

## Tonya L. Peeples

Chemical and Biochemical Engineering  
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### **RESEARCH INTERESTS:**

Research interests of the Peeples lab are in the field of biochemical engineering, with particular focus on bioprocesses under extreme environments and environmentally beneficial biocatalysis. Specific interests include interfacial catalysis, engineering stability in microbial catalysts, microbial physiology in extreme environments, and enhancing efficiencies of environmental toxin biodegradation.

**Engineering Stability in Microbial Catalysts** Organisms from extreme environments possess unusual abilities to survive in harsh chemical environments. Understanding strategies for stabilizing cellular constituents is of interest from both scientific and engineering perspectives. The Peeples group is evaluating the evolution of stabilizing adaptations in microbial systems. Knowledge of unique physiological function may enable the engineering of stability in industrial and environmental biocatalysts. Current research involves the discovery of unique enzymes for biotransformation as well as the evaluation of molecular interactions that govern protein stability under extreme conditions.

**Microbial Physiology in Extreme Environments.** The characterization of archaeal genomes is revealing gene sequences that have not been identified biochemically in extremophilic cultures. Characterizing the selective pressures that govern the expression of this genetic capacity warrants the design and application of novel bioreactor systems that can withstand extremes of temperature, pressure, pH and salinity. The Peeples laboratory focuses on providing environments that reproduce extreme environmental conditions of archaeal habitats. These cultivation strategies will enable the culture of extremophiles to high cell densities and the identification metabolic characteristics that may not be expressed in conventional bioreactors.

**Metabolic Engineering of Organisms For Biocatalysis and Environmental Remediation .** An understanding of microbial physiology may enable the design of novel biocatalysts for directed biotransformations. The Peeples group has pursued metabolic engineering through cloning and expressing foreign genes in methylotrophs and pseudomonads. These biocatalysts are useful for the remediation of environmental pollutants and the production of valuable chemicals.

**Conversion of Biomass to Fuels and Chemicals.** Biomass is an untapped resource which can be used directly as fuel. It is also beneficial and profitable to produce commodity chemicals and fuels from refining waste biomass. The Peeples group is studying the conversion of biomass-derived feedstocks to organic acids and solvents. The potentials to produce biogas as well as the chemical fuels and intermediates is being actively explored.

## EDUCATION AND PROFESSIONAL HISTORY

### *INSTITUTIONS ATTENDED*

<b>Institution</b>	<b>Dates Attended</b>	<b>Major</b>	<b>Degree</b>	<b>Dates Awarded</b>
Johns Hopkins University	8/88-8/94	Chemical Eng.	Ph.D.	10/94
NC State University	8/84-8/88	Chemical Eng.	B. S.	8/88

### *PROFESSIONAL AND ACADEMIC POSITIONS HELD*

#### **Academic**

<b>Institution</b>	<b>Position</b>	<b>Dates</b>
University of Iowa	Associate Professor	8/2002- pres.
University of Iowa	Assistant Professor	8/95-8/2002
California Institute of Technology	Research Fellow	9/94-8/95
North Carolina State University	Research Assistant	6/92-8/94

#### **Industrial**

<b>Company</b>	<b>Position</b>	<b>Dates</b>
Dow Corning Corp.	Summer Pre-Professional	summer's 85,86,87

### *HONORS, AWARDS, AND RECOGNITIONS*

Minority Affairs Committee Service Award American Institute Chemical Engineers	2006
Distinguished Service Award AICHE Minority Affairs Committee	2005
Lloyd N. Ferguson Young Scientist Award, NOBCCChE	2004
National Academy of Engineering: Frontiers in Engineering Symposium Participant	2002
American Society for Engineering Education Chem. Eng. Summer School Best Poster	2002
University of Iowa Collegiate Teaching Award	2001
University of Iowa Old Gold Summer Fellowship	1997
National Science Foundation CAREER AWARD	1997
University of Iowa Old Gold Summer Fellowship	1996
General Electric Faculty for the Future Award	1995/96
Postdoctoral fellowship: California Institute of Technology	1994
Ford Foundation Pre-doctoral Fellowship	1989-1992

**PUBLICATIONS**

1. Peeples, T.L., Hirose, S., Olson, G. J., and Kelly, R.M. "Coal Sulfur Transformations Monitored by Hyperthermophilic Archaeobacteria" Fuel Vol 70, 1991, pp. 599-604.
2. Peeples, T. L. and Kelly, R.M. "Bioenergetics of the Metal/Sulfur Oxidizing Extreme Thermophile, *Metallosphaera sedula*" Fuel Vol. 72, no. 12, 1993 pp. 1619-1624.
3. Schicho, R.N., Brown, S.H., Blumentals, I.I., Peeples, T.L., Duffaud, G.D. and Kelly, R.M. "Continuous culture techniques for extremely thermophilic and hyperthermophilic microorganisms," In, Archaea: A Laboratory Manual, F.T. Robb, Ed., 1994 Cold Spring Harbor Press.
4. Kelly, R. M., Peeples, T. L. and Halio, S. B., "Metabolic Strategies and Biotechnological Potential for Heterotrophic and Mixotrophic Extremely Thermophilic Microorganisms" Annals-New York Academy of Sciences, Vol. 745, 1994, pp. 409-413.
5. Peeples, T. L. and Kelly, R.M. , "Bioenergetic Response of the Extreme thermoacidophile *Metallosphaera sedula* to Thermal and Nutritional Stress" Applied and Environmental Microbiology Vol 61. No. 6, 1995, pp.2314-2318.
6. Semrau J, Chistoserdov A, Lebron J, Costello A, Peeples T, Lidstrom M "Cloning And Characterization Of Genes For The Particulate Methane Monooxygenase" Journal Of Cellular Biochemistry 51-51 Suppl. 21A, 1995
7. S. Stoylar, Costello A. M., Peeples, T. L., and Lidstrom, M. E., "Physiological basis for three genetic copies of Particulate Methane Monooxygenase: Cloning and Mutant Analysis." Microbiology. Vol 145. Part 5, 1999, pp. 1235-1244.
8. Kim, J-W, Flowers, L., Whiteley, M., and Peeples, T. L. "Biochemical Confirmation of the Family 57-like alpha-amylase of *Methanococcus jannaschii*" Folia Microbiologica Vol 46. No. 6, 2001, pp. 467-473
9. Kim, J-W, Flowers, L., Terc, H., Whiteley, M., and Peeples, T. L. "Novel, Thermostable Family-13 glycoside hydrolase from *Methanococcus jannaschii*" Folia Microbiologica Vol 46. No 6., 2001, pp. 475-481
10. Hanford, M. J. and Peeples, T. L. "Archaea Tetraether Lipids: Unique Structures and Applications" Applied Biochemistry and Biotechnology, Vol. 97, No. 1, 2002, pp.45-62
11. Li, M., Kim, J.-W., and Peeples, T. L. "Kinetic enhancement of starch bioconversion in thermoseparating aqueous two-phase reactor systems " Biochemical Engineering Journal Vol 11. 2002. pp. 25-32
12. Li M., Kim J-W, and Peeples, T. L. "Amylase partitioning and extractive bioconversion of starch using thermoseparating aqueous Two-phase systems" Journal of Biotechnology Vol. 95. No. 1, 2002, pp. 15 - 26
13. Li, M., Terc, H.A., Kim, J-W and Peeples, T. L. "Energy-cost Reduction in Starch Processing Using Aqueous Two Phase Reactor Systems " Separation Science and Technology Vol. 38. No. 12 & 13, 2003, pp. 2709-2724.
14. Olivo, H, Peeples, T. L., Ríos, M-Y, Valázquez, F., Kim, J-W., and Narang, S. "Microbial *O*-Demethylation and  $\beta$ -4-*O*-Methylglucosidation of Methyl-Benzamide Ethers" Journal of Molecular Catalysis B: Enzymatic Vol. 21, 2003, pp. 97-105.

15. Peeples, T. L. "Biochemical Engineering", in Science Careers: Advice From Experts, Flowers, L. O, ed. 2003, Scarecrow Press, Lanham MD
16. Peeples, T L. "Introduction to Biochemical Engineering: Synthesis, Resourcefulness, and Effective Communication in Group Learning" Chemical Engineering Education Vol. 37. No. 3, 2003. pp. 174-179.
17. Fang J, Chan O, Kato C, Sato T, Peeples T, Niggemeyer K. "Phospholipid FA of piezophilic bacteria from the deep sea." Lipids. Vol. 38. No. 8, 2003, pp. 885-7.
18. Li, M. and Peeples, T. L. "Purification of hyperthermophilic archaeal amylolytic enzyme (MJA1) using thermoseparating aqueous two-phase systems. Journal of Chromatography B Vol 807, 2004, pp. 69-74.
19. Olivo, H. F, Osorio-Lozada A. , and Peeples, T. L. "Microbial oxidation/amidation of b-sulfanyl carboxylic acids –First asymmetric synthesis of (+)-(S)-modafinil" Tetrahedron: Assymmetric Vol 16, 2005, pp. 3507-11.
20. Horacio F. Olivo, Emmanuel Ankudey, and Tonya Peeples "Lipase-Mediated Epoxidations Utilizing UHP And Ethyl Acetate" Green Chemistry Vol 8. No. 10, 2006, pp. 923-926.
21. Jin-Woo Kim and Tonya Peeples "Screening Extremophiles for Bioconversion Potentials" Biotechnology Progress Vol. 22 No. 6, 2006, pp. 1720-1724.

### **Manuscripts In Preparation**

22. Li, M., Hanford, M. J., Kim, J-W. and Peeples, T. L. "Amyloglucosidase Enzymatic Reactivity inside lipid vesicles" 2007 *in preparation*
23. Nilausen, T.A., Kim, J-W., Fischer, S. E., Flowers, L., Jia, T., Adegboye, D. and Peeples T. L., "Influence of Tungsten and Carbohydrates on Metabolic patterns in *Methanococcus jannaschii*" 2007 *in preparation*
24. Hanford, M. and T. Peeples "Novel Expression Vector for *Methylobacterium extorquens* AM1" 2007 *in preparation*
25. Garikapati, J, McIver, A., Haman, K., Gyamerah M. and T. Peeples. "Biotransformation of Naphthalene to Chiral Diols in Organic Solvents" 2007 *in preparation*
26. Garikapati, J. and T. Peeples. "Biochemical Production of 1-Naphthol in Aqueous and Biphasic Systems 2007 *in preparation*

### **FUNDING RECORD**

#### **Current Support:**

Project/Proposal Title: **Center for Environmentally Beneficial Catalysis** (Faculty participant; PI Bala Subramanian; co-PIs Daryle Busch, Milroad Dudokovic, Joseph Heppert, John Rosazza)

Source of Support: NSF

Award Period: 6/1/03–5/31/08

*Tonya L. Peeples*

Total Award Amount: \$3,569,999 (Peeples share to date \$300,000)

Location of Project: Kansas University/Washington University St Louis/The University of Iowa/Prairie View A&M University

Time Commitment: 5%

Project/Proposal Title: **Microbial Biofilm Reactors for Processing Waste Materials** (PI of subcontract; Overall PIs Rex Montgomery and Robert Brown)

Source of Support: USDA (Biotechnology Byproducts Consortium)

Total Award Amount: \$1,459,762 (Peeples share \$405,000)

Total Award Period Covered: 3/1/99–8/30/08

Location of Project: Iowa State University/The University of Iowa

Time Commitment: 5%

Project/Proposal Title: **Graduate Assistantships in Areas of National Need**

Source of Support: Department of Education

Total Award Amount: \$1,356,742

Total Award Period Covered: 7/1/06–06/30/07

Location of Project: The University of Iowa

Time Commitment: 5%

Project/Proposal Title: **Graduate Assistantships in Areas of National Need**

Source of Support: Department of Education

Total Award Amount: \$300,000

Total Award Period Covered: 7/1/06–06/30/09

Location of Project: The University of Iowa

Time Commitment: 5%

Project/Proposal Title: **Iowa Regents University Alliance for Graduate Education and the Professoriate** (Iowa AGEP) (Faculty participant; PI Phil Kutzko)

Source of Support: NSF

Total Award Amount: \$2,500,000

Total Award Period Covered: 7/1/02–6/30/07 (Peeples trainee to date \$62,000)

Location of Project: University of Iowa, Iowa State University, University of Northern Iowa

Time Commitment: 0%

Project/Proposal Title: **Biocatalysis Training Grant** (Faculty participant; PI Dan Quinn)

Source of Support: NIH

Award Period: 7/1/00–6/30/05

Total Award Amount: \$1,000,000 (Peeples trainees to date \$53,000)

Location of Project: The University of Iowa

Time Commitment: 0%

### **Pending Support**

Project/Proposal Title: NIRT: Self-Assembly of Biological Molecules with Silica-Based Porous Nanoparticles by Receptor-Mediated Interactions (Co-PI, PI Sara Larsen)

Source of Support: NSF

Total Award Amount: \$1,400,000

*Tonya L. Peeples*

Total Award Period Covered: pending  
Location of Project: The University of Iowa  
Time Commitment: 5%

Project/Proposal Title: **Aqueous two-phase bioreaction systems in purification of extremozymes**  
(PI ; T. Peeples; Co-I, Mian Li)

Source of Support: NSF

Total Award Amount: \$300,000

Total Award Period Covered: Submission planned in near future

Location of Project: The University of Iowa/Western Research Institute, Laramie, WY

Time Commitment: 5%

### **Completed support**

Project/Proposal Title: **Literature Review of Hydrogen Production, Storage, Transportation and Utilization Technology** (Faculty advisor; Trainee Karen Haman)

Source of Support: Iowa Energy Center

Total Award Amount: \$4971

Total Award Period Covered: 6/15/06–8/15/06

Location of Project: The University of Iowa

Time Commitment: 0%

Project/Proposal Title: **Archaeal chaperonins can be used to extend the functional range of conditions in which enzymes can be used** (Faculty advisor; Trainee Kurtz Seipel)

Source of Support: NASA GSRP

Total Award Amount: \$66,000

Total Award Period Covered: 9/01–8/04

Location of Project: The University of Iowa

Time Commitment: 0%

Project/Proposal Title: **A molecular, biochemical and biophysical study on piezophilic bacterial adaptation to the deep-sea high pressure environment: Astrobiological implications** (co-PI; PI Jiasong Fang)

Source of Support: Iowa Space Grant Consortium

Total Award Amount: \$90,000

Total Award Period Covered: 2/1/02–1/31/05

Location of Project: The University of Iowa

Time Commitment: 3%

Project/Proposal Title: **Hybrid Thermal/Biological Conversion of Lignocellulose to Industrial Chemicals** (co-PI; co-PI Robert Brown)

Source of Support: DOE/Iowa Energy Center/Iowa State University

Total Award Amount: \$105,000

Total Award Period Covered: 7/1/1999- 6/30/2003

Location of Project: The University of Iowa

Time Commitment: 3%

Project/Proposal Title: **HEDS Program: “Extremophilic Interfacial Systems for Waste**

**Remediation Operations in Space**

Source of Support: NASA  
Total Award Amount: \$428,000  
Total Award Period Covered: 3/1/1999 - 11/30/2004  
Location of Project: The University of Iowa  
Time Commitment: 5%

Project/Proposal Title: **Faculty Early Career Development "Molecular Adaptation to Extremes: Engineering Protein Stability in Archaeal Proteoliposomes**

Source of Support: NSF  
Total Award Amount: \$310,000  
Total Award Period Covered: 6/1/1997 - 5/31/2002  
Location of Project: The University of Iowa  
Time Commitment: 10%

Project/Proposal Title: **Biohydroxylations of Norepibatidines using Archaeosome Immobilized Cytochrome P450** (co-PI; co-PI Horacio Olivo)

Source of Support: Univ. Iowa Bioscience Initiative  
Total Award Amount: \$50,000  
Total Award Period Covered: 12/01-6/02  
Location of Project: The University of Iowa  
Time Commitment: 3%

Project/Proposal Title: **Interfacial Processing of Non-aqueous substrates**

Source of Support: Carver Charitable Trust  
Total Award Amount: \$15,000  
Total Award Period Covered: 7/98-6/99  
Location of Project: The University of Iowa  
Time Commitment: 3%

Project/Proposal Title: **Extremophilic Conversion of Corn to Higher Value Products**

Source of Support: National Corn Growers Association --Corn Refiners Association Iowa Space Grant Consortium  
Total Award Amount: \$125,000  
Total Award Period Covered: 7/1/98-6/30/01  
Location of Project: The University of Iowa  
Time Commitment: 10%

Project/Proposal Title: **Gene Expression in Bioremediation Training Grant** (Faculty Participant; PI E. Peter Greenberg)

Source of Support: NSF  
Total Award Amount: \$1,500,000 (Peeples trainees to date \$38,000)  
Total Award Period Covered: 7/1/1997-6/30/2002  
Location of Project: The University of Iowa  
Time Commitment: 1%

**INVITED LECTURES AND CONFERENCE PRESENTATIONS**

**Invited Lectures**

10/2004	Engineering Stable Biocatalysts and Benign Processing from Biodiversity	Center for Biocatalysis and Bioprocessing University of Iowa	Iowa City, IA
11/2002	Engineering Stable Biocatalysts and Benign Processing from Biodiversity	University of Kansas	Lawrence, KS
2/2002	Engineering Stable Biocatalysts and Benign Processing from Biodiversity	Grinnell College	Grinnell, IA
4/2000	Uncovering Strategies for Stability in Extremophilic Archaea	Civil and Environmental Engineering	Iowa City, IA
12/99	Uncovering Strategies for Stability in Extremophilic Archaea	Johns Hopkins University	Baltimore, MD
12/99	Anomaly Hunting: Searching for Stabilizing Adaptations In Extremophilic Archaea	University of Delaware	Newark, DE
2/99	Anomaly Hunting: Searching for Stabilizing Adaptations In Extremophilic Archaea	Iowa State University	Ames, IA
10/98	Anomaly Hunting: Searching for Stabilizing Adaptations In Extremophilic Archaea	CBB Conference	Iowa City, IA
8/98	Survival and Proliferation of Extremophilic Archaea on Extracellular Polysaccharides	American Chemical Society	Boston, MA
4/98	Physiology and Biocatalysis in Extreme Environments	Med. Nat. Prod. Chem.	Iowa City, IA
11/97	Physiology and Biocatalysis in Extreme Environments	University of Minnesota	Minneapolis, MN
4/97	Biotechnology of Extremophiles	Dillard University	New Orleans, LA
2/97	Extremophilic Conversion of Corn to Higher Value Products	Iowa Corn Growers Association	Ames, IA
11/96	Environmental Remediation and Biocatalysis in Extreme Environments.	AIChE--local section	Amana, IA

## Conference Presentations

1. Emmanuel G. Ankudey (speaker), Horacio F. Olivo, and Tonya L. Peeples<sup>1</sup>Lipase-Mediated Epoxidation with Uhp in Ethyl Acetate *Posterr presented in the Biocatalysis & Protein Engineering Poster Session at the American Institute of Chemical Engineers 2006 Annual meeting* San Francisco, CA.
2. S. V. B. Janardhan Garikipati (speaker), Horacio F. Olivo, and Tonya L. Peeples. Solvent Tolerant Microbial Systems for Biocatalysis *Posterr presented at the Green Biotechnology Poster Session at the American Institute of Chemical Engineers 2006 Annual meeting* San Francisco, CA.
3. T. Akim Nilausen (speaker) and Tonya L. Peeples. Bioconversion of Biomass Using a Coculture of *Thermotoga Maritima* and *Methanococcus Jannaschii* *Paper presented in the Advances in Extreme Biocatalysis Session at the American Institute of Chemical Engineers 2006 Annual meeting* San Francisco, CA.
4. Nilausen, T. Akim (speaker) and T. Peeples “Bioconversion Of Corn Stover Pyrolysates Using A Coculture Of *Thermotoga Martima* And *Methanococcus Jannaschii*” *Paper presented at the American Institute of Chemical Engineers 2004 Annual meeting* Austin, Texas.
5. Kim, J.-W. (speaker) C. Long and T. Peeples Revealing Extreme Thermostability of Glycosyl Hydrolases from a Hyperthermophilic Archaeon *Methanococcus jannaschii*” *Paperr presented at the American Institute of Chemical Engineers 2004 Annual meeting* Austin, Texas.
6. Skrentner, J.(speaker), A. McIver, and T. Peeples “Biotransfrmation of 4-piperidinylacetophenone using *Beaveria Bassiana*” *poster presented at the American Institute of Chemical Engineers 2004 Annual student conference* Austin, Texas.
7. Fang J. (speaker), C. Kato, T. Sato, T. Peeples, O. Chan, L. Bilden, and K. Niggemeyer “Fatty acid composition of taxonomically diverse groups of piezophilic bacteria from the deep sea” submitted to the American Society of Microbiology 2003 General Meeting in Washington, D.C.
8. Fang, J. (speaker), O. Chan, L. Bilden T. L. Peeples, and K. Niggemeyer “Fatty Acids of Piezophilic Bacteria from the Deep Sea *Paper presented at the Annual Iowa Space Grant Consortium Conference.* Marshalltown, IA December 2002
9. Fang, Jiasong (speaker), O. Chan, L. Bilden T. L. Peeples, and K. Niggemeyer “Biochemistry and Biophysics of Piezophilic Bacteria” *Poster presented at the Annual Iowa Space Grant Consortium Conference.* Marshalltown, IA December 2002
10. Li, M., Hanford, M. J. , Kim, J.-W., and Peeples, T. L. (speaker), Modeling of Enzymatic Reactions in Interfacial Catalysis: The Case of Amyloglucosidase Entrapment in Dipalmitoylphosphatidylcholine Multilamellar Vesicles, *Poster presented at the American Institute of Chemical Engineers Annual Meeting,* Indianapolis, IN, November 2002
11. Nilausen, T. Akim (speaker) , S. E. Fischer, and T L. Peeples “High Value Products Using Extremophilic Cocultures” *Poster presented at the Annual Center for Bioprocessing And Biocatalysis Conference.* Iowa City, IA October 2002

12. Nilausen, T. Akim (speaker) , S. E. Fischer, and T L. Peeples “High Value Products Using Extremophilic Cocultures” *Poster presented at the USDA Byproducts from Bioprocessing Consortium Conference*. Iowa City, IA October 2002
13. Biglione N. (speaker), T. L. Peeples, and V. G. J. Rodgers “Pulsed Bioreactor For The Removal Of Atrazine From Water” *Poster presented at the Annual Center for Bioprocessing And Biocatalysis Conference*. Iowa City, IA October 2002
14. Biglione N. (speaker), T. L. Peeples, and V. G. J. Rodgers “Pulsed Bioreactor For The Removal Of Atrazine From Water” *Poster presented at the USDA Byproducts from Bioprocessing Consortium Conference*. Iowa City, IA October 2002
15. Seipel K. (speaker) and T. L. Peeples, “Archaeal Chaperonins can be used to stabilize proteins” *Poster presented at the Annual Center for Bioprocessing And Biocatalysis Conference*. Iowa City, IA October 2002
16. Li, M., Hanford, M. J. (speaker), Kim, J.-W., and Peeples, T. L. “Interfacial Catalysis: Amyloglucosidase entrapment in dipalmitoylphosphatidylcholine multilamellar vesicles” *Paper presented at the American Chemical Society Annual Meeting*, Boston MA August 2002
17. Peeples, T. L. " Synthesis, Resourcefulness, and Effective Communication in Group Learning: Introduction to Biochemical Engineering” *Poster presented at at ASEE Summer School For Chemical Engineering Professors, Boulder CO July 2002*
18. Li, M. (speaker), Kim, J-W. and Peeples, T. L. "Glucose Production by Enzymatic Hydrolysis of Starch in Immiscible Water-dodecane Two-phase Systems" *Abstract accepted as a paper presentation in the Microemulsions: Fundamentals and Applications session, American Institute of Chemical Engineers Annual Meeting*. Reno, NV November 2001
19. Li, M. (speaker), Kim, J-W. Terc, H., and Peeples T. L "Enzymatic Hydrolysis of Starch with Aqueous Two-Phase Systems." *Abstract accepted as a paper presentation in the Bio-Based Industrial Products: Where are we and where are we going? session, American Institute of Chemical Engineers Annual Meeting*. Reno, NV November 2001
20. Li. M. (speaker), Kim, J-W. and Peeples, T. L. " Energy-cost Reduction in Starch Processing Using Aqueous Two Phase Reactor Systems " *Paper accepted as for presentation at the 12<sup>th</sup> Annual Separation Science and Technology Symposium for Energy Applications*. October 2001 Gatlinburg, TN
21. Brown, R. C., Pometto, A., Peeples, T. L., Khiyami, M., Kim, J-W and Fischer, S. E. "Strategies For Pyrolytic Conversion Of Herbaceous Biomass To Fermentation Products" *Paper presented at the Ninth Biennial Bioenergy Conference, Buffalo, New York, October 17-20, 2000*
22. Kim, J-W, Fischer S. E.(speaker) and Peeples, T. L."Biotransformation of Levoglucosan by Extremophilic Organisms" *Poster presented at the Advances in Biocatalysis and Protein Engineering Session, American Institute of Chemical Engineers Annual Meeting, Los Angeles, CA, November 2000*
23. Kim, J-W., Terc, H. (speaker), and Peeples, T.L. "Novel Maltogenic Amylase from the Hyperthermophilic Archaeon, Methanococcus Jannaschii," *Paper presented at the Advances in Biocatalysis and Protein Engineering Session, American Institute of Chemical Engineers Annual Meeting November 2000.*

24. Warner, C. (speaker), Kim, J-W. and Peeples, T.L. "Biodegradation of Atrazine by *Pseudomonas* ADP: Kinetics of Cell Growth and Substrate Utilization" *Poster presented at the Student Poster Session, American Institute of Chemical Engineers Annual Meeting, November 2000.*
25. Terc, H. (speaker), Li, M., Kim, J-W. "Starch Hydrolysis With the a Hyperthermophilic Maltogenic -Amylase from *Methanococcus jannaschii* Using Aqueous Two-Phase Systems." *Poster presented at the Annual Center for Bioprocessing And Biocatalysis Conference. Iowa City, IA October 2000*
26. Kim, J-W. (speaker) and T. L. Peeples, "Extremophilic Conversion Of Corn To Higher Value Products" *Poster presented at the Corn Utilization and Technology Conference, Minneapolis MN, June 2000.*
27. Flowers, L., Kim, J-W, Whiteley, M., and Peeples, T. L. Novel Thermostable Amylase Activities in the Hyperthermophile, *Methanococcus jannaschii*. poster presented in the *Food Pharmaceutical and Bioengineering Poster Session III. AIChE Annual Meeting. Dallas, TX, 1999*
28. Hanford, M. (speaker), Kohen, E. and T. Peeples. Thermotropic Properties of Ether Liposomes from the Extreme Thermoacidophile, *Sulfolobus acidocaldarius*. poster presented in the *Food Pharmaceutical and Bioengineering Poster Session III. AIChE Annual Meeting. Dallas, TX, 1999*
29. T. Jia, J. Ticku, and T. L. Peeples (speaker), "Polysaccharides in the Survival and Proliferation of Extremophilic Archaea" *Presented in the Evolution and Engineering of Biocatalysis in Extreme Environments Session, American Chemical Society Annual Meeting, Boston, MA, August 1998*
30. Hanford, M. J. (Speaker) and Peeples T. L., Oxidative Mineralization of TCE in a Novel Recombinant. paper presented in the *Advances in Metabolic Engineering* session. AIChE Annual Meeting. Los Angeles, CA. November 1997
31. Jewell, H. (Speaker), Kohen E. D., and Peeples T. L., "Tetraether Lipid Extraction and Simultaneous Liposome Formation" Poster presented in the National Student Poster Competition. 3<sup>rd</sup> Place winner AIChE Annual Meeting. Los Angeles, CA. November 1997
32. H-H.A. T. Nguyen, M. Zhu, S. J. Elliott, K. H. Nakagawa, B. Hedman, A.M. Costello, T. L. Peeples, B. Wilkinson, H. Morimoto, P.G. Williams, H. G. Floss, M. E. Lidstrom, K. O. Hodgson, S. I. Chan. "The Biochemistry of the Particulate Methane Monooxygenase" in Microbial Growth on C1 Compounds, M. E. Lidstrom, and F. Robert Tabita (Eds.), Kluwer Academic Publishers, 1996.
33. Hanford, M. J., Thomas S. W. and Peeples T. L. "Growth, Metabolite Flux and TCE remediation with a novel, recombinant methylotroph" paper presented in the *Advances in Bioremediation Session AIChE Annual Meeting, Chicago, IL. November 1996.*
34. Kohen, E. D., and Peeples, T.L. "Tetratether lipid monolayers and protein stabilization: Extremophilic liposome analyses" poster presented in the *Bioengineering Poster Session , AIChE Annual Meeting. Chicago, IL. November 1996.*

35. Peeples, T.L., Costello, A.M., and Lidstrom, M.E. "Genetics of pMMO in Methanotrophs" *paper presented at the Spring meeting of the American Chemical Society April 1995 Anaheim, CA*
36. Peeples, T.L. and Kelly, R.M., " Bioenergetics of Metals Turnover in *Metallosphaera sedula*" *paper presented at the West Coast Bacterial Physiologists meeting. Nov. 1994, Asilomar, CA*
37. Muralidharan, V., Hirsh, I. S., Peeples, T. L., Kelly, R.M., Suy, I, and Bouwer, E. J., "Mixed Cultures of High Temperature Bacteria: Prospects for Bioprocessing of Fossil Fuels" Proceedings: 1991 Second International Symposium on the Biological Processing of Coal. EPRI, Sep. 1991
38. Kelly, R.M., Peeples, T. L., Muralidharan, V., Snowden L. J., Hirosue, S., and Olson, G. J., "Hyperthermophilic Archaeobacteria: Prospects for Bioprocessing of Fossil Fuels" Proceedings: 1990 First International Symposium on the Biological Processing of Coal. EPRI, Sep. 1990
39. Olson G. J., Peeples, T. L., Blumentals, I. I. Schicho, R. N., Brown, S. H. and Kelly, R.M. "Bioprocessing of Fossil Fuels Using Hyperthermophilic Archaeobacteria" Proceedings: 1989 Symposium on Biological Processing of Coal and Coal-Derived Substances. EPRI, Dec. 1989

### ***Courses Taught***

052:105	Chemical Reaction Engineering	
052:185	Chemical Process Control	
052:090	Chemical Engineering Departmental Seminar	
052:223	Introduction to Biocatalysis	
052:187	Chemical Process Safety	
059:005	Engineering Problem Solving I	<i>(new course, team taught)</i>
052:098	Ind.Inv. Program for Enhanced Design Experience	<i>(team taught)</i>
052:108	Introduction to Biochemical Engineering	
052:180	Advanced Biochemical Engineering	
052:181	Bioseparations	
052:198	Biochemical Engineering Group Meeting	
052:095	Contemporary Topics Biomolecular Basics	<i>(new lab course)</i>
052:045	Chemical Reaction Engineering	
052:191	Graduate Seminar	
052:091	Professional Seminar	
052:220	Biotechnology of Extremophiles	<i>(new course)</i>
057:005	Engineering I	
052:041	Process Calculations	

### ***Synergistic Activities***

Center for Biocatalysis and Bioprocessing, University of Iowa 1995-present  
Executive Board 1998 to present, Biocatalysis Conference Planning Committee 1998, 2000, 2002, 2004  
NSF RTG Training Grant, Admissions Committee, 1997 to present  
NIH Training Grant, Coordinating Committee 1999-present  
Advisory Council, Iowa Energy Center, 1998 - present

Bioengineering Programming Chair (15c), American Institute of Chemical Engineers 2003  
Minority Affairs Committee of American Institute of Chemical Engineers: Second Vice Chair  
2005  
Minority Affairs Committee of American Institute of Chemical Engineers: Liason to Student  
Chapter 1997-pres.  
Coordination of Diversity forums for AIChE Student Conference 1997-1998  
Urban Outreach: Science Experiments for Middle School Students: Los Angeles 1997, Dallas-  
1999.

### ***Educational Outreach and Curricular Development***

Advisory Council for the NSF Targeted Infusion Project: Development of a Bioengineering  
concentration in the Department of Chemical Engineering at Prairie View A&M University  
2006- pres  
Summer School for Chem. Engin. Prof., Amer. Soc. Engin. Ed., Boulder Colorado, Aug. 2000  
Intro. to Biochem. Engin.: Student Design Poster Session, Extremozyme Lab Experiment, and  
Panel Discussion, Student tour of Genencor International: 1998-2002  
Tutor 3<sup>rd</sup> -12<sup>th</sup> Graders Multi-Ethnic Engineering Student Assoc-Iowa City School District  
Faculty Advisor, Society of Women Engineers University of Iowa Chapter, 1996- pres.  
Faculty Advisor, National Organization for the Professional Advancement of Black Chemists and  
Chemical Engineers, University of Iowa Chapter, 2004- pres.  
Professional Panelist SWE High School Conference  
Member SWE-East Central Iowa Professional Section  
Student Research Mentorship  
Mentor: Secondary Student Training Program 1998-1999  
Mentor: NSF Research Experiences for Undergraduates Program 1996-1997  
Mentor: Funds for Improvement of Post Secondary Education Program 1996-1997  
Honors Thesis Advisor: Reed Morgan 2000, Chris Warner 2001, Erin Steenblock 2004

### ***Collaborators & Other Affiliations***

R. Brown, A. Pometto, and B. Shanks, Iowa State University:  
Jiasong Fang, Iowa State University  
Peter Reilly, Iowa State University  
V. Rodgers, University of Iowa  
H. Olivo, Univeristy of Iowa  
B. Subramanian, Kansas University  
M. Gyamerah, Prairie View A& M University  
D. Rethwissch, University of Iowa

#### ***Graduate and Postdoctoral advisors:***

Robert M. Kelly, Ph.D. advisor; North Carolina State University, Raleigh, NC  
Mary E. Lidstrom, postdoctoral advisor; University of Washington, Seattle, WA

#### ***PhD Candidates:*** Thesis advisees (total 7)

Michael Hanford, BS, Chemical Engineering, Rutgers University, 1995 - 2004  
Kurtz Seipel, BS, Biology, University of Wisconsin, Green Bay, 1999-pres.  
Nicole Biglione, BS/MS Chemical Engineering, Wayne State University, 2001-pres.  
Emmanuel Ankudey, BS Ghana, MS Norway Chemical Engineering, 2002 – pres.  
Akim Nilausen, BS, Chemical Engineering, Univ. of Iowa, 2000-pres.  
Angela McIver, BS, Chemical Engineering, Michigan State Univ, 2003--pres.  
Janardhan Garikapati, MS, Chemical Engineering, Univ. Wyoming, 2004-pres.

*MS Advisees – total 4*

Someet Narang, BS, UDCT, India, MS. University of Iowa 2002  
Henry Terc, BS, Biotechnology, University of Puerto Rico, MS. University of Iowa 2002  
Stephen Fischer, BS, Chemical Engineering, Notre Dame University, MS University of Iowa 2001  
Elizabeth Kohen BS, Chemistry, University of California Berkeley; MS University of Iowa, 1998

*Post Doctoral Advisees – total 3*

Jin-Woo Kim, BS Chemical Technology, Seoul National University; BS, Microbiol., Univ. of Iowa, MS, Microbiol., Univ. Wisc., Madison Ph.D. Texas A & M University, 1998, Postdoc. 1999-2001  
Mian Li, BS, MS, PhD Chemical Engineering, Zhejiang Univeristy, China, Postdoctoral study University of Porto, Portugal 1988-99, University of Alabama, 1999-00, Postdoc. 2000-2002  
David Adegboye, Assistant Professor, Biological Sciences, Dillard University, New Orleans LA 1996-pres. FIPSE Fellow at UI Summer 1996, 1999

***OTHER CONTRIBUTIONS TO INSTRUCTIONAL PROGRAMS***

**Workshops**

Fall 99 -- Workshop for the Retention and Advancement of Minority Engineering Educators, NSF-WEE, Arlington, VA  
Summer 2000 -- New Technologies in the Learning Environment, University of Iowa.  
Summer 2002 – ASEE Summer School for Chemical Engineering Professors, Boulder, CO  
Spring 2002 – Chemical Engineering Curriculum Revitalization Workshop, Orlando, FL  
Fall 2004 – NSF Workshop for Development of Minority Faculty in Engineering, Arlington, VA

**Educational committees**

CBE Undergrad. Curriculum Committee Chair	2002 – pres
Ad Hoc CBE Graduate Curriculum Committee	2001-2002
AICHE Minority Affairs Committee	
Liaison to Student Chapters	1998, 1999
Urban Outreach Coordinator	2002
ACT Science Test Question Reviewer	1996
U. Iowa CBE Curriculum Committee	1997
U. Iowa Graduate Admissions Committee	1998-pres.
U. Iowa NSF- RTG Admissions Committee	1997-pres.
GAANN Admissions Committee	2003-pres.

***OTHER RELEVANT INFORMATION ON MENTORING AND TEACHING***

**Ph.D. Committee Membership**

<u>Sem.</u>	<u>Student</u>	<u>Date</u>	<u>Topic</u>	<u>Dept</u>
Fall 04	C. Jones	10/04	MAS-NMR	Chemistry
Spg 04	J. Chen	4/04	Bioreactor Monitoring with NIR spectroscopy	Chemistry

Spg 04	M. Wissel	4/04	Cell Division	Microbiology
Spg 04	K. Tilakaratne	4/04	Oxygen transport	CBE
Fall 02	M. Scohlten		Biocatalytic Plastics	CBE
Spg 02	P. Rose		Baculovirus	CBE
Spg 02	SJ. R. Arend		Cell Division	Microbiology
Spg 02	S. Hrkstra		Glycosylation	CBE
Spg 02	D. Kim		Photopolymeriz.	CBE
Fall 00	M. Saarinen	8/02	Insect Cell Cult.	CBE
Fall 00	C. Histerich	5/02	Prot. Cryst.	CBE
Fall 00	M. Wissel		Cell Division	Microbiology
Fall 98	M. Wolff	6/99	Insect Cell Cult	CBE
Fall 97	C. Song	11/99	Atm. Chem.	CBE
Spg 97	C. Mitchell	6/97	Biocatalysis	CBE
Fall 95	P. Kitchaiya	12/95	Catalysis	CBE

### **Other Graduate Student Mentoring and Special Advising**

<u>Sem</u>	<u>Student</u>	<u>Description</u>
Spring 98	Marvin Whiteley	NSF-RTG: Cloned High Temperature Amylase
Sum 98-00	Lawrence Flower	Electron Microscopy/Sequencing of Amylase Enzymes

### **Undergraduate Student Advising and Mentoring**

<u>Sem.</u>	<u>Student</u>	<u>Project Description</u>	<u>Awards</u>
Spring 96	S. Thomas	Methylotroph bioremediation	
Spring 96	D. Decker	Thermophilic Mixed Cultures	
Fall 96	J. Ticku	Thermoacidophile physiology	
Summer 96	M. Bartek	Hyperthermophile cultivation	
Summer 97	O. Idewu	Bioreactor for Methylotrophs	
Fall 97	R. Mullin	Bioremediation	
Fall 97	H. Jewell	Thermoacidophilic Lipids	AIChE Poster 3 <sup>rd</sup>
Sum 98	D. Hillary	Cloned High Temp. Amylase	
Fall 98	K. Siepel	Thermoacidophile Physiology	
Fall 98	Ezra Eash	Methylotroph bioremediation	
	R. Morgan	Bioethanol	Honors Thesis
Fall 99	C. Warner	Bioconversion of Atrazine	Honors Thesis
Fall 99	R. Rosas	Bioconversion of Atrazine	
Fall 01	L. Koele	Extremophile cultivation	
Summer 02	K. Niggemeyer	Piezophile cultivation	
Spring 02	T. Bui	Genetic Mod. of Extremozyme	
Spring 02	C. Whitmore	Genetic Mod. of Extremozyme	
Spring 03	A. Alam	Fermentation of Lignocellulose hydrolysates	
Fall 04	E. Steenblock		Honors Thesis
Spring 04	J. Skrentner	Biotransformation with B.	AIChE Poster

		Bassiana	3 <sup>rd</sup> place Greer Engineering
Summer 04	V. Tachia	Biotransformation with Immobilized B. Bassiana	

### **Science Research Mentors for Highschool Students.**

<u>Sem</u>	<u>Student</u>	<u>Description</u>
Fall 95	Mathew Rude	Cultivating Extremophiles
Spring 97	Tim Kresowick	Cultivating Extremophiles
Summer 98	Beth Hochman	Cloned High Temp. Amylase
Summer 99	John Sauer	Biotransformation of Atrazine
Summer 02	Kate Rethwisch	ATPS
Summer 02	Jennifer Woller	Biotransf. of Atrazine

## **SERVICE ACTIVITIES**

### **Professional Societies**

<b>American Institute of Chemical Engineers (AIChE)</b>	1989-pres	Member
AIChE Food Pharmaceutical and Bioengineering (FP&B) Division (15c)	1996-pres	Member
AIChE FP&B	2003	Chair (15c)
AIChE FP&B	2002	vice-chair (15c)
<i>Extremophile Bioprocessing</i>	2004	Session Co-Chair
<i>Biochemical Engineering: Fundamentals, Innovations, and Technology</i>	2003	Topical Conference Chair
<i>Advances In Protein Structure, Function and Design</i>	2000	Session Co-Chair
<i>Advances in Biocatalysis and Protein Engineering</i>	1999	Session Co-Chair
<i>Young Faculty Forum</i>	1999	Panelist
<i>Advances in Biocatalysis and Protein Engineering</i>	1998	Session Chair
<i>Advances in Bioremediation</i>	1996	Session Chair

AIChE Minority Affairs Committee (MAC)	1995-pres	Member
AIChE MAC	2006	Chair
AIChE MAC	2005	Vice-Chair
Urban Outreach Coordinator: Science experiments for middle school students:		
Los Angeles	1997	
Dallas	1999	
Indianapolis	2002	
San Francisco	2006	
AIChE (MAC) liason to student chapters	1996-pres	Member
<i>Diversity in the Global Marketplace</i>	1998	Session coordinator
<i>Diversity in the Workforce</i>	1997	Session Chair
<i>Diversity as a Business Edge</i>	1996	Session Co-chair
AIChE Women's Initiatives Committee	1999-pres	Member
AIChE Environ. Technol. Div.	1996-pres	Member
<b>American Chemical Society (ACS)</b>	1996-pres.	Member
ACS Biotechnology (BIOT) Division	1996-pres	Member
<i>Evolution and Engineering Biocatlaysis in Extreme Environments</i>	1998	Session Chair
<b>Society of Women Engineers</b>	1996-pres.	UI Faculty Advisor
SWE East Central Iowa Chapter	2001	Member
<b>American Association for the Advancement of Science (AAAS)</b>	1999-pres	Member
<b>American Society for Engineeirng Education</b>	1999-pres	Member
<b>Association for Women in Science (Triangle Chapter)</b>	1993-1994	Member
<b>Tau Beta Pi</b>	1987-pres	Member

## Reviews of Scholarship

### Journals

Trends in Biotechnology	1995
Biotechnology and Bioengineering	1996-pres
Journal of Biotechnology	1997-1998

### Proposals

ACS Petroleum Research Fund	2001
NSF Bioengineering Directorate	1997-pres
NSF Career Program Reviewer	2002
NSF Large Bioengineering Proposals/ POWRE Program	2000
NSF Lexen Reviewer	1999
EPA-NSF Technology for a Sustainable Environment	1998

### Standardized tests

ACT Science Test Question Reviewer	1996
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## Departmental Service Activities

Undergraduate Curriculum Committee	2002-pres	Chair
AFG for Assistant Professor	2003	Chair
FPOA Committee	2003	Chair
Admissions Committee	1998-2001	Member
Faculty Search Committee	1999	Member
Graduate School Fair AIChE	1999	
Faculty Search Committee	1998	Member
Seaman's Center Space Proposal	1998	
CBE Curriculum Committee	1997	Member
Industrial Relations Committee Chair	1996	Chair

### College of Engineering Service Activities

Ethnic Inclusion Effort for Iowa Engineering	2006-pres.	
Tutor 6 <sup>th</sup> –12 <sup>th</sup> Graders, Multi-Ethnic Engineering Student Association–Iowa City School District	2002-pres.	Tutor
SWE UI Student Chapter	1996-pres	Faculty Advisor
UI SWE.High School Conference	1995, 1997, 2000, 2002,	Panelist
UI Women in Engineering Committee	1995-pres	Member
Dean Search Committee	Fall 1999	
Multiethnic Engineering Student Association (MESA) Annual Banquet	1999	MC
<i>Outreach to Northwest Jr. High Careers Day</i>	1997	
<i>Building on Diversity Colloquium</i>	1996	Panelist

### University of Iowa Service Activities

Faculty Panel to Meet with Governor Vilsack	2000	Member
Executive Board: CBB	1998-pres.	Member
CBB Conference Committee	1998	Member
NSF-RTG Admissions Committee	1999-pres.	Member
NIH Training Grant Coordinating Committee	2000-pres.	Member
Iowa Energy Center Advisory Board	1997 - pres.	Member
Greeters Panel for President Bush	2001	Member
Committee on Affirmative Action	1998	Member
Women in Science and Engineering (WISE) Leadership Conference	1998	Panelist
Illumine Advisory Board	1997-98	Member
Facets Course Instructor	1997	

### Community Service Activities

#### University Baptist Church

Girls in Action/Acteens Advisor	1999-2001.
Women's Missionary Union Director	1998-2002.
Worship Committee	1998-pres.
Youth Sunday School Teacher	2004-pres.