factor = 4.173)
11) P. Blowers and R. Masel, *Conservation of Bond Order During Hydrogenolysis and Dehydrogenation Reactions*, Surf. Sci., *417*, 238-246 (1998). (Impact Factor = 2.241)
12) P. Blowers and R. Masel, *Conservation of Bond Order During Hydrogenlysis and Dehydrogenolysis Reactions: Implications for the BEBO Model*, J. Phys. Chem., *102*, 9957-9964, (1998). (Impact Factor = 4.173)
13) W. T. Lee, L. P. Ford, P. Blowers, H. L. Nigg, and R. I. Masel, *Why Do Heats of Adsorption of Simple Gases on Platinum Vary So Little with Surface Structure*, Surf. Sci., *416*, 141-151, (1998). (Impact Factor = 2.241)
14) L. Ford, H. L. Nigg, P. Blowers, and R. Masel, *The Role of Step Density on the Binding and Reaction of Surface Species*, J. Catal., *179*, 163-170, (1998). (Impact Factor = 2.997)
15) N. Chen, P. Blowers, and R. Masel, *Evidence for Carbocation Formation During the Coadsorption of Methanol and Hydrogen on Pt (110*), Surf. Sci., *418*, 329-341, (1998). (Impact Factor = 2.241)
16) N. Chen, P. Blowers, and R. I. Masel, *Formation of Hydronium and Water-Hydronium Complexes During Coadsorption of Hydrogen and Water on (2x1)Pt(110)*, Surf. Sci., *419*, 150-157, (1999). (Impact Factor = 2.241)
17) L. P. Ford, P. Blowers, N. Chen, I. Lee, R. I. Masel, *UV/HREELS Measurements of the Excited States of Adsorbed CO: Benchmarks for Ab Initio Calculations*, Surf. Sci., *419*, 144-149, (1999). (Impact Factor = 2.241)
18) M. Uusi-Penttila, R. J. Richards, P. Blowers, B. A. Torgerson, and K. A. Berglund, *Liquid-Liquid Equilibria of Selected Dibasic Ester + Water + Solvent Ternary Systems*, J. Chem. Eng. Data, *41*, 235-238 (1997). (Impact Factor = 0.885)

SUBMITTED PUBLICATIONS.
1)

EDUCATIONAL PUBLICATIONS
1) P. Blowers, J. A. Field, K. Ogden, A. E. Saez, and R. Sierra, *ChE at...The University of Arizona*, Chem. Engr. Educ., 45, 1, 2-7 (2011)
2) P. Blowers, "Application of Multimodal Software Tools to Teach Problem Solving Skills", *ASEE National Conference Proceedings*, Austin, TX, June 14-17 (2009).
3) P. Blowers, "Longitudinal Contact with Individual Students as a Route of Encouraging Self-Determination in Chemical Engineers", *ASEE National Conference Proceedings*, Austin, TX, June 14-17 (2009).
4) P.Blowers, "Use of Concept Maps to Build Student Understanding and Connections Among Course Topics", *PSW-ASEE Regional Conference Proceedings*, National University, San Diego, CA (2009).
5) P. Blowers, "Longitudinal Contact with Individual Students as a Route of Encouraging Self-Determination in Chemical Engineers", *PSW-ASEE Regional Conference Proceedings, National University*, San Diego, CA (2009).

6) P. Blowers, "Environmental Foresight: Estimating Global Warming Potentials with Intermediate Results", *CSE Archive of Peer-Reviewed sustainability instructional modules*, http://www.csengin.org/library.htm (2008).
7) Ogden, K. (invited speaker) and Blowers, P., "Integration of Sustainability and Industrial Mentors into Capstone Design", *Proceedings of the ICEER 2007 Meeting* – Queensland Australia.
8) B. Williams, P. Blowers and J. Goldberg, "Integrating Information Literacy Skills into Engineering Courses to Produce Lifelong Learners", *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition*, Salt Lake City, UT (2004).
9) P. Blowers and B. Williams, "Have we Changed the Way we do Research in Response to the Availability of Online Information?" *2004 American Society for Engineering Education Annual Conference & Exposition*, Salt Lake City, UT June 20-23 (2004).
10) B. Williams and P. Blowers, "A Quantitative Investigation into whether the Publication of Engineering Pedagogical Material is an Indicator of Value in 'Rankings' when Assessing Instruction", *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, Memphis, TN.
11) B. Williams and P. Blowers, "Deconstruction of an Engineering Syllabus for Information Literacy", *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, Memphis, TN.
12) P. Blowers, "Using Student Skill Self Assessments to Get Balanced Groups for Group Projects", *College Teaching*, Summer, 111-114 (2003).
13) P. Blowers., "Use of Web-Based Examples in Engineering Courses", *Proceedings of the 2002 American Society for Engineering Education Annual Conference and Exposition*, Albuquerque, NM (2002).
14) P. Blowers, "Breaking the Curve - Why a Straight-Scale is Appropriate in Engineering Courses", *Proceedings of the 2002 American Society for Engineering Education Annual Conference and Exposition*, Albuquerque, NM (2002).
15) P. Blowers, "A Course of Freshmen Survival Skills", *Proceedings of the 2002 American Society for Engineering Education Annual Conference and Exposition*, Albuquerque, NM (2002).
16) P. Blowers, "Course Syllabus Construction: A Stitch in Time Saves Nine", *Proceedings of the 2002 American Society for Engineering Education Annual Conference and Exposition*, Albuquerque, NM (2002).
17) P. Blowers and J. Wilcox, " Integration of Communication Skills into the Introductory Material and Energy Balances Course in Chemical Engineering", *Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exposition*. (2001).

PRESENTATIONS

1) M. Taborga[u], C. Canter[g], P. Blowers[a], R. Handler[p], D. Shonnard, *Sustainability Analyses of Production Scale Processes for Forming Biofuels from Algal Biomass Based On Experimental Data*, AIChE, Pittsburgh, PA, October 28-November 2,(2012).
2) C. E. Canter[g] (speaker), R. Handler, C. Young, D. Shonnard, P. Blowers, *A Review of Algae-based Biofuel Production: Sustainability and Life Cycle Assessments*, AIChE, Minneapolis, MN, October 17-21 (2011).

3) P. Blowers (speaker), C. E. Canter[g], D. D. Galvan, *Total Global Warming Potential: An Expanded Definition of GWP*, AIChE, Minneapolis, MN, October 17-21 (2011).
4) M. Galka[u] (speaker), J. Lownsbury[u], P. Blowers, *Greenhouse Gas Emissions for Refrigerant Choices in Room Air Conditioner Units, NASA Space Grant Symposium,* April (2012).
5) P. Blowers (invited speaker), *Environmental Foresight Through Computational Chemistry: An Expanded Definition of Global Warming Potentials*, March 1 (2012).
6) P. Blowers (**invited speaker**), *Environmental Foresight Through Computational Chemistry: How do we Avoid Wasting Resources through Implementing Changes that Turn out to be Bad Ideas*?, ERE Department, Stanford University, October 4 (2011).
7) P. Blowers, C. Canter[g], D. Shonnard (speaker), R. Handler, C. Young, *Evaluating the Environmental Sustainability of Algal Biomass for Biofuel Production,* 1st International Conference on Algae Biomass, Biofuels, and Bioproducts, Westin St. Louis, St. Louis, MO, July 17-20 (2011).
8) I. Joshipura (speaker) and P. Blowers, *Evaluation of Supercritical Carbon Dioxide forDry Cleaning Solvent Replacement of Perchloroethylene*, Arizona Space Grant Consortium, Arizona State University, Phoenix, AZ, 4-9 (2011).
9) C. Canter[g] (speaker) and P. Blowers, *Modeling of Sustainability of Biofuels from Microalgae: Predicted Bottlenecks for Success*, Earth Week 2011 Soil, Water, and Envrionmental Science, The University of Arizona, 3-31 (2011).
10) P. Blowers (speaker), C. E. Canter[g], M. Starbuck, J. Richardson, and B. Fischer, *Biodiesel from Algae: Scientific Development Guided by Sustainability Evaluations of Environmental, Economic, and Social Constraints*, Second International Congress on Sustainability Science and Engineering, Tucson, AZ, January 8-15 (2011).
11) P. Blowers and J. Lownsbury, A decision point on public policy regarding HFCs: We are close to making poor choices at the international level, AIChE, November 8-12 (2010).
12) C. Canter[g] (speaker) and P. Blowers, Degradation pathways for CHF_2OH and implications to the atmosphere, AIChE, November 8-12 (2010).
13) S.-J. Lee, Y. Li, J. O. L. Wendt (speaker), B.-G. Kim[g], and P. Blowers, *High Temperature Minearl Based Sorbents for Mercury: Progress and Problems, Mercury Emission from Coal*, MEC7, U. Strathclyde, Glasgow, Scotland, June 16-18 (2010).
14) P. Blowers (invited), *Environmental Foresight: Is Banning HFC's "good"?*, Environmental Law Society Earth Week, University of Arizona Law School, April 22 (2010).
15) B.-G. Kim[g] (poster presenter) and P. Blowers, *Mercury-containing species adsorption studies on inorganic compounds using density functional theor*, EUEC (Energy & Environment Conference), Phoenix, Arizona, Feburary 1-3, (2010).
16) B.-G. Kim[g] (poster presenter) and P. Blowers, *The adsorption of CO_2 on a rumpled CaO (0 0 1) surface and the effect of water vapor investigated by density functional theory*", EUEC (Energy & Environment Conference), Phoenix, Arizona, Feburary 1-3, (2010).
17) P. Blowers (poster), *Prediction of Physical Properties of an Emerging Class of Compounds*, AIChE National Conference, Nashville, TN, November 9-13 (2009).
18) P. Blowers (speaker), *Longitudinal Contact with Individual Students as a Route of Encouraging Self-Determination in Chemical Engineers*, AIChE National Conference, Nashville, TN, November 9-13 (2009).
19) B. Kim[g] (speaker) and P. Blowers, *The Adsorption of the CO_2 On Rumpled CaO (0 0 1) Surface and the Effect of Water Vapor Investigated by Density Functional Theory*, AIChE National Conference, Nashville, TN, November 9-13 (2009).

20) P. Blowers (speaker), *What Could have Happened If the Kyoto Protocol Had been Signed?*, U of Arizona Environmental Summit, Student Union, April 22 (2009).
21) P. Blowers (speaker), *Application of Multimodal Software Tools to Teach Problem Solving Skills*, AIChE Fall National Conference, Philadelphia, PA, November 16-21 (2008).
22) P. Blowers (speaker), M. Lee[u], and Z. Ronan[u], "Environmental Foresight through Computational Chemistry: Improved Radiative Forcing Predictions for Global Warming Potentials", *AIChE Fall National Conference*, Philadelphia, PA, November 16-21 (2008).
23) B.-G. Kim[g] (speaker) and P. Blowers, "Elemental Mercury Adsorption Study on Gehlenie ($Ca_2Al_2SiO_7$)", *AIChE Fall National Conference*, Philadelphia, PA, November 16-21 (2008).
24) P. Blowers (speaker), K. Hollingshead[u], Y. Zhu[u], K. Seamans[u], Z. Ronan[u], "Environmental Foresight through Computational Chemistry: Hydrofluroethers and Potential Impacts", *AIChE Fall National Conference*, Philadelphia, PA, November 16-21 (2008).
25) P. Blowers (invited speaker), "Computational Chemistry for Environmental Foresight", *The Environmental Breakfast Club*, The University of Arizona, Tucson, AZ, September, 14 (2007).
26) P. Blowers (invited speaker), "Use of Computational Chemistry to Estimate Global Warming Potentials: Environmental Foresight", Summer Teacher Institute, U of Arizona, July 20 (2007).
27) P. Blowers (invited speaker), "Use of Computational Chemistry to Estimate Global Warming Potentials:
Environmental Foresight", Chemistry Club Student Chapter, The University of Arizona, April 18 (2007).
28) P. Blowers (invited speaker), "Use of Computational Chemistry to Estimate Global Warming Potentials:
Environmental Foresight", AIChE Student Chapter of Arizona Meeting, April 11 (2007).
29) P. Blowers (speaker), K. Marr[u], K. Hollingshead[u], D. Hubler[u], and B. LaFountain[u], "Prediction of Global Warming Potentials through Computational Chemistry – Testing Robustness of Methodology through Experimental Comparisons", AIChE Annual Meeting, November 12-17, San Francisco Hilton, San Francisco, CA (2006).
30) P. Blowers (speaker), "Environmental Applications of Computational Chemistry", AIChE Annual Meeting, November 12-17, San Francisco Hilton, San Francisco, CA (2006).
31) P. Blowers and X. Li[g], "Adsorption Phenomena of Mercury-Chlorine Species on a Novel Sorbent Derived from Paper Waste", AIChE Annual Meeting, November 12-17, San Francisco Hilton, San Francisco, CA (2006).
32) J. Farrell (speaker), N. Zhang[g], N.; P. Blowers "Density Functional Study of Chloroethene Reactions with Iron Surfaces," presented at the Advances in Surface Mediated Transformations in Environmental Systems Symposium at the 230th National Meeting of the American Chemical Society, March 30, 2006, Atlanta, GA
33) X. Li (speaker) [g], P. Blowers, "A DFT Study of Mercury Capture on Paper Waste Derived Sorbents", 2005 American Institute of Chemical Engineers Conference, Cincinatti, OH, October 30-November 4, (2005).
34) X. Zheng[g] (speaker), P. Blowers, "An investigation of light alkane conversion reactions on zeolites with a cluster approach", 2005 American Institute of Chemical Engineers Conference, Cincinatti, OH, October 30-November 4, (2005).

35) X. Zheng[g] (speaker), P. Blowers, "An ab initio investigation of hydrocarbon radical beta-scission reaction kinetics", 2005 American Institute of Chemical Engineers Conference, Cincinatti, OH, October 30-November 4, (2005).
36) J. Wilcox[g] (speaker), P. Blowers, J. O. L. Wendt, "An Ab Initio Investigation of Mercury Oxidation in Combustion Flue Gases", 2005 American Institute of Chemical Engineers Conference, Cincinatti, OH, October 30-November 4, (2005).
37) P. Blowers (speaker), K. Marr[u], F. Durham[u], "Use of Ab Initio Calculations to Estimate Global Warming Potentials for HBrFC's: Atmospheric Lifetimes and Radiative Forcing Results", 2005 American Institute of Chemical Engineers Conference, Cincinatti, OH, October 30-November 4, (2005).
38) P. Blowers (speaker), N. Zhang[g], J. Farrell, "DFT Study of Trichloroethylene Chemisorption to Iron Surfaces Using Density Functional Theory", 2005 American Institute of Chemical Engineers Conference, Cincinatti, OH, October 30-November 4, (2005).
39) J. Wilcox[g], P. Blowers, J. Wendt, *Can Mercury Oxidation Take Place Homogeneously in Combustion Flue Gases?*, 22nd Annual International Pittsburgh Coal Conference, Coal-Energy, Environment, and Sustainability, Pittsburgh, PA, September 12-15 (2005).
40) P. Blowers (invited speaker), *Environmentally Benign Manufacturing*, Arizona Association of Industries Meeting, Phoenix Country Club, June 21 (2005).
41) J. Wilcox[g] (speaker), P. Blowers, and J. O. L. Wendt, *Can Mercury Oxidation Take Place Homogeneously in Combustion Flue Gases? A Theoretical Investigation*, 9th International Congress on Combustion By-products and their Health Effects, Ventana Canyon Ranch Resort, Tucson, AZ, June 12-15 (2005).
42) X. Zheng[g] (main contact) and P. Blowers, *The Application of Composite Energy Method to n-Butyl Radical beta-scission Reaction Kinetic Estimations*, 10th Electronic Computational Chemistry Conference, April 2005, eccc.monmouth.edu (last accessed 5-12-05).
43) P. Blowers, Y. Chen (speaker), N. Krishnan, S. Boyd, M. R. Overcash, and G. J. McRae, *Assessing the Environmental, Safety, and Health Impacts Associated with Process Modifications: Moving Towards Sustainability Metrics*, AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).
44) P. Blowers and H. Zhao[g] (speaker), *Water Reuse Planning Model from Industrial Aspects*, AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).
45) P. Blowers (speaker) and H. Zhao[g], P. Case[u], J. Swan[u], *Atom Economy: Expanding Boundaries to Incorporate Upstream Reactions to Raw Materials* AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).
46) P. Blowers (speaker) and H. Zhao[g], *Hospital Water Use: Issues Regarding Sustainability* AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).
47) J. Wilcox[g] (speaker) , P. Blowers and J. O. L. Wendt, *An Ab Initio Investigation of the Oxidation of Mercury in the Flue Gases of Coal Combustion*, AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).
48) J. Wilcox[g] (speaker), J. O. L. Wendt, and P. Blowers, *A Comparison of Ab Initio and Experimental Results Involving Mercury*, AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).
49) N. Zhang[g] (speaker) and P. Blowers, *Ab Initio Study of Dissociative Electron Transfer Reactions: Carbon-Chlorine Bond Cleavage in Carbon Tetrachloride*, AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).

50) X. Zheng[g] (speaker) and P. Blowers, *The Application of Composite Energy Method to Hydrocarbon Cracking Reaction Kinetic Estimations,* AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).

51) N. Zhang[g], J. Farrell, and P. Blowers (speaker), *Understanding Arsenite Adsorption to Ferric Oxides using Density Functional Theory,* AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).

52) X. Zheng[g] (speaker) and P. Blowers, *Quantum Chemical Prediction of Hydrocarbon Cracking Reactions,* AIChE Annual Meeting and Fall Showcase, Austin, TX, November 7-12 (2004).

53) P. Blowers (invited speaker) and H. Zhao[g], "The Search for Economical Water Reuse in the Desert Southwest", The Southern Arizona Environmental Management Society Luncheon, Tucson AZ, October, 27 (2004).

54) P. Blowers (invited speaker), G. McRae, Y. (N.) Chen, S. Boyd, N. Krishnan, M. Overcash, *Environmental, Safety, and Health Impacts: Moving Towards Sustainability Metrics*, NSF/ERC Retreat, Stanford, CA, August, 19-20 (2004).

55) P.Blowers and M. Titus[u], " The Use of Life Cycle Assessment as a Screening Tool for Environmental Performance: Supercritical Carbon Dioxide Use in Photoresist Removal in the Semiconductor Industry", NSF/ERC Teleseminar, Tucson, AZ, April, 9 (2004).

56) P. Blowers (speaker) and T. Zhu, "NF_3 vs. C_2F_3 for Chamber Clearning in Semiconductor Processing: Improvement Opportunities Identified Usinag an LCA Approach", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

57) P. Blowers, N. Zhang[g] (speaker), "An Ab Initio Study of Reductive Dechlorination of Halocarbosn at Metal Cathodes", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

58) P. Blowers, T. Zhu, "The Use of Life Cycle Assessment as a Screening Tool for Environmental Performance: Supercritical Carbon Dioxide Use in Photoresist Removal in the Semiconductor Industry", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

59) P. Blowers, A. Benne[u]t (poster presenter), "Mercury Speciation in Flue Gases: Hg + HCl -> HgCl + H", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

60) P. Blowers (poster presenter), B. Williams, "Deconstruction of an Engineering Syllabus for Information Literacy",. AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

61) P. Blowers, J. Wilcox[g] (speaker), J. O. L. Wendt, "Understanding the Kinetics of Mercury Oxidation in the Flue Gases of Coal Combustion: Experimental and Theoretical Results", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

62) X. Zheng (poster presenter), P. Blowers, " Quantum Chemical Rate Estimation of the Experimentally Difficult Neopentyl Radical Unimolecular Decomposition Reaction", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

63) P. Blowers, J. Wilcox[g] (poster presenter), J. O. L. Wendt, "Modeling Mercury Oxidation in the Flue Gases of Coal Combustion", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

64) X. Zheng[g] (speaker), P. Blowers, "Collision Efficiency and Hindered Rotor Considerations for Predicting Rate Constants of Hydrocarbon Beta-Scission Reactions", AIChE Annual Meeting and Fall Showcase, San Francisco, CA, November 16-21 (2003).

65) P. Blowers (invited speaker), "On the Path to Elucidating the Speciation of Mercury in the Flue Gases of Coal Combustion", Materials Science Department, The University of Arizona, September 22 (2003).
66) P. Blowers (poster), "Where Do We Go From Here? A Vision of Integrating LCA Efforts Within the ERC", ERC Retreat, Stanford University, Palo Alto, CA, August 21-22 (2003).
67) J. Wilcox[g] (speaker) and P. Blowers, "An Ab Initio Investigation of Gas Phase Mercury Reactions Important in Coal Combustion", 6th Annual Conference on Air Quality & Global Climate Change, January 27-30, 2003 - Loews Ventana Canyon Resort, Tucson, Arizona (2003).
68) J. Wilcox[g] (speaker) and P. Blowers, "Mercury Speciation in Flue Gases: $HgCl_2 + H \leftrightarrow HCl + HgCl$", AIChE National Meeting, Indianapolis, IN, November 3-8, (2002).
69) X. Zheng[g] (speaker) and P. Blowers, "Reaction Rate Estimation of Paraffin Cracking Reaction in Zeolites", AIChE National Meeting, Indianapolis, IN, November 3-8, (2002).
70) T. Zhu[g] (speaker) and P. Blowers, "Development of LCA Database Information for Complex Manufacturing Processes", AIChE National Meeting, Indianapolis, IN, November 3-8, (2002).
71) J. Wilcox[g] (poster) and P. Blowers, "Mercury Speciation in Flue Gases: $HgCl \leftrightarrow Hg + Cl$", AIChE National Meeting, Indianapolis, IN, November 3-8, (2002).
72) J. Wilcox[g] (speaker), J. Robles[u] and P. Blowers, "An Ab Initio Investigation of Gas Phase Mercury Reactions Important in Coal Combustion Vapor Emissions", University of Arizona, Department of Applied Mathematics, invited talk (2002).
73) X. Zheng[g] and P. Blowers., "Surface Effects on Beta-Scission Reaction Rates", AIChE National Meeting, Reno, NV, November 4-9, poster (2001).
74) P. Blowers and X. Zheng[g], "Evaluation of Composite Energy Methods and RRKM Theory For Estimating Rate Constants For Large Molecule Reactions", AIChE National Meeting, Reno, NV, November 4-9, (2001).
75) J. Wilcox[g] and P. Blowers, "An Ab Initio Investigation of Gas Phase Mercury Reactions Important in Coal Combustion Vapor Emissions", AIChE National Meeting, Reno, NV, November 4-9, (2001).
76) J. Muehlbauer[u] (speaker) and P. Blowers, "Atmospheric Reactions of Mercury Containing Compounds", NASA Space Grant Program Symposium, Arizona State University, May 21, (2001).
77) P. Blowers (invited speaker), "Putting the Chemistry Back into Chemical Engineering", University of Arizona, Department of Chemical and Environmental Engineering Departmental Seminar, January 23, 2001..
78) P. Blowers (invited speaker), "Putting the Chemistry Back into Chemical Engineering", Southern Arizona local AIChE Chapter, Tucson, AZ (2000).
79) P. Blowers (speaker), K. Homan[u], J. Muehlbauer[u], W. Lewis[u], and X. Zheng[g] "The Accuracy of Gas Phase Rate Constants from Approximate Transition State Geometries", AIChE Annual Meeting, Los Angeles, CA (2000).
80) P. Blowers (speaker), K. Homan, and B. Constance, "The Suitability of Using Bond Order Conservation for Estimating Combution Reaction Modeling Parameters", AIChE Annual Meeting, Los Angeles, CA (2000).
81) P. Blowers (speaker), K. Homan[u], and X. Zheng[u], "An Assessment of Composite Computational Methods for Predicting Activation Energies", AIChE Annual Meeting, Los Angeles, CA (2000).

82) R. Masel (speaker), K. Krummel[u], and P. Blowers, "Engineering Approximations for Kinetic Parameter Estimation in Process Design", AIChE Annual Meeting, Los Angeles, CA (2000).
83) J. Farrell (speaker), J. Luo, J. Curry, and P. Blowers, "Square pegs, round holes, and slow desorption", ACS Annual Meeting, Washington, DC (2000).
84) P. Blowers (speaker) and R. I. Masel, *Approximations for the Position of Ligand Transfer Transition States: A Comparison to Ab Initio Calculations*, AIChE meeting, Dallas, (1999).
85) P. Blowers, C. I. Lee, and R. I. Masel (speaker*), Spectroscopic Observation of Carbocation Intermediates on Metal Surfaces*, AIChE meeting, Dallas, (1999) .
86) R. Masel (speaker), P. Blowers, and L. Ford, *Benchmarking DFT Calculations for Properties of Adsorbates*, AIChE meeting, Dallas, (1999).
87) R. Masel and P. Blowers (speaker), *Non-linear Correlations in Kinetics: Going Beyond the Polanyi Relationship*, AIChE meeting, Dallas, (1999).
88) P. Blowers (presenter), R. Masel, F. Thomas, J. Ackerman, I. Lee, and N. Chen, *New Correlations for Catalytic Activity*, AIChE Meeting, Miami, (1998).
89) P. Blowers (presenter) and R. Masel, *Calculations of the Barriers to Methanol Hydrogenation and Dehydration: The Role of Surface Work Function,* AIChE Meeting, Miami, (1998).
90) P. Blowers (presenter) and R. Masel, *Engineering Approximations for Chemical Kinetics*, AIChE Meeting, Miami, (1998).
91) P. Blowers (presenter), N. Chen, I. Lee, *Coadsorption of Water and Hydrogen on Pt (110),* American Vacuum Society 45th International Symposium, Baltimore, (1998).
92) L. Ford, P. Blowers, and F. Thomas, *The Role of Steps and Kinks in Catalytic Activity*, American Vacuum Society 45th International Symposium, Baltimore, (1998).
93) R. I. Masel, W. T. Lee, P. Blowers (presenter), F. Thomas, *Intrinsic Activation Energies as a Guide to Rate Mechanisms of Reactions on Solid Surfaces*, North American Catalysis Society Meeting, Chicago, (1997). (poster)
94) P. Blowers (presenter), W. T. Lee, Rich Masel, *Intrinsic Barriers as a Guide to Rates and Mechanisms of Reactions on Solid Surfaces*, AIChE Meeting, Los Angeles, (1997).
95) P. Blowers (presenter), R. Masel, *The Use of Intrinsic Activation Barriers to Predict Reaction Pathways: A Study of the Reaction of Hydrogen with Methanol,* AIChE Meeting, Los Angeles, (1997).

EDUCATIONAL PRESENTATIONS

1) P. Blowers and K. Rivas[u] (invited speakers), *Mentoring and Success for Undergraduates at U of A, Arizona Assurance Scholars Recognition Program*, The University of Arizona, February, 19 (1013).
2) P. Blowers, *Incremental Development of Student Success through Leveraged Resume Development in Class and Advising Interactions with Students*, AIChE, Pittsburgh, PA, October 28-November 2,(2012).
3) P. Blowers (speaker), *Integrated Assessment of Student Success in Achieving a-k Criteria using Course Management Software,* AIChE, Pittsburgh, PA, October 28-November 2,(2012).
4) P. Blowers (speaker) and G. Ogden, *Interactive Online Instruction using Course Management Software and Approaches that Engage Students Actively and Asynchronously*, AIChE, Pittsburgh, PA, October 28-November 2,(2012).

5) P. Blowers (**invited speaker**), *Engaging students with active learning techniques (and make your life easier!)*, U of Arizona Mathematics Department, February (2012).
6) P. Blowers (**invited speaker**), *What Students Have Taught Me About Teaching (and what I've learned about myself along the way)*, U of Arizona Mathematics Department, January (2012).
7) P. Blowers (speaker) and A. Sorooshian, "Using concept mapping to teach students critical thinking for fragmenting senior design projects into coherent and manageable tasks", *AIChE*, Minneapolis, MN, October 17-21 (2011).
8) P. Blowers (speaker), K. Ogden, A. Sorooshian, "Sustainable Integration of Sustainability into Senior Design for Chemical Engineers", *AIChE*, Minneapolis, MN, October 17-21 (2011).
9) P. Blowers (speaker), "Real-World Thematic Problem Creation to Engage Students in Material and Energy Balances", *AIChE*, Minneapolis, MN, October 17-21 (2011).
10) P. Blowers (speaker) and J. Hunter, "Use of asynchronous media to facilitate active learning", *AIChE*, Salt Lake City, November 8-12 (2010).
11) P. Blowers and D. Faetz, "Lifelong learning training through sustainability-focused problems using information literacy", *AIChE*, Salt Lake City, November 8-12 (2010).
12) P.Blowers (**invited Keynote Speaker**), "What I've Learned about Teaching (and about myself) from Students", *University of Arizona Graduate Assistant Teaching Orientation*, Centennial Hall, The University of Arizona, Tucson, AZ, August 19 (2010).
13) P. Blowers (presenter), "Environmental Foresight: Evaluation of Environmental Trade-Offs through Computational Chemistry", *NASA Space Grant Consortium*, Tucson, AZ, March 8, (2010).
14) P. Blowers (presenter), "Study Strategies for Success", *student AIChE Chapter*, The University of Arizona, March 8 (2010).
15) G. Schrader (speaker), P. Blowers, and L. Huber, "Relevancy of Sustainability Concepts in Science and Engineering Education" at the *1st International Congress of Sustainability Science and Engineering*, Cincinnati OH (University of Cincinnati), August 9-12, (2009).
16) P. Blowers (speaker), "Application of Multimodal Software Tools to Teach Problem Solving Skills", *ASEE Annual Conference*, Austin, TX, June 14-17 (2009).
17) P. Blowers (speaker), "Longitudinal Contact with Individual Students as a Way of Encouraging Self-Determination in Chemical Engineers", *ASEE Annual Conference*, Austin, TX, June 14-17 (2009).
18) P. Blowers (**keynote speaker**), "Planting the Seeds of the Future", U of Arizona Celebration of Excellence, Recognizing the UA Academic Advising Community, Tucson, AZ, May 4 (2009)
19) P. Blowers, "Use of Concept Maps to Build Student Understanding and Connections Among Course Topics", *PSW-ASEE Regional Conference Proceedings*, National University, San Diego, CA (2009).
20) P. Blowers, "Longitudinal Contact with Individual Students as a Route of Encouraging Self-Determination in Chemical Engineers", *PSW-ASEE Regional Conference Proceedings, National University*, San Diego, CA (2009).
21) **Invited Keynote Speaker**, "The Seeds of Advising to Help Student Success Take Root", U of Arizona, *December Advising Symposium*, Student Union, Tucson, AZ December 16 (2008).
22) P. Blowers (speaker), "Longitudinal Contact of Individual Students as a Route of

Encouraging Self-Determination", U of Arizona, *December Advising Symposium*, Student Union, Tucson, AZ December 16 (2008).

23) P. Blowers (speaker), G. Ogden, and K. Ogden, "A Toolbox for Integrating Information Literacy into Engineering Courses: Helping Students Help Themselves", *Pacific Southwest Regional ASEE Conference*, Northern Arizona University, Flagstaff, AZ March 27-28 (2008).
24) P. Blowers (speaker) and K. Ogden, "Integration of Sustainability into A Chemical Engineering Senior Capstone Design Course", *Pacific Southwest Regional ASEE Conference*, Northern Arizona University, Flagstaff, AZ March 27-28 (2008).
25) P. Blowers (speaker), "Application of Multimodal Software Tools to Teach Problem Solving Skills", *Pacific Southwest Regional ASEE Conference*, Northern Arizona University, Flagstaff, AZ March 27-28 (2008).
26) Ogden, K. (invited speaker) and Blowers, P., "Integration of Sustainability and Industrial Mentors into Capstone Design", *Proceedings of the ICEER 2007 Meeting* – Queensland Australia.
27) K. Ogden, P. Blowers, B. Williams, "Linking Information Literacy Skills to ABET's Lifelong Learning Component", *ASEE National Conference*, Honolulu, HI (2007).
28) P. Blowers, "Effective Integration of Coursework: Equilibrium Thermodynamics as a Bridge from Material and Energy Balances and Mass Transfer to Design", 2005 *American Institute of Chemical Engineers Conference*, Cincinatti, OH, October 30-November 4, (2005).
29) P. Blowers, B. Williams, and J. Goldberg, "Integrating Information Literacty Skills into Engineering Courses to Produce Lifelong Learners", 2004 *American Society for Engineering Education Annual Conference & Exposition*, Salt Lake City, UT, June 20-23 (2004).
30) P. Blowers (invited speaker), "Librarian and Faculty Partnerships" and "Syllabi Makeovers for Information Literacy", *Linking Information Literacy Skills to ABET's Life-Long Learning Component Workshop*, University of Arizona Library, College of Engineering Assessment Committee, January 9, (2004).
31) P. Blowers (poster presenter), B. Williams, "Deconstruction of an Engineering Syllabus for Information Literacy", *AIChE Annual Meeting and Fall Showcase*, San Francisco, CA, November 16-21 (2003).
32) P. Blowers (invited speaker), "Resumes and CVs for Professionals", *Masters of Public Health Student Meeting*, The University of Arizona, October 16 (2003).
33) P. Blowers (speaker), "New Topics in Chemical Engineering Design", *ASEE Annual Conference and Exposition*, Nashville, TN, June 22-25 (2003).
34) P. Blowers and B. Williams, "A Quantitative Investigation into Contributions to the Pedagogical Advancement of Engineering Education and a Comparison to Undergraduate Engineering Education School Rankings", *ASEE Annual Conference and Exposition*, Nashville, TN, June 22-25 (2003).
35) P. Blowers and B. Williams, "Deconstruction of an Engineering Syllabus for Information Literacy", *ASEE Annual Conference and Exposition*, Nashville, TN, June 22-25 (2003).
36) P. Blowers, "New Topics in Chemical Engineering Design", *AIChE National Meeting*, Indianapolis, IN, November 3-8, (2002).
37) P. Blowers, "Group Selection Processes - How to Use a Student Skill Self Assessment to Get Balanced Groups", *PSW - ASEE Regional Meeting*, Fresno, CA, April 7-8 (2002).
38) P. Blowers, " A Course of Freshmen Survival Skills", PSW - ASEE Regional Meeting, Fresno, CA, April 7-8 (2002).

39) P. Blowers, "Use of Interactive Web-Based Examples in Engineering Courses", *PSW - ASEE Regional Meeting*, Fresno, CA, April 7-8 (2002).
40) P. Blowers, "Breaking the Curve - Why a Straight-Scale Is Appropriate in Engineering Courses", *PSW - ASEE Regional Meeting*, Fresno, CA, April 7-8 (2002).
41) P. Blowers (invited moderator), "Roundtable Discussion on Skills Outcomes: Problem Solving", *Measuring Success: Taking Responsibility for Learning at the University of Arizona*, March 27-28, University of Arizona (2002).
42) P. Blowers, "Breaking the Curve - Why a Straight-Scale Is Appropriate in Engineering Courses", *ASEE National Meeting*, Montreal, Quebec, Canada, June 16-19 accepted (2002).
43) P. Blowers, "A Course on Freshmen Survival Skills", *ASEE National Meeting*, Montreal, Quebec, Canada, June 16-19 accepted (2002).
44) P. Blowers, "Group Selection Processes - How to Use a Student Skill Self Assessment to Get Balanced Groups", *ASEE National Meeting*, Montreal, Quebec, Canada, June 16-19 accepted (2002).
45) P. Blowers, "Course Syllabus Construction: A Stitch in Time Saves Nine", *ASEE National Meeting*, Montreal, Quebec, Canada, June 16-19 accepted (2002).
46) Blowers, P., "Teamwork Skills - Group Selection Processes and Their Implications", *AIChE National Meeting*, Reno, NV, November 4-9, (2001).
47) Blowers, P., and J. Wilcox[g], "Communication and Teamwork Skills in Undergraduate - Effective Use of Scheduled Discussion Times", *AIChE National Meeting*, Reno, NV, November 4-9, (2001).
48) G.W. Rubloff, B. Levy, B. Conaghan, L. Henn-Lecordier, A. Rose, P. Blowers, J. DeGenova, E. Weisman[u], and F. Shadman, "Simulator-Based Learning Systems for Environmentally Benign Semiconductor Manufacturing", *NSF/SRC Engineering Research Center for Environmentally Benign Semiconductor Manufacturing Meeting*, Stanford, CA, August (2001).
49) P. Blowers and J. Wilcox[g] (speakers), "Integration of Communication Skills into the Introductory Material and Energy Balances Course in Chemical Engineering", *ASEE Annual Meeting*, Albuquerque, NM, May 24-27 (2001)..
50) P. Blowers (speaker) and E. Weisman[u], "Integration and Use of a Novel Semiconductor Processing Simulator to Teach Stream Recycle Issues to Chemical Engineering Students in Materials and Energy Balances", *ASEE Annual Meeting*, Albuquerque, NM, May 24-27 (2001).
51) P. Blowers and J. Wilcox[g] (speakers), "Integration of Communication & Teamwork Into Introductory Courses", Learning Technology Showcase 2000, *Learning in the New Millenium: our Future Continues*, University of Arizona, May 3 (2001).
52) P. Blowers, "What's grad school all about?" Invited talk, *student chapter of AIChE at University of Arizona*, Spring 2000.
53) P. Blowers, E. Kokkoli, and R. S. Parker, "Academic Interviewing/Choosing a Post-Doc", panel discussion. *AIChE meeting*, Dallas, (1999).
54) P. Blowers (presenter), "Selling Yourself on Paper: How to Write a Resume", *University of Illinois AIChE Student Chapter*, (1999).
55) P. Blowers (presenter), "The Graduate School Experience", *AIChE Student Chapter Meeting, University of Illinois*, (1999).
56) P. Blowers (presenter), "Why (and How) to Go to Graduate School", *American Chemical Society Student Chapter*, University of Illinois, (1997).

FINANCIAL GRANTS RECEIVED

1) *Engineering Access: An Online Education*, Office of Instructional Assessement, The University of Arizona, $80,000 with $80,000 matching from Intel, Inc. 2011-2012.
2) *NAABB Biodiesel from Algae*, $350,000 with Kim Ogden, Bob Arnold and a multi-state-multi-agency team, DOE, $43,000,000.
3) *Global Warming Potentials for Degradation Byproducts in the Atmosphere*, 100%, U of Arizona Institute to Study Planet Earth, $9,602, 9-07 to 8-08.
4) *Estimation of Atmospheric Lifetimes and Global Warming Potentials of Halogenated Volatile Organic Compounds*, 100%, NASA, $2,400, 9-06 to 5-07.
5) *Incorporation of Sustainability Concepts into Traditional Chemical Engineering Education to Increase Job Diversity*, 20%, NSF, $99,000.
6) *Global Conference on Sustainable Product Design and Life-Cycle Engineering*, 100%, NSF sponsored attendee, $1,721.
7) *Sorption Mechanisms for Mercury Capture In Warm Post-Gasification Gas Clean-Up Systems*, 50% with Jost Wendt, DOE-NETL, $492,000, 10-04 to 9-07
8) *Simulated Basin Model for Water Resource Planning and Education*, 20% with Kevin Lansey, Paul Brooks, Wendell Ela, and Paul Wilson, TRIF - Proposition 301, State of Arizona, $217,216, 7-03 to 6-05.
9) *Integration of Green Chemistry into Chemical Engineering Design*, 100%, The Camille and Henry Dreyfus Foundation, $26,000, 2-1-02 to 1-31-04.
10) *Ab Initio and Experimental Investigation of Reductive Dechlorination Mechanisms at Metal Cathodes*, 50% with Jim Farrell, NSF/REU, $12,000, 9-1-01 to 8-31-02.
11) *Development and Testing of Interactive Problem Solving Examples for Chemical Engineers*, 100%, Intel, $10,286 in equipment, one time support 10-21-01.
12) *Lifecycle Assessment within the Semiconductor Industry*, 100 %, NSF/SRC Engineering Research Center for *Environmentally Benign Semiconductor Manufacturing*, $12,500 seed money to begin project, 10-2-01 through 3-31-01.
13) *Ab Initio and Experimental Investigation of Reductive Dechlorination Mechanisms at Metal Cathodes*, 50% with Jim Farrell, NSF, $200,516, 9-1-01 to 8-31-03.
14) *Theoretical Estimates of Mercury Speciation Reactions Under Atmospheric Conditions*, 100% NASA, $1,575, 8-24-01 to 5-1-02.
15) *Development of Novel Environmentally-Based Problems and their Solutions in the Semiconductor Manufacturing Industry*, 100 %, $3,315, summer 2001, Western Alliance to Expand Student Opportunity.
16) *Fundamentals of Mercury Speciation Kinetics: A Theoretical and Experimental Study*, 50% with Jost Wendt, EPA, $225,000, 9-1-00 to 8-31-02.
17) *Engineering Approximations for Gas Phase Rate Constants*, 100%, NASA, $1,050, 8-21-00 to 5-1-01.
18) *Development and Testing of a Web-Based Tool for Teaching Material and Energy Balances with Environmentally Based Semiconductor Manufacturing Examples*, 100%, NSF/SCR, $8,424, 5-1-01 to 12-31-01.
19) *Assessment of Prediction Activation Barriers for Beta-Scission Reactions, 100%, University of Arizona Foundation*, $5,000, 12-15-99 to 12-14-00.

COMPUTATIONAL TIME GRANTS RECEIVED (All 100% by P. Blowers)

1) *A computational Investigation of Arsenic Adsorption on Iron Oxides, 100 %*, 300 hours of supercomputer time, Boston University Mariner program, 1-05 to 1-06.
2) *A Quantum Chemical Study of Hydrocarbon Conversion Reactions on Zeolites*, 100%, 10,000 hours, National Center for Supercomputer Applications, 10-04 to 9-05
3) *Investigation of Mercury Speciation Kinetics Using Quantum Chemical Techniques*, 100 %, UIUC/NCSA, 15,171 hrs CPU time, 6-25-03 to 6-30-04.
4) *An Ab Initio Study of Reductive Dechlorination of Halocarbons*, 100 %, NPACI, San Diego, 5,000 hours CPU time, 4-03 to 6-04.
5) *Estimation of Hydrocarbon Cracking Reaction Rates on Supported Catalysts*, 100%, UIUC/NCSA, 10,000 hrs CPU time, 4-5-02 to 4-30-03.
6) *Fundamentals of Mercury Speciation Kinetics: A Theoretical Study*, 100%, UIUC/NCSA, 10,000 hrs CPU time, 9-18-02 to 9-03-03.
7) *Estimating Beta-Scission Reaction Rate Parameters*, 100%, UIUC/NCSA, 10,000 hrs CPU time, 7-1-00 to 6-30-01.

GRADUATE STUDENTS ADVISED

Current:

1) Christina E. Canter, PhD., Spring 2010-present.

Past:

1) Jennifer Wilcox (co-advised with Jost Wendt, U of Utah), *On the Path to Elucidating Mercury Speciation Reactions*, Ph. D., April 2004. Presently Assistant Professor at Stanford University.
2) Tao Zhu, *Life Cycle Assessment in Designing Greener Semiconductors*, M. S., January 2004. Presently Ph.D. student at U. of Arizona in chemical engineering
3) Kasi Kiehlbaugh (co-advised with Anthony Muscat, U of Arizona), *Thermal Stability of ALD-Grown Aluminum Oxide Thin Films and the Influence of Rapid Thermal Silicon Nitride and Silicon Oxynitride Barriers*, M.S., November 2003. received Ph.D. at University of Berkeley in chemical engineering; now adjunct faculty in College of Engineering at U of Arizona in Tucson.

UNDERGRADUATE STUDENT RESEARCHERS ADVISED

Honors Students (graduated)

Kim Homan, Ph. D. graduate, University of Texas in biomedical engineering
Brian Constance, Stanford for M.S. in Materials Science, now Lockheed Martin
Joe Robles , engineer, Raytheon, Tucson
Bill Lewis, process engineer, Eli Lilly
Joseph Muehlbauer, engineer, Valero Oil Corporation, California
Eric Weisman, Ph. D. student U. South Florida, Biochemical Engineering
Anne Williams, graduate student, University of Arizona, Ph.D. in Biomedical Engineering
Jimmy McCloskey, independent consultant in Tucson, AZ
James Swan, Ph. D. student at Cal. Tech. in Chemical Engineering
Nathan Jenness, Ph. D. graduate from Duke University in Mechanical Engineering
Mike Molloy, M. S. graduate at Arizona in Environmental Engineering
Monica Titus, Ph. D. student at Berkeley in Chemical Engineering
Jacqueline Shaw, M. S. graduate at U of Arizona in Environmental Engineering

Paul Case, engineer at Alcoa in Tucson Arizona.
Stephanie Freeman, Ph.D.graduate UT Austin in Chemical Engineering.
Kyle Marr, engineer at Gore, Inc.
Ben LaFountain, engineer at Valero Oil Co.
Aaron Bennett, Ph.D. graduate at Oregon State University in Mathematics.
Kyle Hollinghead, PhD. Student at UT Austin in Chemical Engineering
David Hubler, Ph. D. student in Chemical Engineering student at Arizona
James Moxness, M.S. earned from Oxford Univ. in England in Archeology, now at Harvard Law School
Patrick Vinck, now Medical School Resident at Univ. of Arizona
James Lownsbury, now PhD student at University of Washington

Alex Harris	Corey Kinsinger	Michael Galka
Chris Steffes	Jacob Pitts	Alexandra Nelson
Jessica Bawden	Israel Portillo	Kimberly Seamans
Marcus Pearman	Roger Wilhelmi	Russell Ruanto
Rachel Barroso	Justin Dahlgren	Michael Cordon
Daniel David Galvan	Samuel Warren	Jennifer Ramin
Armand DeForest		

Other Undergraduate Students Advised on Research projects

Kurt Schwamberger	Carlos Andre Branco	Mario Aponte Zavala
Michael Amezquita	Nguyet Kim Tran	David Camacho
Espiridion Evangelista	Kyle Goss	Jessie Partridge
Jeremy Zarowitz	Dave Boudreaux	Jenna Alexander
Deanna King	Monica Hibberd	Bridget DeCot
Cynthia Badilla	Jennifer Stubbs	Rebecca Marksch
Chris Lewis	John Wilcoxon	Brendan Gleeson
Cynthia Thompson	Justin Neal	Oybek Kholiqov
Zhuoran Wang	Iesha Batts	Nick Zimmer
Sam Hriljac	Patrick Blythe	

OTHER SERVICE TO THE PROFESSION:
Reviewer for Proquest Academic Edition, a journal and textbook search engine (1)
Reviewer for *Journal of Physical. Chem. A* (15)
Reviewer for *Journal of Physical. Chem. C* (3)
Reviewer for *Journal of Chemical Physics* (3)
Reviewer for *Chemical Engineering Education* (1).
Reviewer for *I&ECR* (3).
Reviewer for *Environmental Engineering Science* (1)
Reviewer for *Environmental Science and Technology* (3)
Reviewer for *Biodegradation* (2)
Reviewer for *Chemical Physics Letters* (1)
Reviewer for *Energy and Fuels* (1)
Reviewer for *Journal of Molecular Catalysis A* (2)
Reviewer for *THEOCHEM* (1)
Reviewer for *Theoret. Chem. Accounts* (2)

Reviewer for *Journal of Chemical Theory and Computation* (1)
Reviewer for *The Journal of Undergraduate Chemistry Research* (1)
Reviewer for *Journal of the American Chemical Society* (1)
Reviewer of proposals for ACS - Petroleum Research Fund (2)
Internal Reviewer for ERC 2000 CD-ROM
Session chair at AIChE national conference (5)
Student Poster Session evaluator, AIChE (2)
Reviewer of proposals for NSF (5).
Reviewer for ASEE Conference Prodeedings, 2002-2003 (17).
Reviewer for Cambridge Press book (1)
Reviewer for John Wiley & Sons book (1)
Reviewer for International Computational Chemistry Symposium (4)