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EDUCATION

Ph.D. August 1982, Chemical Engineering,
Purdue University, West Lafayette, IN
B.S. June 1977, Chemical Engineering,
Indian Institute of Technology, Kanpur, India

RESEARCH

Systems Medicine and Systems Biology, Autism, Bio-Process
Engineering, Artificial Intelligence, On-Line Process Fault Diagnosis,
Modeling and Simulation of medical, biological and engineering systems

EXPERIENCE

September 1991+
until Present

Professor of Chemical & Biomolecular Engineering, Univ. of Delaware
(current Joint Appointment in Mathematical Sciences)

September 1987
to August 1991

Associate Professor of Chemical Engineering, University of Delaware

September 1988
to August 1989

Visiting Scientist (on Sabbatical) Pasteur Institute, Paris, France

September 1982
to August 1987

Assistant Professor of Chemical Engineering, University of Delaware

September 1977
to August 1982

Research/ Teaching Assistant Chemical Engineering, Purdue University

Visiting Professorships: University of Lyon, France, VNIT, Nagpur, India
University of Toronto, Canada

AWARDS

NSF Presidential Young Investigator Award, 1986-1991
College of Engineering Special Faculty Award, 1986
Elected Fellow, American Institute of Medical and
Biological Engineering, 2004

RESEARCH INTERESTS: Systems Medicine and Systems Biology, Autism, BioProcess Engineering, Artificial Intelligence, On-Line Process Fault Diagnosis, Modeling and Simulation of Engineering, Biological and Medical Systems

Our current research combines three decades of expertise in *biotechnology and artificial intelligence*. This research has resulted in over a hundred publications that have been cited over two thousand times with a H-index of 25. The top ten papers have been cited over 1000 times. The research has also resulted in the training of nearly 40 graduate students and post-doctoral research fellows (who are currently well placed in industry and academia) and over 60 undergraduate research students. The key research accomplishments are in the fields of Biochemical engineering and “On-line fault diagnosis”. Current research is in the area of Systems Biology and Modeling of Engineering Systems. In biotechnology, we are currently applying mathematical models and knowledge-based approaches to convert biological and medical data to useful knowledge. In chemical process systems, we are analyzing on-line data using hybrid mathematical-heuristic approaches to diagnose faults. Common to both these application areas are the use of dynamic models, qualitative domain knowledge and artificial intelligence approaches for data interpretation and knowledge integration.

Our past research in biotechnology has resulted in a better understanding of microscopic and macroscopic variables that influence the *kinetics of genetically engineered microorganisms*. The work from 1977 to 2000 in biochemical engineering was largely experimental. In joint research with the Pasteur Institute in Paris, Kostas Tokatlidis examined the effect of gene sequence and protein structure on the mechanism of inclusion body (protein aggregate) formation during high-level expression of cellulolytic proteins in recombinant cells. The papers from this work were cited nearly 300 times. As part of collaborative research with DuPont in environmental biotechnology, Konstantin Konstantinov (DuPont/Delaware) investigated the use of bioluminescent recombinant microorganisms as sensors for pollutants. The related paper has been cited 250 times.

A second major area of our research is *Knowledge-Based Process Monitoring and Fault Diagnosis*. In a joint project with Foxboro and DuPont (1982-86), we were involved in a pioneering effort for the first industrial application of an expert system, FALCON (Fault Analysis Consultant), for on-line fault diagnosis in a dynamic chemical process (DuPont adipic acid plant in Victoria, Texas). A key aspect of our work with intelligent monitoring and diagnostic systems is the exploitation of qualitative domain knowledge from heuristics as well as quantitative knowledge from mathematical models.

We are currently combining our past expertise in biotechnology and knowledge-based systems to examine novel applications in *Systems Biology*. In a joint project with Allan Shapiro in Plant Science, we developed a mathematical model of signaling pathways in Arabidopsis disease resistance. We have recently developed a systems connectivity model of Autism (Medical Hypotheses, 80, 264-270,(2013). Our goal is to develop system level models and tools for analysis and integration of information at various levels of hierarchy in biological systems. Our review article on Systems Biology (April 2008) points to the future direction of our research.

PUBLICATIONS (Citations 3100+, H-index 31, i10-index 56)

1. Proceedings: P. Dhurjati and George Stephanopoulos, Editors, "On-line Fault Detection and Supervision in the Chemical Process Industries", IFAC Symposia Series, 1993, Number 1, ISBN 0-08-041896-1, Pergamon Press, Oxford, (1993)
2. Proceedings: P. Dhurjati and Sylvie Cauvin, Editors, "On-line Fault Detection and Supervision in the Chemical Process Industries 1998", ISBN 0-08-043233-6, Pergamon Press, Oxford, (1998)
3. Dhurjati, P., D. Ramkrishna, M. C. Flickinger and G. T. Tsao, "Cybernetic Modeling of Microbial Growth in Multiple Substrate Systems," *Proc. Sec. World Cong. Chem. Eng.*, 16 (5), 252-255 (1981)
4. Chester, D. L., D. E. Lamb and P. Dhurjati, "An Expert System Approach to On-Line-Alarm Analysis in Power and Process Plants," *Computers in Engineering, ASME*, 1, 345-351 (1984)
5. Chester, D. L., D. E. Lamb and P. Dhurjati, "Rule-Based Computer Alarm Analysis in Chemical Process Plants," *Microdelcon*, 1, 22-29 (1984)
6. Dhurjati, P., D. Ramkrishna, M. C. Flickinger and G. T. Tsao, "[A Cybernetic View of Microbial Growth: Modeling of Cells as Optimal Strategists](#)," *Biotechnology and Bioengineering*, 27, 1-9 (1985)
7. Givler, R. M., P. Dhurjati and M. T. Klein, "[A Model Compound Analysis of a Strategy for the Selective Microbial Pretreatment of Lignin](#)," *The Chemical Engineering Journal*, 30, (2), B37-B41 (1985)
8. Lamb, D. E., P. Dhurjati and D. L. Chester, "[Development of an Expert System for Fault Identification in a Commercial Scale Chemical Process](#)," *Proc. Sixth Int. Workshop on Expert Systems and Their Applications*, Avignon, 2, 1371-1382 (1986)
9. Hopkins, D. J., M. J. Betenbaugh and P. Dhurjati, "[Effects of Dissolved Oxygen Shock on the Stability of Recombinant *Escherichia coli* Containing Plasmid pKN401](#)", *Biotechnology and Bioengineering*, 29, 85-91 (1987)
10. Pih, N. and P. Dhurjati, "[Oscillatory Behavior of beta-galactosidase Enzyme Activity in *Escherichia coli* during Perturbed Batch Experiments](#)", *Biotechnology and Bioengineering*, 29, 292-296 (1987)
11. DiPasquantonio, V. M., M. J. Betenbaugh and P. Dhurjati, "[Improvement of Product Yields by Temperature Shifting of *Escherichia coli* Cultures Containing Plasmid pOU140](#)", *Biotechnology and Bioengineering*, 29, 513-519 (1987).
12. DeBernardez, E. and P. Dhurjati, "[Effect of a Broad-Host Range Plasmid on the Growth Dynamics of *Escherichia coli* and *Pseudomonas putida*](#)", *Biotechnology and Bioengineering*, 29, 558-565 (1987)
13. Coppella, S. J., C. M. Acheson and P. Dhurjati, "[Measurement of Copy Number Using HPLC](#)", *Biotechnology and Bioengineering*, 29, 646-647(1987)

14. Coppella, S. J. and P. Dhurjati, "[Low Cost Computer-Coupled Fermentor Off-Gas Analysis via Quadrupole Mass Spectrometer](#)", *Biotechnology and Bioengineering*, 29, 679-689 (1987)
15. Kim, S. U. and P. Dhurjati, "[Analysis of Two Interacting Bacterial Populations with Opposite Substrate Preferences](#)", *Biotechnology and Bioengineering*, 29, 1015-1023 (1987)
16. Betenbaugh, M. J., V. M. diPasquantonio and P. Dhurjati, "[Growth Kinetics of Escherichia coli Containing Temperature-Sensitive Plasmid pOU140](#)", *Biotechnology and Bioengineering*, 29, 1164-1172(1987)
17. Coppella, S. J., C. M. Acheson and P. Dhurjati, "[Isolation of High Molecular Weight Nucleic Acids for Copy Number Analysis Using HPLC](#)", *Journal of Chromatography*, 402, 189-199 (1987)
18. Dhurjati, P., D. E. Lamb and D. C. Chester, "Experience in the Development of an Expert System for Fault Diagnosis in a Commercial Scale Chemical Process", *Foundations of Computer Aided Process Operations*, 589-625, Elsevier Science Publishers, New York (1987)
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21. Pih, N. P., E. DeBernardez and P. Dhurjati, "[Elucidation of Enzyme Control Mechanisms Using Macroscopic Measurements in a Mixed Substrate Fermentation System](#)", *Biotechnology and Bioengineering*, 31, 311-320 (1988)
22. DeBernardez, E. D. and P. Dhurjati, "[Host-Plasmid Interactions in Gram-Negative Bacteria Harboring Broad-Host Range Plasmids](#)", *BioProcess Engineering*, 3, 141 (1988)
23. Bree, M. A., P. Dhurjati, R. F. Geohagen and B. Robnett, "[Kinetic Modeling of Hybridoma Cell Growth and Immunoglobulin Production in a Large Scale Suspension Culture](#)", *Biotechnology and Bioengineering*, 32, 1067-1072 (1988)
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57. Pillai, V., A. Beris and P. Dhurjati, "[Implementation of model-based optimal temperature profiles for autoclave curing of composites using a knowledge-based system](#)", *Industrial and Engineering Chemistry Research*, 33, 2443-2452 (1994)
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62. Kordon, A. and P. Dhurjati, "An Expert System for Crude Unit Process Supervision", *Proc. Third IFAC Symp. on On-line Fault Detection and Supervision in the Chemical Process Industries*, 35-39 (1995)
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88. R. J. Brendel, B. A. Ogunnaike, P. S. Dhurjati, "[Nonlinear PI Controllers Based on Low-Order Empirical Process Models](#)", *IEC Research*, 42, 4668-4677 (2003)
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105. Colin Heberling, Prasad Dhurjati and Myron Sasser, "[Hypothesis for a systems connectivity model of autism spectral disorder pathogenesis: Link to gut bacteria, oxidative stress and intestinal permeability](#)", *Medical Hypotheses*, 80, 264-270 (2013)

106. Aditya Utturkar, Bikram Paul, Hemanth Akkiraju, Jeremy Bonor, Prasad Dhurjati and Anja Nohe, "[Development of PBPK model of BMP2 in Mice](#)", Biological Systems, volume 2, issue 4, 1000123 (2013)
107. Alex J. Apostolidis, Antony Beris, and Prasad S. Dhurjati, "[Introducing CFD Through a Cardiovascular Application in a Fluid Mechanics Course](#)", Chemical Engineering Education, Volume 48, No. 3, Summer Issue, 175- 184 (2014)
108. Jeremy Bonor, Vandhana Reddy, Hemanth Akkiraju, Prasad Dhurjati and Anja Nohe, "[Synthesis of L-Lysine Conjugated Silver Nanoparticles smaller than 10 nM](#)", Advanced Science, Engineering and Medicine, Volume 6, Number 9, 942-947 (2014)
109. Ryan Downs, Jonathon Perna, Andrew Vitelli, Daniel Cook, Prasad Dhurjati, "[Model-based hypothesis of gut-microbe populations and gut/brain barrier permeabilities in the development of regressive autism](#)", Medical Hypotheses, 83-649-655 (2014)
110. Sean G. Mack, Daniel J. Cook, Prasad Dhurjati, Matthew E. R. Butchbach, "[Systems Biology Investigation of cAMP Modulation to increase SMN levels for the Treatment of Spinal Muscular Atrophy](#)", doi:10.1371/journal.pone.0115473, PLoS One, 9 (12) e115473 (2014)
111. Alexander Delluva, Saul Salonga, Brandon Stewart, Jay Arivalagan, Rachel Lehr, Prasad Dhurjati, Mark Shiflett, "[CHE Junior Laboratory and the New Kinetics Experiment at the University of Delaware](#)", Chemical Engineering Education, Fall Issue, Vol. 3, 149-156 (2015)
112. Colin Heberling and Prasad Dhurjati, "[Novel Systems Modeling Methodology in Comparative Microbial Metabolomics: Identifying Key Enzymes and Metabolites Implicated in Autism Spectrum Disorders](#)", Int. Journal of Molecular Science, 16(4), 8949-8967 (2015)
113. Bronson Weston, Benjamin Fogal, Daniel Cook, Prasad Dhurjati, "[An agent-based modeling framework for evaluating hypotheses on risks for developing autism: Effects of the gut microbial environment](#)", on-line, <http://dx.doi.org/10.1016/j.mehy.2015.01.027> Medical Hypothesis, 84 (4), 395-401 (2015)
114. MJ Gilkey, V.Krishnan, L. Scheetz, X. Jia, A.K. Rajasekaran, P.S. Dhurjati, "[Physiologically Based Pharmacokinetic Modeling of Fluorescently Labeled Block Copolymer Nanoparticles for Controlled Drug Delivery in Leukemia Therapy](#)", CPT Pharmacometrics and Systems Pharmacology, 4(3), 167-174 (2015)
115. Hailey Cramer, Chirag Mevawala, Saul Salonga, Chelsea Shockey, Ru Chen, David Colby, Prasad Dhurjati, Mark Shiflett, "[Chemical Engineering Senior Laboratory: The](#)

[University of Delaware](#)”, Chemical Engineering Education, 2 (50), 131-140 (2016)

116. A. Lisberg, R. Ellis, K. Nicholson, P. Moku, A. Swarup, P. Dhurjati, A. Nohe, “[Mathematical Modeling of the Effects of CK2.3 on Mineralization in Osteoporotic Bone](#)”, CPT: Pharmacometrics & Systems Pharmacology, 6, 208-215 (2017)

117. J. Caccavle, D. Fiumara, M. Stapf, L. Sweitzer, H.J. Anderson, J. Gorky, P. Dhurjati and D.S. Galileo, “[A simple and accurate rule-based modeling framework for simulation of autocrine/paracrine stimulation of glioblastoma cell motility and proliferation by L1CAM in 2-D culture](#)”, BMC Systems Biology, 11: 124 (2017)

CONFERENCE PRESENTATIONS

Dhurjati, P., D. Ramkrishna, M. C. Flickinger and G. T. Tsao, "Microbial Growth on Multiple Substrates. Models of Cells as Optimal Strategists," Annual AIChE Meeting, Chicago, November 1980, Session 105, Paper a.

Dhurjati, P., D. Ramkrishna, M. C. Flickinger and G. T. Tsao, "A Computer Assisted Experimental Investigation of the Growth of *Klebsiella pneumoniae* in Multiple Substrate Systems," Annual AIChE Meeting, Los Angeles, November 1982, Session 88, Paper b.

Dhurjati, P., and M. S. Corley, "Conflicting Microbial Growth Using a Computer-Coupled Fermenter," Annual AIChE Meeting, San Francisco, November 1984, Session 72, Paper a.

Laffend, L. A., and P. Dhurjati, "Growth Dynamics and Plasmid Segregation of Recombinant *Bacillus subtilis*," 190th National American Chemical Society Meeting, Chicago, September 1985.

Pih, N. P., and P. Dhurjati, "Elucidation of Enzyme Control Mechanisms Using Macroscopic Measurements in a Mixed Substrate Fermentation System," 190th National American Chemical Society Meeting, Chicago, September 1985.

Betenbaugh, M. J., and P. Dhurjati, "Growth Kinetics of Temperature-Sensitive Recombinant Cells," 190th National American Chemical Society Meeting, Chicago, September 1985. (Winner Of Peterson Award).

Chester, D. L., D. E. Lamb, P. Dhurjati and J. Hale, "An Academic/Industry Project to Develop an Expert System for Chemical Process Fault Detection," Annual AIChE Meeting, Chicago, November 1985.

Hopkins, D. J., M. J. Betenbaugh and P. Dhurjati, "Environmental Effects on the Growth of A Recombinant Population of *Escherichia coli* containing Plasmid pKN 401," Annual

AICHE Meeting, Chicago, November 1985.

Fickelscherer, R., P. Dhurjati, D. Lamb and D. Chester, "Role of Dynamic Simulation in the Construction of Expert Systems for Process Fault Diagnosis," paper 51d, AIChE National Meeting, New Orleans, April 1986.

Galt, S. E., and P. Dhurjati, "Control of Recombinant *Escherichia coli* containing Temperature-Sensitive Plasmid pOU 140," American Control Conference, Seattle, June 1986. (Winner of Award for Best Presentation in Applications of Advanced Process Control Section).

DeBernardez, E., and P. Dhurjati, "Effect of a Broad-Host Range Plasmid on the Growth Dynamics of *E. coli* and *P. putida*," Engineering Foundation's Fifth International Conference on Biochemical Engineering, Henniker, July 1986.

Betenbaugh, M. J., and P. Dhurjati, "Identifying Copy Number and Gene Expression Effects on the Kinetics of *E. coli* containing Temperature-Sensitive Plasmids," 192nd American Chemical Society Meeting, Anaheim, Sep. 1986.

Coppella, S., C. M. Acheson and P. Dhurjati, "Growth Kinetics, Plasmid Stability and Foreign Gene Expression in *Saccharomyces cerevisiae*," 192nd American Chemical Society Meeting, Anaheim, September 1986.

Galt, S. E., and P. Dhurjati, "Mathematical Modeling of Recombinant *E. coli* with Temperature-Sensitive Plasmid pOU140," 192nd American Chemical Society Meeting, Anaheim, September 1986.

DeBernardez, E., and P. Dhurjati, "Effect of a Broad-Host Range Plasmid on the Growth Dynamics of Three Gram-Negative Bacteria," 192nd American Chemical Society Meeting, Anaheim, September 1986.

Bree, M. A., P. Dhurjati, R. F. Geohagen and B. M. Robnett, "Kinetics of Hybridoma Growth in Suspension Culture and Immunoglobulin Formation," 192nd American Chemical Society Meeting, Anaheim, September 1986.

DeBernardez, E., P. Dhurjati and D. E. Lamb, "A Hybrid Heuristics and Mathematical Model Based Expert System to Diagnose Metabolic State of Cells," 192nd American Chemical Society Meeting, Anaheim, September 1986.

Kim, D., S. Kim and P. Dhurjati, "Mathematical Modeling of the Mixed Culture Growth of Two Bacterial Populations with Opposite Substrate Preferences," 192nd American Chemical Society Meeting, Anaheim, September 1986.

Coppella, S. J., C. M. Acheson and P. Dhurjati, "Measurement of Copy Number Using HPLC," 192nd American Chemical Society Meeting, Anaheim, September 1986.

DeBernardez, E., and P. Dhurjati, "Prediction of the Dynamic Behavior of Temperature-

Sensitive Recombinant Cells Using a Hybrid Heuristics and Mathematical Model Based Expert System," AIChE Annual Meeting, Miami, November 1986.

Betenbaugh, M. J., V. diPasquantonio and P. Dhurjati, "Improvement of Product Yields by Temperature-Shifting *E. coli* Cultures Containing Plasmid pOU140," AIChE Annual Meeting, Miami, November 1986.

Lamb, D. E., P. Dhurjati, D. Chester and R. Fickelscherer, "Use of Mathematical Models in the Construction of Expert Systems for Fault Diagnosis in Chemical Plants," IMACS International Symposium on AI, Expert Product Yields by Temperature-Shifting *E. coli* Cultures Containing Plasmid pOU140," AIChE Annual Meeting, Miami, November 1986.

Fickelscherer, R., P. Dhurjati, D. Lamb and D. Chester, "The FALCON Project: Application of An Expert System to Fault Diagnosis," AIChE Spring National Meeting, Houston, Paper 82a, April 1987.

Lamb, D. E., P. Dhurjati, D. Chester and R. Fickelscherer, "Use of Mathematical Models in the Construction of Expert Systems for Fault Diagnosis in Chemical Plants," IMACS International Symposium on AI, Expert Systems and Languages in Modeling and Simulation, Barcelona, Spain, June 1987.

Bischoff, K., and P. Dhurjati, "Bioengineering," Session on "The New Technologies in Chemical Engineering," Paper 151c, AIChE Annual Meeting, New York, November 1987.

Varrin, R. D., and P. Dhurjati, "Implementation of an Expert System for On-Line Fault Diagnosis in a Commercial Scale Chemical Process," Paper No. 21a, AIChE Spring National Meeting, New Orleans, March 1988.

Coppella, S. J., and P. Dhurjati, "A Structured Mathematical Model for Recombinant Yeast Phenomena," 196th National Meeting of The American Chemical Society, Los Angeles, Sept. 25-30 (1988).

Coppella, S. J., and P. Dhurjati, "Production Kinetics of Human Epidermal Growth Factor in Recombinant Yeast," 196th National Meeting of The American Chemical Society, Los Angeles, Sept. 25-30 (1988).

Betenbaugh, M. J. and P. Dhurjati, "Independent Regulation of Recombinant Gene Expression and Plasmid Copy Number to Identify Metabolic Effects in *E. coli*," 196th National Meeting of the American Chemical Society, Los Angeles, September 25-30 (1988).

Petti, T. F. and P. Dhurjati, "A Generalized Model-Based Approach to Automated Fault Diagnosis" AIChE Spring National Meeting, Orlando, March 18-22 (1989).

Dhurjati, P., K. Tokatlidis, P. Beguin, R. Tremel, R. Longin and J-P Aubert, "Inclusion bodies formed by an endoglucanase and a xylanase cloned in *E. coli*," 199th National Meeting of the American Chemical Society, Boston, MA, April 22-27 (1990).

Leipold, R. J., R. W. Morgan and P. Dhurjati, "Specialized Ribosome System for the Overproduction of Proteins in *E. coli* ," AIChE National Meeting, Chicago, November (1990).

Tokatlidis, K., P. Dhurjati, J. Millet, P. Beguin and J-P. Aubert, "Corps d'inclusion contentant une protéine recombinante active," Meeting on "Conception, selection, production and analysis of proteins of a new generation," organised by French Society for Microbiology and French Society of Biochemistry and Molecular Biology, Ecole Polytechnique, Palaiseau, Region Parisienne, May 15-17, (1991).

Petti, T. F. and P. Dhurjati, "Hydrogen Balance Advisory Control," IFAC Workshop on "Computer Software Structures integrating AI/KBS Systems in Process Control," Bergen, Norway, May 29-30 (1991).

Leipold, R. J., R. W. Morgan and P. Dhurjati, "Specialized Ribosomes and Feedback Regulation of rRNA Synthesis in *E. coli*," American Chemical Society National Meeting, New York, August (1991).

Leipold, R. J., R. W. Morgan and P. Dhurjati, "Mathematical Model of Temperature-Sensitive Plasmid Replication," AIChE National Meeting, Los Angeles, November (1991).

Petti, T. F., and P. Dhurjati, "Using Fuzzy Intervals for Resource Management," AIChE National Meeting, Los Angeles, November (1991).

Pillai, V., A. Beris and P. Dhurjati, "Use of Local Criteria in Optimization of Batch Processes," AIChE National Meeting, Los Angeles, November (1991).

Tokatlidis, K., P. Dhurjati, J. Millet, P. Béguin, and J. P. Aubert, "High Activity of Inclusion Bodies formed in *Escherichia coli* overproducing *Clostridium thermocellum* Endoglucanase-D," American Chemical Society, National Meeting, San Francisco, April, (1992).

Klein, Jim and P. Dhurjati, "Experimental Investigation of the In-vivo Kinetics of Inclusion Body Formation," American Chemical Society, National Meeting, San Francisco, April, (1992).

Tokatlidis, K., S. Salamiou, P. Béguin, P. Dhurjati and J. P. Aubert, "Interaction of the Duplicated Segment carried by *Clostridium thermocellum* Cellulases with Cellulosome Components ," American Chemical Society, National Meeting, San Francisco, April, (1992).

Tokatlidis, K., S. Salamiou, P. Beguin, P. Dhurjati, J. Millet and J. - P. Aubert, "Properties of the Duplicated Segment carried by *Clostridium thermocellum* Cellulases," Ninth International Biotechnology Symposium, Crystal City, VA, August, (1992).

K. Konstantinov, T. Van Dyk, W. Majarian, P. Dhurjati, R. Larossa, "On-line Monitoring of the Physiological State of Recombinant Cultures," American Chemical Society, National Meeting, Denver, April, (1993).

T. Van Dyk, W. Majarian, K. Konstantinov, P. Dhurjati, R. Larossa, "Pollutant Detection by Induction of a Heat Shock Promoter-lux Gene Fusion in *Escherichia coli* K12" American Society of Microbiology National Meeting, May, (1993).

R. Larossa, D. A. Smulski, W. Majarian, R. Young, S. Belkin, A. C. Volmer, P. Dhurjati, and T. K. Van Dyk, "Luminescent Sensors Detecting Cellular Stress," American Chemical Society, San Diego, March, (1994).

S. Rupani, K. Konstantinov, P. Dhurjati, T. Van Dyk, W. Majarian, P. Dhurjati, "On-line monitoring of recombinant *Escherichia coli* in batch and continuous cultures using a *grpE* promoter bioluminescence reporter gene system," American Chemical Society, San Diego, March, (1994).

A. Kordon and P. Dhurjati, "Model-Based Expert System for Improving Productivity of a Refinery Crude Unit," AIChE Spring National Meeting, Atlanta, April, (1994).

Z.-Y. Yang, V. Pillai, A.N. Beris, and P. Dhurjati, "Integrated Simulation, Optimization and Control of Autoclave Curing of Thick Laminate Composites," CADCOMP94 Conference, June, Southampton, U.K. (1994).

P. Dhurjati, S. Rupani, V. Pillai, T. Van Dyk, R. LaRossa, "Intelligent Supervision and Control of a Bioluminescent Culture for Development of an On-line Biosensor System," Annual AIChE Meeting, San Francisco, November (1994).

D. J. Michaud, A. N. Beris, P. S. Dhurjati, "Curing Behavior of Thick Composites Manufactured by RTM," Joint Composites Workshop on Manufacturing Science of Composites, Newark, September (1995).

D. J. Michaud, A. N. Beris, P. S. Dhurjati, "Kinetic Behavior of a Vinyl-Ester Resin Within a Thick-Sectioned Composite," AIChE National Meeting, Chicago, November (1996).

R. J. Brendel, B. A. Ogunnaiké, P. Dhurjati, "A Nonlinear PI Controller Based on a Low-Order Empirical Process Model," AIChE National Meeting, Chicago, November (1996).

Robert Brendel and Prasad Dhurjati, "A Method for Analyzing Dynamics of Heat-Integrated Processes", AIChE National Meeting, Los Angeles, Nov 1997.

Kordon, A., Y. O. Fuentes, B. A. Ogunnaike, P. Dhurjati, (ESCAPE Conference, Trondheim, Norway), "An Intelligent Parallel Control System Structure for Plants with Multiple Operating Regimes," *Computers and Chemical Engineering*, S119-S124 (1997)

Z. Chen, J-T Oh, P. Dhurjati, T. K. Van Dyk, R. A. LaRossa, S. L. Cooper, "Synthesis and Toxicity Evaluation of Dendritic Biocides", Annual Meeting of the Society for Biomaterials, April 22-26, San Diego, 1998

R. P. Wool, S. H. Kusefoglu, S. N. Khot, R. Zhao, G. Palmese, A. Boyd, C. Fisher, S. Bandyopadhyay, A. Paesano, P. Dhurjati, J. LaScala, G. Williams, K. Gibbons, M. Bryner, J. Rhinehart, C. Wang, and C. Soultoukis, "Affordable Composites from Renewable Sources", *Polym. Prepr.*, American Chemical Society, Div. Polymer Chemistry, Boston, 39, 90 (1998).

D. J. Michaud, A. N. Beris, P. S. Dhurjati, "Robust Design Optimization of a Batch Composite Process Using Evolutionary Strategies," AICHE Annual Meeting, Dallas, TX (November 1999).

D. J. Michaud, A. N. Beris, P. S. Dhurjati, "System Analysis and Processing of Thick-Sectioned Vinyl Ester Composite Systems," AICHE Annual Meeting, Dallas, TX (November 1999).

I. Trezzani,, M. Nadri, C. Dorel, H. Hammouri, J. Lieto, P. Lejeune, R. Longin, P. Dhurjati, "On-line control of fermentation processes using recombinant bioluminescent bacteria", Eleventh International Symposium on Bioluminescence and Chemiluminescence, Asilomar, CA, (September 2000).

D. J. Michaud, P. S. Dhurjati, and Keith S. Decker, "Intelligent Multi-Agent System for Information Management and Interpretation in Biotechnology Applications", AICHE Annual Meeting, Los Angeles, CA, (Nov. 12-17, 2000).

Dennis Michaud (speaker), Keith Decker, and Prasad Dhurjati, "A Bioinformatic Framework to Integrate Biological Knowledge with Methods for Analyzing Gene Expression Data," presented at the 1st North American Symposium on Chemical Reaction Engineering, Houston, TX (January 2001).

Pascal Dufour, Sharad Bhartiya, Thomas J. English, Edward P. Gatzke, Prasad S. Dhurjati and Francis J. Doyle III, "Fault Detection in a Continuous Pulp Digester", Fourth IFAC Workshop on "On-Line Fault Detection and Supervision in the Chemical Process Industries", Seoul, South Korea (June 8-9, 2001).

Dennis J. Michaud and Prasad S. Dhurjati, "A Dynamic Gene Expression Simulator to Examine Regulatory Networks and Evaluate Analysis Methods," presented at the 2001 AICHE Annual Meeting, Reno, NV (November 2001).

Dennis J. Michaud, Prasad S. Dhurjati, and Antony N. Beris, "Model-Based Global

Optimization Using Robust Evolutionary Strategies," presented at the 2001 AIChE Annual Meeting, Reno, NV (November 2001).

Vikas Agrawal, Chu Zhang, Allan D. Shapiro, and Prasad S. Dhurjati, "Computational Biology Approaches to Disease Resistance Signal Transduction", 3rd Annual Arabidopsis Minisymposium, College Park, MD (April 13, 2002).

Sharad Bhartiya, Selwa Ben Amor, Prasad Dhurjati, Frank Doyle, "Process Modeling, Control, And Monitoring For A Continuous Kamyir Digester", International Symposium on Process Systems Engineering and Control(ISPSEC'03), IIT Bombay, India, (Jan 2003)

Vikas Agrawal, Chu Zhang, Allan D. Shapiro, and Prasad S. Dhurjati, "Genetics-based Dynamic Modeling and Computational Guidance for Reengineering of the Programmed Cell Death Response in Arabidopsis Disease Resistance", 4th Annual Arabidopsis Minisymposium, College Park, MD (April 12 2003).

Vikas Agrawal, Chu Zhang, Allan D. Shapiro, and Prasad S. Dhurjati, " A Systems Biology Approach to Understanding the Arabidopsis Hypersensitive Response", 464, 14th International Conference on Arabidopsis Research, Madison, WI (June 20-24 2003).

Vikas Agrawal, Chu Zhang, Allan D. Shapiro, and Prasad S. Dhurjati, "Dyanmic Mathematical Modeling to Understand the Signaling Circuitry Underlying Arabidopsis thaliana Disease Resistance", 101, 4th International Conference on Systems Biology, Saint Louis, MI (November 5-9, 2003).

Vikas Agrawal, Chu Zhang, Allan D. Shapiro, and Prasad S. Dhurjati, "Systems Biology Approaches to Underrrstanding the Signaling Circuitry Undrlying Arabidopsis thaliana Disease Resistance", 1, 4th International Conference on Bioinformatics, GeorgiaTech, Atlanta, GA (November 13-16, 2003).

Vikas Agrawal, Chu Zhang, Allan D. Shapiro, and Prasad S. Dhurjati, "Understanding the Signaling Circuitry Underlying Arabidopsis thaliana Disease Resistance Using Systems Biology"; New York Area Plant Molecular Biology Meeting, Rutgers University, Piscataway, NJ. (January 17 2004).

Prasad Dhurjati, "Chemical Engineering Challenges in the Life Sciences: From Fermentation to Genetic Engineering to the Omics Revolution", in Session on Future Challenges in Chemical Engineering, Joint AIChE/IICHE Chemcon conference, Mumbai, India, (December 28-30, 2004).

Vikas Agrawal, Allan D. Shapiro, Prasad S. Dhurjati, "Computational Approaches to Understanding Plant Disease Resistance Signal Transduction", AIChE Annual National Meeting, Austin, Texas, Paper 428d, (November 2005).

Allan Shapiro, Vikas Agrawal, Prasad Dhurjati, Raghunathan Rengaswamy, "Programmed Cell Death in Plant Defense against Bacterial Pathogens", AIChE Annual

National Meeting, San Francisco, CA, (November 17, 2006).

“A Systems Biology Approach to Biotherapeutics: From Genes and Cells to Products and Profits”, Seminar at the International Conference on Recent Advances in Biotherapeutics, Dhirubhai Ambani Life Sciences Center, Bombay, India, February 13, 2009

Sven Saldanha, P. Dhurjati and A. Nohe (2010). Novel imaging and system biology approaches demonstrate caveolae are key signaling centers for BMP dependent stem cell differentiation. Chemical Biophysics Symposium 2010, Toronto, Ontario CA.

S. Mukherjee, P. Dhurjati, V. Smorodin, and A. Nohe (2010). Synthesis of Silver Nanoparticles for Use in an Animal Model. UMBC Research Symposium in Chemical and Biological Sciences, Baltimore MD.

B. Bragdon, S. Saldanha, O. Moseychuk, J. Bonor, P. Dhurjati, A. Nohe (2011). Caveolae Regulate Bone Morphogenetic Protein 2 Signaling as Identified with the Systems Biology Approaches. 55th Annual Meeting of the Biophysical Society. Baltimore MD.

Kevin Hutter, Anja Nohe, and Prasad Dhurjati. A physiologically Based Pharmacokinetic Model of Bone Morphogenetic Protein 2 in Mice. University of Delaware Undergraduate Research and Service Celebratory Symposium. August 10. 2011.

Prasad Dhurjati, Mark Shiflett. Chemical Engineering Undergraduate Research at the University of Kansas and the University of Delaware. 2016 AIChE Annual Meeting, San Francisco. November 17, 2016.

INVITED SEMINARS

Invited seminars in academia and industry all over the world include countries such as Australia, Belgium, France, India, Japan, Switzerland, Spain, United States, etc. A list of invited seminars is given below:

"Mathematical Modeling of Microbial Systems," Dow Chemical Company, Midland, Michigan, October 31, 1984.

"Host-Plasmid Interactions in Recombinant Microorganisms," Columbia University, March 4, 1986.

"Growth, Gene-Expression Kinetics and Plasmid Stability of Recombinant Cells," Pfizer, April 18, 1986.

"FALCON: An Expert System for Fault Diagnosis in Commercial Scale Chemical Plants," Lund Institute of Technology, Sweden, May 5, 1986.

"FALCON: An Expert System for Fault Diagnosis in a Commercial Scale Chemical

Plant," Massachusetts Institute of Technology, July 21, 1986.

"Growth, Gene-Expression Kinetics and Plasmid Stability of Recombinant Cells," OTSUKA Pharmaceuticals, Rockville, MD, October 27, 1986.

"Kinetics of Recombinant Microorganisms," Drexel University, November 17, 1986.

"Kinetics and Stability of Recombinant Microorganisms," Eastman Kodak Co., December 2, 1986.

"FALCON: An Expert System for Fault Diagnosis in a Commercial Scale Chemical Plant," Air Products Company, December 16, 1986.

"Growth, Gene-Expression Kinetics and Plasmid Stability of Recombinant Microorganisms," Lehigh University, February 18, 1987.

"FALCON: An Expert System for Fault Diagnosis in a Commercial Process Plant," NSF AAAI Workshop on Artificial Intelligence in Process Engineering, Columbia University, March 10, 1987.

"FALCON: An Expert System for Fault Diagnosis in a Commercial Process Plant," The Dow Chemical Company, Midland, Michigan, May 20, 1987.

"Experience with the Development of an Expert System for Fault Diagnosis in a Commercial Scale Chemical Process" Foundations of Computer Aided Process Operations (FOCAPO) Conference, Salt Lake City, July 10, 1987.

"FALCON: An Expert System for Fault Diagnosis in a Commercial Process Plant," Summer Session Course, Knowledge-Based Expert Systems in Process Engineering, MIT, Cambridge, July 20-24, 1987.

"Process Trends Analysis and Diagnosis of Faults," First Annual Workshop, Laboratory for Intelligent Systems in Process Engineering, Massachusetts Institute of Technology, November 2-3, 1987.

"Fault Diagnosis in a Dynamic Chemical Process," Rhone-Poulenc Company, Lyon, France, February 2, 1988.

"Growth, Gene-Expression Kinetics and Plasmid Stability of Recombinant Microorganisms," University of Virginia, February 25, 1988.

"Host-Plasmid Interactions, Knowledge-Based Systems and their Relationship to Chemical Engineering," University of California, Santa Barbara, April 28, 1988.

"Effects of Copy Number and Recombinant Gene Expression on *Escherichia coli*," Mycogen Corporation, San Diego, May 13, 1988.

"Evaluation of Expression Systems for Recombinant Products," Indian Institute of Technology, New Delhi, December 17, 1988.

"Optimization of Recombinant Protein Product Using Temperature Sensitive Plasmids," Indian Institute of Technology, New Delhi, December 19, 1988.

"Beyond FALCON: A Generalized Model-Based Approach to Automated Fault Diagnosis," Union Carbide Research Center, South Charleston, WV, April 6, 1990.

"Impact of Host-Plasmid Interactions on Foreign-Gene Expression and Product Activity," SANOFI (Elf Aquitaine) R & D Center, Labège, France, May 23, 1990.

"Overproduction of Recombinant Proteins: Specialized Ribosomes and Inclusion Bodies," University of Maryland, College Park, February 11, 1992.

"Metabolic and Genetic Enhancement of Microorganisms: Specialized Ribosomes and Inclusion Bodies," Dupont Environmental Biotechnology, Glasgow, March 18, 1992.

Series of 10 seminars as a TOKTEN fellow of the United Nations Development Program, National Environmental Engineering Research Institute, Nagpur, India, Dec. 29, 1992 to Jan. 26, 1993.

"Expert Systems for Processing," Center for Composite Materials Workshop, Newark, DE, May 18-20, 1993.

Indian Institute of Science, Bangalore, India, December 1993.

National Environmental Engineering Research Institute, India, January 1994.

National Chemical Laboratory, India, January 7, 1994.

Pasteur Institute, Paris, France, January 10, 1994.

University of Minnesota, Minneapolis, February 15, 1994.

University of Pennsylvania, Philadelphia, February 25, 1994.

University of Colorado, Boulder, April 21, 1994, Patten Seminar Speaker.

University of Queensland, Brisbane, Australia, March 5, 1996.

University of Sydney, Sydney, Australia, March 19, 1996.

Monash University, Melbourne, Australia, March 14, 1996.

Flemish Institute of Technology, Mol, Belgium, May 13, 1996.

University of Louvain-La-Neuve, Belgium, May 14, 1996.

Dow Chemical Co., Freeport, Texas, March 12, 1997.

AIChE Wilmington Section Meeting, March 18, 1997.

Academy of Life Long Learning, Wilmington, April 29, 1997.

Laboratoire d'Automatique et de Genie des Procédés, University of Lyon 1, France, June 27, 1997

French Petroleum Institute, Solaize, France, June 30, 1997.

ENSIC, Nancy, France, " Applications of Knowledge-Based Systems for Fault Diagnosis, Supervision and Control" July 8, 1997.

Dow Chemical Company, Freeport, Texas, "Overview of Research In Intelligent Systems at UD", April/Sept 1997.

University of California, Riverside, April 1998.

University of Akron, Ohio, November 4, 1998.

Purdue University, LORRE, November 12, 1998.

Bryn Mawr University, "Measures of Sustainability", November 20, 1998.

Mechanical Engineering Department, UD, "Biotechnology for Dummies", Feb 3, 1999.

Electrical Engineering Department, UD, "Bioinformatics", Feb 12, 1999.

College of Business and Economics, UD, "Biotechnology", Feb 19, 1999.

CAPSL, UD, "Bioinformatics", Feb 26, 1999.

Computer and Information Sciences Department, "Biotechnology", March 5, 1999.

Hercules: "Engineering approaches for optimal use of Genetically Engineered Organisms", March 17, 1999.

Johns Hopkins, Meeting to honor ex-student, Mike Betenbaugh's promotion to Full Professor, April 19, 1999.

Dow, Freeport, Texas: Research Challenges in Bioinformatics and Biotechnology,

November 3, 1999.

Pennsylvania State University, March 13, 2001, "Engineering of Genes, Metabolism and Reactors: The Bioinformatics Driven Renaissance"

Third Francophone Workshop on Biotechnology and Process Optimization, May 21, 2001, Casablanca, Morocco, "Engineering of Genes, Metabolism and Reactors: The Bioinformatics Driven Renaissance"

American Philosophical Association Conference, Newark, DE, October 27, 2001, "A Scientific Foundation for the Biotechics Debate"

Technology Symposium on Process Fault Diagnosis, UD- PCMC, January 24, 2002, "The Gap between Practice and Theory in Fault Diagnosis".

University of California, Davis, June 3, 2002, "Engineering of Genes, Cells and Reactors: The Bioinformatics Driven Renaissance"

Life Science Consortium and Hershey Medical School, Penn State University, May 2002
CANREIG, Toronto, Canada, July 2002

University of Hawaii, NSF Center on Marine Bio-Products Engineering, August 2002

University of California, Los Angeles (UCLA) Chemical Engineering, November 2002

Indian Institute of Technology, Bombay, Chemical Engineering, January 2003

University of Hawaii, March 2003

University of California, Davis, Chemical Engineering, April 2003

Mars Symposium on Robust Engineering, University of California, Davis, September 22-24, 2003

Delaware State University, Department of Mathematics, "Challenges in Systems Biology and Bioinformatics: The Use and Abuse of Mathematics in the Life Sciences", October 20, 2005.

USV India, Mumbai, "Challenges in Systems Biology and Bioinformatics: Impact on Biotechnology and Pharmaceutical Industries", December 14, 2005.

Lambent, Nagpur, India, "Challenges in Systems Biology and Bioinformatics: Interface of IT and Biotechnology (BioIT), January 2, 2006.

Clarkson University, Department of Chemical Engineering, March 2006.

Reliance (Dhirubhai Ambani Life Sciences Center), New Bombay, India, “Challenges in Systems Biology, February 1, 2007.

Reliance Technology Center, Polymer Research Group, Patalganga, India, “Challenges in Systems Biology”, February 2, 2007.

Reliance Manufacturing, Safety and Environment Group, India, “On-Line Fault Diagnosis”, January 25, 2008.

Nagpur Rotary Club, India, January 29, 2009.

CARE Hospital, Nagpur, India, January 31, 2009.

St. Francis De Sales College, Dept. of Biotechnology, Nagpur, India, Feb 4, 2009.
Short Course on “Modeling and Simulation in Chemical Engineering using Matlab and Simulink” VNIT, Nagpur, India, Jan. 2012

“The Three Pillars of Research: Ideas, Implementation and Communication”, VNIT, Nagpur, India, Jan. 2012

Reliance Industries Limited, Seminar, December 19, 2012

VNIT, Nagpur, India, Computer Science, Seminar, Jan 2013

NIT, Tiruchi, India, Remote Seminar, March 2013

Prasad Dhurjati, “The Human Gut Microbiome and Health, Insights from System-Level Models”, October 9, 2015

Prasad Dhurjati, “Predictive Diagnostics and Preventive Therapies, System-Level Models and the Gut Microbiome”, IIT AC Conference, Toronto, Canada, October 1, 2016.

Prasad Dhurjati, “Models of the Gut-Brain Connection”, Veritas Forum on “Engineering Faith”, Department of Philosophy, University of Delaware, November 2, 2016.

IMPACT VIA SERVICE

Past service activities include organization as Program Chair of the entire American Chemical Society (ACS) Biochemical Technology (BIOT) Division Meeting in Atlanta in 1991 and of the entire ACS BIOT Division Meeting in San Diego in 1992. Also organized the first conference of the International Federation of Automatic Control (IFAC) on Fault Diagnosis (as the National Program Committee chair) in Delaware in 1992 and the International Program Committee chair for the IFAC meeting in Fault Diagnosis in Lyon, France in 1998. Below is a list of professional and other service

activities:

Session Coordinator, "Transport Processes in Biological Systems", 7th International Biotechnology Symposium, New Delhi, India, February 1984.

Session chairman, "Mathematical Modeling of Fermentation Processes", 190th Annual American Chemical Society Meeting, Chicago, September 1985.

Session chairman, "Recent Advances in Biochemical Engineering", Annual Meeting of the American Institute of Chemical Engineers, Chicago, November 1985.

Session chairman, "Regulation of Growth and Product Formation in Microbial Cells", American Chemical Society National Meeting, New Orleans, LA, Aug 30-Sep 4, 1987.

Session chairman, "Expert Systems in Biotechnology", Annual Meeting of the American Institute of Chemical Engineers, New York, November 1987.

Session chairman, "Engineering Aspects of Eukaryotic Host Vector Interactions", American Chemical Society Meeting, Los Angeles, September 25-30, 1988.

Consultant to Formosa Plastics Company, Delaware, 1987.

Member, AIChE Long-Range Planning Committee, 1987-88.

Past Member, Governor's High Technology Task Force on Pharmaceuticals.

Reviewed Papers for many Journals including the following: Biotechnology and Bioengineering; Industrial and Engineering Chemistry; Chemical Engineering Science; Biotechnology Progress; Chemical Engineering Communications; AIChE Journal; Chemical Engineering Journal; Computers and Chemical Engineering. Panel Reviews for many funding agencies including NSF and NIH.

Host, Mid-Atlantic Biochemical Engineering Consortium Symposium, February, 1988.

Member of Panel Reviews for National Science Foundation and NIH.

Past Member of Editorial Advisory Board, CHEMTECH.

Past Member, Publication Committee, Biochemical Technology Division, American Chemical Society.

Program Chair, Biochemical Technology Division, American Chemical Society, Annual Meeting, Atlanta, April 14-19, 1991. (organizing the entire program, with Norman Jansen at Upjohn, including deciding on session topics and locating session chairs).

National Organizing Committee Chair, International Federation of Automatic Control

(IFAC) Symposium, "On-Line Fault Detection and Supervision in the Chemical Process Industries", Newark, Delaware, April 22-24, 1992. (organizing a major IFAC symposium consisting of approximately 150 participants, about half from abroad and half from industry).

United Nations Development Program, TOKTEN Consultant, January 1993, National Environmental Engineering Research Institute, Nagpur, India.

International Program Committee Member and Session Chair, "Analytic Redundancy 2", International Conference on Fault Diagnosis- Tooldiag '93" Toulouse, France, April 5-7, 1993.

Program Chair, Biochemical Technology Division, American Chemical Society, Annual Meeting, San Diego, April 1994. (organizing the entire program consisting of 300+ abstracts, with Steven Lee of Merck).

Session co-chair, "Advances in Monitoring and Control of Bioprocesses", Annual Meeting of the American Chemical Society, Anaheim, April 1995.

International Program Committee Member, "IFAC Symposium on "On-Line Fault Detection and Supervision in the Chemical Process Industries", New Castle, United Kingdom, June 12-13, 1995.

Session Chair, "Modeling in Biochemical Engineering," University of Minnesota, October 11-12, 1996

Organized Symposium in Memory of Professor Gianni Astarita, U. Delaware, October 6, 1997

International Program Chair, "IFAC Symposium on "On-Line Fault Detection and Supervision in the Chemical Process Industries", France, June 4-5, 1998.

Co-organized the "International Symposium on Advances in BioProcess Engineering and Biotechnology" at Purdue University, November 11-14, 1998

Seminar Coordinator, Delaware Biotechnology Institute Seminar Series. 1998-2000
Chair, University-wide Committee on Bionformatics Graduate and Undergraduate Education, 2001

Chair, University Faculty Senate Committee on International Studies Organized Technology Symposium on Fault Diagnosis at the University of Delaware Process Control and Monitoring Consortium, January 24, 2002.

Board Member, University Interdisciplinary Committee on Ethics.

College of Engineering Promotion and Tenure Committee

College Educational Activities Committee

Session Chair, Future Challenges in Chemical Engineering, Joint AIChE/IChE
Chemcon conference, Mumbai, India, December 28-30, 2004

Member, Search Committee for Chair of Dept. of Mathematical Sciences, 2006-2007

Faculty Advisory Board for Howard Hughes Medical Institute \$1.5 Million grant, and
Advisor on Quantitative Biology Programs.

Organized the Arthur B. Metzner Symposium, May 14, 2007, University of Delaware.

Commentator, APA Conference on Energy, Environment and Ethics, University of
Delaware, September 21-23, 2007

Organized the TWF Russell Symposium, August 2009, University of Delaware.

Search Committee: Interdisciplinary Science Education (ISE) Director, College of Arts
and Sciences

Employer Advisory Board Member, Career Services Center

Department Undergraduate Studies Committee Member
Co-Chair Ecalc committee

Executive Council Member, American Association of University of Professors

Member, Faculty Advisory Board for the Howard Hughes Medical Institute 1.5MM Grant
Faculty Senator starting Fall 2012

Member, Faculty Senate Committee to evaluate academic impact of RBB

Member, College Committee on Twin Program in India

Program Committee BIBM 2012 IEEE Conference, Bioinformatics & Biomedicine.

President, University Faculty Senate, University of Delaware, 2016-2017

Advisees: 20 sophomores in Spring 2017

Editorial Advisory Board, Energy & Fuels, ACS Publication

Medical and Scientific Advisory Board, Documenting Hope Project

Speech on behalf of Faculty at the May 2017 Commencement, University Stadium

Member of University President Executive Committee 2016-17

Faculty Representative at the Board of Trustees Committees (Finance, Executive, etc.)

Chair, Senate Budget Committee, Coordinating Committee on Education, Executive Committee

IMPACT VIA TRAINING OF STUDENTS AND POSTDOCS:

Graduate Theses Completed

Twenty graduate theses were supervised. Several computer science students were also co-supervised as part of the FALCON project but are not listed below.

M.S.

Norman P. Pih, (B.S., Tennessee), "An Engineering Study of Microbial Control Mechanisms using a Computer-Coupled Bioreactor." (June 1984; currently at WL GORE, AZ).

Matthew S. Corley, (B.S., CMU), "Analysis of the Growth of Two Interacting Bacterial Populations with Opposite Substrate References in a Computer-Coupled Batch Reactor." (June 1984; currently working in Germany)

Susan M. Grill, (B.S., UMinn), "A Study of Plasmid-Host Interactions in *Escherichia coli* during a Batch Fermentation". (June 1985; currently at Army Research Center, Aberdeen, MD).

Concetta LaMarca, (B.S., MIT), "Partitioning of Host and Recombinant Cells in Aqueous Two-Phase Polymer Systems", joint project with A. Lenhoff. (June 1986; currently at DuPont, DE)

Sameer P. Rupani, (B.S., UMass), "Characterization of the Heat Shock Stress Response of a Recombinant Bioluminescent *Escherichia coli* Biosensor in Batch and Continuous Cultures". (June 1995; currently at Allied Signal Co., NJ).

Dennis J. Michaud, (B.S., Northeastern U.), "Investigation of Curing Behavior in Thick Thermoset Composites Manufactured by Resin Transfer Molding". (June 1996; currently at Mathworks).

Ph.D.

Steven J. Coppella, (B.S., PennState), "Growth Kinetics, Plasmid Stability, and Foreign Gene Expression in *Saccharomyces cerevisiae*" (August 1987; currently at Pure Carbon Co., PA).

Michael J. Betenbaugh, (B.S., UVa), "Effect of Plasmid Copy Number and Recombinant Gene Expression on *Escherichia coli* " (May 1988; currently Professor at Johns Hopkins University, MD. Winner of 1992 NSF-NYI Award, ex-chair of Dept at JHU)

Richard Fickelscherer, (B.S., SUNY Buffalo), "Automated Process Fault Analysis" (September 1989).

John Kim, (B.S., MIT), "Growth Kinetics and Mixed Culture Interactions of *Klebsiella*

oxytoca and *Pseudomonas aeruginosa* " (Aug. 1990, currently at U.S. Patent Office, VA)

Robert Leipold, (B.S., RHIT), "Specialized Ribosome Systems for Overproduction of Proteins" (December 1991; currently at Entelos)

John Gaertner, (B.S., Cornell), "Kinetics of Growth and Product Formation in Hybridoma Cells" (October 1991; currently at ABBOT labs, IL)

Thomas Petti, (B.S., UMD, NSF Fellow), "Using Mathematical Models in Knowledge based Control Systems" (April 1992; currently at W. R. Grace, MD)

Konstandinos Tokatlidis, (B.S., Greece), "Role of the Duplicated Segment of Clostridium Thermocellum in the Formation of Inclusion Bodies and the Organization of the Cellulosome", coadvisor Pierre Beguin, Pasteur Institute, Paris (December 1992, currently at University of Crete, Greece)

James Klein, (B.S., M.S., Tufts), "Experimental Determination of In-vivo Recombinant Protein Aggregation Kinetics in *E. coli*" (April 1993; currently at Merck, PA)

Vikram Pillai, (B.S., India), "Intelligent Control of Autoclave Cure Process" (joint project with Anthony Beris--December 1993)

Dennis J. Michaud (B.S. Northeastern), "Simulation-Based Design Optimization and Control of Thick Composite Laminates Manufactured by Resin Transfer Molding", (joint project with Antony Beris), (currently at Mathworks, MA), Spring 2000

Robert J. Brendel (B.S., Univ. Illinois, M.S., IIT Chicago), "Methodologies for Design and Control of Heat Integrated Processes", Fall 2001.

Vikas Agrawal (graduate student) (joint with Shapiro and Blake Meyers), currently at Infosys, Sep 2001- 04

Current Graduate Students: Juan Lucio-Vega (joint graduate student with Mike Klein, UDEI), Sam Keating (doctorate student in bioinformatics & computational biology), Aadish Chaubal (Masters student in Bioinformatics), Julie Trinh and Vrita Patel (joint graduate students at the University of Toronto)

Impact via Postdoctoral Fellows and Visiting Scientists

There were about 20 postdoctoral fellows and visiting scientists trained at Delaware. A list of postdocs and visiting scientists is given below.

Dec. 84 - Nov. 86 -- Dr. Eliana DeBernardez, Argentinian Science Foundation Fellow

Jan. 88 - April 88 -- S. Rajagopalan, I. I. T. Bombay, India, UNIDO Visiting Fellow

July 88 - July 89 -- Dr. Kuen-Hack Suh, Korean Science Foundation Fellow

Feb 92 - July 93 -- Dr. Konstantin Konstantinov, Ph.D, Osaka University, Japan
(currently at Bayer, Berkeley, CA)

July 92 - June 96 -- Dr. Arthur Kordon, Ph.D, Sofia Univ., Bulgaria (currently at Dow)

1993-94 -- Dr. Vikram Pillai, Ph. D., University of Delaware,

July 94 - June 95 -- Dr. Man Bock Gu, Ph.D. University of Colorado

July 94 - June 95 -- Gu Zhengrong (China)

Feb-Mar 95 -- Dr. Hemant Purohit, NEERI, India

Feb-Dec 96 -- Bhupinder Singh Dhillon, NEERI, India (currently at Beas)

Sep 96 - June 98 -- Lars Kaiser, Chemnitz, Germany

Sep 96 - Aug 98 -- Dr. Oh, Yonsei University, Seoul, Korea

Aug 00- Aug 01 -- Prof. Kyu Suk Hwang, (Pusan National University, South Korea)

July 01 – Feb 02 – Prof Sung Ho Won, (South Korea)

Aug 00- Sep 01 -- Dr. Ramanathan Raghavan, Ph. D., (IIT Delhi, India)

July 01 – Aug 01 - Dr. Sung Ho Won, (Ph. D., South Korea)

July 00- July 01—Dr. Pascal DuFour, (Ph.D, University of Lyon, France)

Dr. Dennis Michaud (Ph. D, Delaware), June 00 – 02

Dr. Selwa Ben Amor (Ph. D., Lyon), (joint with Doyle on DOE project), Feb 02 – 03

Dr. Raman Lall, (Ph. D., Drexel), (joint with Edwards/Gao), Sep 2001 – Aug 2003

Dr. Pramod Wangikar (Ph. D Iowa), Sabbatical Visitor, Jan-Dec 2004

IMPACT VIA TEACHING: Courses Taught

CHEG 341: Fluid Mechanics

CHEG-MATH 460: Introduction to Systems Biology

CHEG 620: Biochemical Engineering

CHEG 667: Biochemical Engineering and the Environment

CHEG 667: Topics in Environmental Biotechnology

CHEG 667-011: Advanced Biochemical Engineering

CHEG 660 Systems Biology

CHEG 401: Process Control & Dynamics

CHEG 445: Senior Lab (Biochemical Reaction Kinetics)

CHEG 345: Junior Lab (Heat Transfer and Fluid Mechanics)

CHEG/MATH 305: Applied Mathematics for Chemical Engineers

RESEARCH IMPACT VIA CITATIONS

Over 80 Patents have cited our work in the Patent Literature in approved Patent Applications (<http://www.uspto.gov/>). Many of them have quoted our work in fault diagnosis and especially the work in the FALCON project. Others have quoted our work in the area of Biotechnology. As of May 2018, there have been over 3100 citations for over 140 publications. There are two papers that are cited more than 300 times and three other papers that have been cited over 100 times. The most cited papers include one on bioluminescent biosensors (AEM), two on inclusion bodies of cellulases (FEBS), one on cybernetic modeling (B&B), and one on fault diagnosis (AIChE Journal). The H-index is 31 and the i10-index is 56. (The i-10 index is the number of papers cited at least 10 times).