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B. Wayne Bequette

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Education

PhD The University of Texas at Austin, December, 1986
MSE The University of Texas at Austin, May, 1985
BSChE University of Arkansas, January, 1980

Professional Experience

2006-2007 **Acting Head**, Dept. of Chem. & Biol. Eng. Rensselaer Polytechnic Inst., Troy, New York
2002-2004 **Acting Chair**, Dept. of Chem. & Biol. Eng., Rensselaer Polytechnic Inst., Troy, New York
2000 - **Professor**, Rensselaer Polytechnic Institute, Troy, New York
1994-2000 **Associate Professor**, Rensselaer Polytechnic Institute, Troy, New York
1996 **Visiting Professor**, Northwestern University, Evanston, IL (sabbatical leave)
1995 **CERD Visiting Professor**, Merck & Co., Rahway, New Jersey (sabbatical leave)
1988-1994 **Assistant Professor**, Rensselaer Polytechnic Institute, Troy, New York
1987-1988 **Visiting Lecturer**, University of California at Davis, Davis, California
1986-1987 **Postdoctoral Research Associate**, The University of Texas at Austin
1980-1982 **Process Engineer**, American Petrofina Company of Texas, Port Arthur, Texas
1979 **Assistant Process Engineer**, Cosden Oil and Chemical, Big Spring, Texas
1977-1978 **Engineering Assistant (Co-op)**, Arkansas Eastman Co., Batesville, Arkansas.

Honors and Awards

Fellow, American Institute of Chemical Engineers (AIChE); elected May 2008
Rensselaer School of Engineering 2008 Research Excellence Award
Arkansas Academy of Chemical Engineers (AAChE), inducted April, 2007
AIChE – Award for Service as the Computing and Systems Technology (CAST) Division Chair (2006)
Top 100 (23rd) Citations to a paper published in Industrial and Engineering Chemistry Research
Trustee, CACHE Corporation, 2010-2012

Research Interests

Process systems engineering, including process design for operability, nonlinear control, batch control and biomedicine. Projects include: (1) Continuous glucose monitoring for diabetes. (2) A closed-loop artificial pancreas. (3) Control of blood glucose in intensive care. (4) Optimization of protein purification by ion exchange chromatography. (5) Pharmaceutical applications of process analytical technology (PAT). (6) Modeling and control of rotating disk microbial reactors. (7) Fuel cell modeling and control. (8) Modeling and control of integrated coal gasification combined cycle (IGCC) power plants.

Teaching Interests

Process systems engineering, including process dynamics and control, process design, modeling and simulation. I have authored textbooks on *Process Dynamics: Modeling, Analysis and Simulation* (1998) and *Process Control: Modeling, Design and Simulation* (2003), both published by Prentice Hall.

Professional Activities

Editorial Positions

Associate Editor, *Automatica* (1994-2005)
 Guest Editor, *IEEE EMB Magazine*, Special Issue on Automated Control in Biomedicine (April, 2001)
 Guest Editor, Algorithms for Glucose Monitoring and Control, *Diabetes Tech. Therapeutics* (Feb., 2005)
 Guest Editor, Snapshots of Process Control, *IEEE Control Systems Magazine* (Aug. & Dec., 2006)
 Editorial Board, *Journal of Diabetes Science and Technology*, Founding Member
 Guest co-editor, Modeling, Sensors and the Artificial Pancreas (3 Symposia), *J. Diabetes Sci. & Tech.* (2007)
 Guest Editor, *Ind. Eng. Chem. Res.* special issue honoring Tom Edgar (Sept. 2010)
 Guest co-editor, *J. Process Cont.*, special issue in memory of Ken Muske (Dec. 2011)

Professional Society Memberships

American Automatic Control Council (AACC) – Vice President (2006-7), President (2008-9)
 American Institute of Chemical Engineers - CAST Div. 10b Prog. Chair (1998-9), AIChE Society Review Chair for 1998-9 ACC, CAST Awards, 2nd Vice Chair (2004), Vice-Chair (2005) and Chair (2006) of CAST Div.
 AIChE CAST Division Programming Chair, 2010-2013
 Institute of Electrical and Electronics Engineers (IEEE), *Senior Member* (elected 2003), Control Systems Society, Technical Committee on Industrial Process Control
 AIChE Director on the AACC Board (2000-1), Various Awards Committees
 IFAC Technical Activities Committees: (i) Chemical Process Control, (ii) Modeling & Control of Biomed. Sys.
 American Diabetes Association (ADA)
 American Society for Engineering Education (ASEE)

Conference Chairs

General Chair, Joint Conference on FOCAP0 and CPC, Savannah, GA (January, 2012)
 General Chair, 2003 American Control Conference, Denver (June, 2003)
 Program Chair, 2001 American Control Conference, Washington, DC (June, 2001)
 Publicity Chair, 1998 American Control Conference, Philadelphia (June, 1998)
 Publications Chair, 1995 American Control Conference, Seattle (June, 1995)
 Finance Chair, 1991 American Control Conference, Boston (June, 1991)
 Exhibits Chair, Fourth Int. Conf. on Chemical Process Control, Padre Island, TX (Feb., 1991)

Programming Committees

International Programming Committee, Nonlinear MPC, Pavia (September, 2008)
 International Programming Committee, Nonlinear MPC for Fast Systems, Grenoble (Oct, 2006)
 International Programming Committee, ADCHEM 2006, Brazil (April 2006)
 Programming Committee, CPC-7, Lake Louise, Canada (January, 2006)
 Scientific Panel, 7th World Congress of Chemical Engineering, Glasgow (July, 2005)
 Programming Committee, CPC-VI, Arizona (January, 2001)
 International Programming Committee, DYCOPS-6, Korea (June, 2001)
 International Programming Committee, PSE 2000, Colorado (July, 2000)
 International Programming Committee, ADCHEM 2000, Pisa, Italy (June 2000)
 International Programming Committee, DYCOPS-5, Corfu, Greece (June 1998)
 Organizing Committee, 1995 IEEE Conference on Control Applications, Albany (Sept., 1995)
 International Programming Committee, ADCHEM '94, Kyoto, Japan (May 1994)

Other

Scientific Advisory Board, Ultradian Diagnostics LLC
 Academic Advisory Board, Quanser, Inc.
 NSF Roadmap Workshop on Smart Process Manufacturing and Sustainability (April, 2008)
 NSF Workshop on the Research Needs in the Modeling, Dynamics, Control, and Monitoring of Complex Engineering Systems, Anchorage (May, 2002)
 NSF Workshop on New Directions in Control System Education, Champaign, IL (October, 1998)
 NSF Workshop on "Improving Proposal Success Ratio" (15-16 November, 1996)

Session Chairs

- “In Honor of Tom Edgar’s 65th Birthday, I & II,” AICHE Annual Meeting, Salt Lake City, UT (November, 2010)
- “CAST Plenary,” AICHE Annual Meeting, Salt Lake City, UT (November, 2010)
- “CAST Plenary,” AICHE Annual Meeting, Nashville, TN (November, 2009)
- “Biosignals: Analysis and Interpretation,” 17th IFAC World Congress, Seoul (July, 2008)
- “Biomedical Systems,” 2008 American Control Conference, Seattle (June, 2008).
- “CAST Plenary,” AICHE Annual Meeting, Salt Lake City (November, 2007)
- “Pharmacokinetics and Dynamics: Glucose Sensors and Diabetes,” IEEE EMB Conference, New York (August, 2006).
- “Microchemical and Fuel Cell Systems,” Chemical Process Control VII, Lake Louise (Jan., 2006).
- “Advances in Process Control,” AICHE Annual Meeting, Cincinnati, OH (November, 2005).
- “Integrated Optimization and Control,” AICHE Annual Meeting, San Francisco (November, 2003).
- “Tutorial: Applications of Process and Control System Monitoring,” AICHE Spring Meeting, New Orleans (April, 2003)
- “Modeling and Control of Biomedical Processes,” AICHE Annual Meeting, Indianapolis (Nov, 2002).
- “Pharmaceutical Process Control,” 15th IFAC World Congress, Barcelona (July, 2002).
- “Workshop session 5: Process Control,” 2nd Pan American Workshop on Process Systems Engineering, Guarujá, Brazil (September, 2001).
- “Chemical Reactors/Separators,” Chemical Process Control VI (CPC-6), Tucson (January, 2001)
- “Plenary - Recent Developments in Computing and Systems Technology,” AICHE Annual Meeting, Dallas (November, 1999)
- “Challenges in Control of Solids Processing Systems,” AICHE Annual Meeting, Dallas (November, 1999)
- “Control Education. A Multidisciplinary Discussion,” American Control Conference, San Diego (June, 1999)
- “Poster Session,” DYCOPS-5, Corfu, Greece (June 1998)
- “Modeling for Nonlinear Model Predictive Control,” NMPC Workshop, Ascona (June 1998)
- “Simulation and Control in Electronic Materials Processing,” 1997 AICHE Meeting, Los Angeles, (Nov)
- “Process Systems Engineering Applications in Electronic Materials Processing,” 1997 AICHE Meeting, Los Angeles, CA (Nov)
- “Topics in Systems and Process Control,” 1997 AICHE Meeting, Los Angeles, CA (Nov)
- “Model Predictive Control,” NATO ASI on Nonlinear Model Based Control, Antalya, Turkey (Aug, 1997)
- “Model Predictive Control,” PSE ‘97 - ESCAPE-6, Trondheim, Norway (May, 1997)
- “Chemical Reactors” Session 2A, DYCORD+ ‘95, Helsingor, Denmark (June, 1995)
- “Nonlinear Control”, 1994 AICHE Annual Meeting, San Francisco (Nov. 1994)
- “Advances in MPC I”, NATO ASI on Methods of Model-Based Process Control, Antalya, Turkey (August, 1994)
- “Industrial Implementations”, NATO ASI on Methods of Model-Based Process Control, Antalya, Turkey (August, 1994)
- “Modeling and Control in Microelectronics Processing”, 1994 American Control Conference, Baltimore (June 1994)
- “Applications”, 1994 American Control Conference, Baltimore (June 1994)
- “Additional Case Studies”, IFAC Workshop on Integration of Process Design and Control (IPDC '94), Baltimore, MD (June, 1994)
- “Process Modeling and Computing Methods”, PSE '94, Kyongju, Korea (May 1994)
- “Nonlinear Control and Optimization II”, ADCHEM '94, Kyoto, Japan (May 1994)
- “Nonlinear Input/Output Model Development and Identification for Process Control”, 1993 American Control Conference, San Francisco (June, 1993)
- “Systems and Process Control” 1992 AICHE Annual Meeting, Miami Beach (November, 1992)
- “Nonlinear Control”, 1992 AICHE Annual Meeting, Miami Beach (November, 1992)
- “Model Predictive Control I”, 1992 American Control Conference, Chicago, IL (June, 1992)
- “Process Control”, 1991 American Control Conference, Boston, MA (June, 1991)
- “Model Predictive Control”, 1990 AICHE Annual Meeting, Chicago, IL (November, 1990)
- “Control I”, 40th Canadian Chemical Eng. Conference, Halifax, Nova Scotia (July, 1990)
- “Batch Process Control”, 1989 AICHE Annual Meeting, San Francisco, CA (Nov., 1989)
- “Modeling and Control of Distributed Parameter Systems”, 1987 American Control Conference, Minneapolis, MN (June, 1987)

Graduate Student Advising

M.S.

1. Yoga Ramamurthi, Data Reconciliation and Estimation Using Nonlinear Programming, December, 1990
2. Yelena V. Aleksyenko, Tuning LQ Controllers Based on Internal Model Controller Design, August, 1999
3. Vikas Saraf, Automatic Tuning of Cascade Controllers on Open-loop Unstable Processes, December, 2000
4. Sandra Lynch, Modeling and Control of Insulin Infusion Systems, August, 2002
5. Dale Weber (co-advised with Joel Plawsky), Particle Update in Growing Microbial Cellulose Gels, May, 2010
6. Anna Lis Laursen, Modeling Droplet Flow in an Annular Pipe, expected May, 2011.

Ph.D.

1. Phani B. Sistu, Nonlinear Model-Based Discrete Control of Chemical Processes, May, 1994
2. Ravi S. Gopinath, Model Predictive Control of Multi-rate Sampled Data Systems, May, 1994
3. Louis P. Russo, Bifurcation Behavior of an Exothermic CSTR, May, 1996
4. Ramesh R. Rao, Model Based Control of Nonlinear Processes, December, 2000
5. Vinay Prasad, Model-Based Identification, Estimation and Control of Chemical Processes, May, 2001
6. Brian Aufderheide, Multiple Model Predictive Control: A Novel Algorithm Applied to Biomedical and Industrial Systems, August 2002
7. Deepak Nagrath, Evolutionary Design and Control of Chromatographic Materials and Processes, August 2003
8. Cesar C. Palerm (Eng. Sci.), Model Reference Adaptive Control of Drug Infusion Systems, August, 2003
9. Matthew Kuure-Kinsey, Novel Approaches to Nonlinear Model Predictive Control with Application to High Temperature Fuel Cell Systems, December, 2008
10. Judith O'Rourke (co-advised with Murat Arcak), Impedance Monitoring in Fuel Cell Systems, Dec., 2008
11. Priyadarshi Mahapatra, MPC of IGCC Power Plants, December, 2010
12. Jing Sun, Circadian Effects in Diabetes, Expected August, 2011
13. Jeffrey Marquis (co-advised with Marc-Oliver Coppens), Nature-inspired Reformer Design and Operation, Expected May 2013
14. Matthew Titus, Fuel Cell Systems, Expected May 2014

Postdoctoral Research Associates and Visiting Scholars

1. Hyunjin Lee, Identification and Model Predictive Control for an Artificial Pancreas, Nov, 2006 – July, 2009
2. Cesar C. Palerm, Blood Glucose Estimation and Hypoglycemia Detection using Continuous Glucose Monitoring, September, 2003 – September, 2004
3. Futao Zhao, Fuel Cell Modeling and Control, January, 2005 – September, 2005
4. Ruben Rojas, Fulbright Fellow, Universidad Los Andes, November, 2009 – October, 2010

Other

1. Matthias Schley, Extended Kalman Filter-based Nonlinear Model Predictive Control of a Styrene Polymerization Reactor, Diploma Thesis, Aachen, Germany, May, 1998
2. Kevin D. Schott, Studies in Multiple Model Adaptive Control, 1999
3. Sandip Pasricha, Battery Modeling for Fuel Cell System Applications., 2007
4. Thomas Horgan, Fuel Cell Diagnostics and Control through Pattern Recognition (June, 2008)
5. ZhiXin Wang, Modeling and Control of Carbon Dioxide Separations Processes, Visiting Ph.D. Candidate from Southeast University, Nanjing, China (Sept. 2010 – Sept. 2011)

Publications

Refereed Manuscripts

Books and Book Chapters

1. **Bequette, B.W.** *Process Control: Modeling, Design and Simulation*, Prentice Hall, Upper Saddle River, NJ (2003).
2. **Bequette, B.W.** *Process Dynamics: Modeling, Analysis and Simulation*, Prentice Hall, Upper Saddle River, NJ (1998).
3. Address, R.J., L.L. Martin and **B.W. Bequette** “A Systems Approach Towards the Identification and Evaluation of Hydrogen Producing Thermochemical Reaction Clusters,” Chapter 41 (pp. 451-459) in *Design for Energy and the Environment. Proceedings of the Seventh International Conference on the Foundations of Computer-Aided Process Design*. M.M. El-Halwagi and A.A. Linninger (eds.), CRC Press, Taylor & Francis (2010).
4. Kuure-Kinsey, M. and **B.W. Bequette** “Multiple Model Predictive Control of Nonlinear Systems,” in *Nonlinear Model Predictive Control*, Lecture Notes in Control and Information Sciences Vol. 384, pp. 153-165, L. Magni, D.M. Raimondo, F. Allgower (eds), Springer (2009).
5. **Bequette, B.W.** “From Pilot Plant to Manufacturing: Effect of Scale-up on Operation of Jacketed Reactors,” Chapter 3.1, pp. 139-158, in the *Pharmaceutical Manufacturing Handbook*, Shayne C. Gad (ed.), John Wiley & Sons (2008).
6. **Bequette, B.W.** and L.P. Russo “Process Design, Simulation, Optimization and Operation,” in the *Encyclopedia of Physical Science and Technology*, 3rd Edition, Volume 2, pp. 751-766, R. Matsubara (ed.), Academic Press (2002).
7. Schley, M., V. Prasad, L.P. Russo and **B.W. Bequette** “Nonlinear Model Predictive Control of a Styrene Polymerization Reactor,” in *Nonlinear Model Predictive Control*, F. Allgower and A.

Zheng (eds.), *Progress in Systems and Control Theory Series*, Vol. 26, pp. 403-417, Birkhauser Verlag, Basel (2000).

8. **Bequette, B.W.** “Practical Approaches to Nonlinear Control: A Review of Process Applications,” in *Nonlinear Model-based Process Control*, NATO ASI Series, Ser. E, Vol. 353, pp. 3-32, R. Berber and C. Kravaris (eds.), Kluwer, Dordrecht (1998).
9. Schott, K.D. and **B.W. Bequette** “MMAC: Using a Bank of Linear Models to Control a Nonlinear System,” in *Nonlinear Model-based Process Control*, NATO ASI Series, Ser. E, Vol. 353, pp. 33-57, R. Berber and C. Kravaris (eds.), Kluwer, Dordrecht (1998).
10. Schott, K.D. and **B.W. Bequette**, Multiple Model Adaptive Control, Chapter 11 (pp. 269-291) in: *Multiple Model Approaches to Modelling and Control*, R. Murray-Smith and T.A. Johanson (eds.), Taylor & Francis, London, UK (1997).
11. Sistu, P.B. and **B.W. Bequette**, “A Stability Analysis of Nonlinear Model Predictive Control,” in *Methods of Model-Based Process Control*, NATO ASI Series, Vol. E-293, R. Berber (ed.), 577-606, Kluwer, Dordrecht (1995).
12. Gopinath, R.S. and **B.W. Bequette** “The Design of Nonlinear Predictive Controllers: Application to A Drug Infusion System,” in *Methods of Model-Based Process Control*, NATO ASI Series, Vol. E-293, R. Berber (ed.), 607-626, Kluwer (1995).

Articles

1. Cameron, F., **B.W. Bequette**, D.M. Wilson, B.A. Buckingham, H. Lee and G. Niemeyer “A Closed-Loop Artificial Pancreas Based on Risk Management,” *J. Diabetes Sci. Technol.*, 5(2), 368-379 (2011).

2. Kuure-Kinsey, M. and **B.W. Bequette** "A Multiple Model Predictive Control Strategy for Disturbance Rejection," *Ind. Eng. Chem. Res.* **49**(17), 7983-7989 (2010).
3. Dassau, E., F. Cameron, H. Lee, **B.W. Bequette**, H. Zisser, L. Jovanovic, H.P. Chase, D.M. Wilson, B.A. Buckingham and F.J. Doyle III. "Real-time Hypoglycemia Prediction Suite Using Continuous Glucose Monitoring: A safety net for the artificial pancreas," *Diabetes Care*, **33**(6), 1249-1254 (2010).
4. Buckingham, B, H.P. Chase, E. Dassau, E. Cobry, P. Clinton, V. Gage, K. Caswell, J. Wilkinson, F. Cameron, H. Lee, **B.W. Bequette**, F.J. Doyle III "Prevention of Nocturnal Hypoglycemia Using Predictive Alarm Algorithms and Insulin Pump Suspension," *Diabetes Care*, **33**(5), 1013-1018 (2010).
5. Bequette, B.W. Continuous Glucose Monitoring: Real-Time Algorithms for Calibration, Filtering and Alarms. *J. Diabetes Science and Technology*, **4**(2), 404-418 (2010).
6. Patek, S.D., **B.W. Bequette**, M. Breton, B.A. Buckingham, E. Dassau, F.J. Doyle III, J. Lum, L. Magni and H.Zisser "In Silico Preclinical Trials: Methodology and Engineering Guide to Closed-Loop Control," *J. Diabetes Science and Technology*, **3**(2), 269-282 (2009).
7. Lee, H., B.A. Buckingham, D.M. Wilson and **B.W. Bequette** "A Closed-loop Artificial Pancreas Using Model Predictive Control and a Sliding Meal Size Estimator," *J. Diabetes Sci. Tech.*, **3**(5), 1082-1090 (2009).
8. Bequette, B.W. "Glucose Clamp Algorithms and Insulin Time-Action Profiles," *J. Diabetes Sci. Tech.*, **3**(5), 1005-1013 (2009).
9. Lee, H. and **B.W. Bequette** "A Closed-loop Artificial Pancreas based on MPC: human-friendly identification and automatic meal disturbance rejection," *Biomedical Signal Processing and Control* **4**(4), 347-354 (2009).
10. Andress, R.J., X. Huang, **B.W. Bequette** and L.L. Martin "A Systematic Methodology for the Evaluation of Thermochemical Cycles for Hydrogen Production," *Int. J. Hydrogen Energy* **34**(9), 4146-4154 (2009).
11. Dassau, E., **B.W. Bequette**, B.A. Buckingham and F.J. Doyle III "Detection of a Meal Using Continuous Glucose Monitoring (CGM): Implication for an Artificial β Cell," *Diabetes Care* **31**(2), 295-300 (2008).
12. Bequette, B.W. "Analysis of Algorithms for Intensive Care Unit Blood Glucose Control," *Diabetes Science and Technology*, **1**(6), 813-824 (2007).
13. Bequette, B.W. "Nonlinear Model Predictive Control: A Personal Retrospective," *Canadian J. Chemical Engineering*, **85**(4), 408-415 (2007).
14. Bequette, B.W. "A Tutorial on Biomedical Process Control. III. Modeling and Control of Drug Infusion in Critical Care," *J. Process Control* **17**(7), 582-586 (2007).
15. Palerm, C.C. and **B.W. Bequette** "Hypoglycemia Detection and Prediction Using Continuous Glucose Monitoring – A study on hypoglycemic clamp data," *Journal of Diabetes Science and Technology*, **1**(5), 624-629 (2007).
16. Bequette, B.W. "Discussion on A Stacked Model Structure for Off-Line Parameter Estimation in Multi-equilibria Nonlinear Systems," *European J. Control*, **12**(6), 365-367 (2006).
17. Bequette, B.W. "Hydrogen and Sustainable Fuels," *IEEE Control Systems Magazine*, **26**(6), 84-92 (December, 2006).
18. Bequette, B.W. "Snapshots of Process Control II. From Small Batch to Large-Scale Continuous Processes," *IEEE Control Systems Magazine*, **26**(6), 32-33 (December, 2006).
19. Bequette, B.W. "Snapshots of Process Control. A Focus on Biological Systems," *IEEE Control Systems Magazine*, **26**(4), 28-29 (August, 2006).
20. Edgar, T.F., B.A. Ogunnaike, J.J. Downs, K.R. Muske and **B.W. Bequette** "Renovating the Undergraduate Process Control Course," *Comp. Chem. Engng.* **30**, 1749-1762 (2006).
21. Kuure-Kinsey, M., R. Cutright, and **B.W. Bequette** "Computationally Efficient Neural Predictive Control based on a Feedforward Architecture," *Ind. Eng. Chem. Res.* **45**(25), 8575-8582 (2006).
22. Bequette, B.W. "Editorial: Symposium on Algorithms for Continuous Glucose Monitoring and Control," *Diabetes Technology and Therapeutics*, **7**(1), 1-2 (2005).
23. Bequette, B.W. "A Critical Assessment of Algorithms and Challenges in the Development of an Artificial Pancreas," *Diabetes Technology and Therapeutics*, **7**(1), 28-47 (2005).

24. Palerm, C.C., J.P. Willis, J. Desemone and **B.W. Bequette** "Hypoglycemia Prediction and Detection using Optimal Estimation," *Diabetes Technology and Therapeutics*, **7**(1), 3-14 (2005).
25. **B.W. Bequette** and J. Desemone "Intelligent Dosing System: Need for Design and Analysis based on Control Theory," *Diabetes Technology and Therapeutics*, **6**(6), 868-873 (2004).
26. B.W. Bequette "A Laptop-based Studio Course for Process Control," *IEEE Control Systems Magazine*, **25**(1), 45-49 (February, 2005).
27. Palerm, C.C. and **B.W. Bequette** "Hemodynamic Control Using Direct Model Reference Adaptive Control – Experimental Results," *European Journal of Control*, **11**(6) 558-571 (2005).
28. Nagrath, D., A. Messac, **B. W. Bequette** and S.M. Cramer "Multiobjective Optimization Strategies for Linear Gradient Chromatography," *AIChE J.*, **51**(2) 511-525 (2005).
29. **Bequette, B.W.**, S. Holihan and S. Bacher "Automation and Control Issues in the Design of a Pharmaceutical Pilot Plant," *J. Process Control* **12**(7), 901-908 (2004).
30. Nagrath, D., A. Messac, **B. W. Bequette** and S.M. Cramer "A Hybrid Model Framework for Optimization of Preparative Chromatographic Processes," *Biotechnology Progress*, **20**(1), 162-178 (2004).
31. Prasad, V. and **B.W. Bequette** "Nonlinear System Identification and Model Reduction Using Artificial Neural Networks," *Comp. Chem. Eng.* **27**, 1741-1754 (2003).
32. Saraf, V.S., F.T. Zhao and **B.W. Bequette** "Auto-tuning of Cascade Controlled Open-loop Unstable Reactors," *Ind. Eng. Chem. Res.*, **42**(20), 4488-4494 (2003).
33. Rao, R.R., B. Aufderheide and **B.W. Bequette** "Experimental Studies on Multiple-Model Predictive Control for Automated Regulation of Hemodynamic Variables," *IEEE Trans. Biomed. Eng.* **50**(3), 277-288 (2003).
34. Aufderheide, B. and **B. W. Bequette** "Extension of Dynamic Matrix Control to Multiple Models," *Comp. Chem. Engng.*, **27**, 1079-1096 (2003).
35. Nagrath, D., **B.W. Bequette** and S.M. Cramer "Evolutionary Operation and Control of Chromatographic Processes," *AIChE J.*, **49**(1), 82-95 (2003).
36. Prasad, V., M. Schley, L.P. Russo and **B.W. Bequette** "Product Property and Production Rate Control of Styrene Polymerization," *J. Process Control*, **12**(3), 353-372 (2002).
37. Nagrath, D., V. Prasad and **B.W. Bequette** "A Model Predictive Formulation for Cascade Control," *Chemical Engineering Science*, **57**(3), 365-378 (2002).
38. **Bequette, B.W.** and B.A. Ogunnaike "Chemical Process Control Education and Practice," *IEEE Control Systems Magazine*, **21**(2), 10-17 (April, 2001).
39. **Bequette, B.W.** and F.J. Doyle III "Automated Control in Biomedicine," *IEEE Engineering in Medicine and Biology Magazine*, **20**(1), 22-23 (Jan/Feb, 2001).
40. Rao, R., C.C. Palerm, B. Aufderheide and **B.W. Bequette** "Experimental Studies on Automated Regulation of Hemodynamic Variables," *IEEE Engineering in Medicine and Biology Magazine*, **20**(1), 24-38 (Jan/Feb, 2001).
41. Natarajan, V., **B.W. Bequette** and Steven M. Cramer "Optimization of Ion Exchange Displacement Separations. I. Validation of an Iterative Scheme and Its Use as a Methods Development Tool," *J. Chromatography A*, **876**, 51-62 (2000).
42. Rao, R.R., R.J. Roy and **B.W. Bequette** "Simultaneous Regulation of Hemodynamic and Anesthetic States: A Simulation Study," *Annals Biomed. Eng.* **28**(1), 71-84 (2000).
43. Rao, R., J.W. Huang, **B.W. Bequette**, H. Kaufman and Rob J. Roy "Control of a Nonsquare Drug Infusion System: A Simulation Study," *Biotechnology Progress*, **15**(3), 556-564 (1999).
44. **Bequette, B.W.** "Computer Applications in Process Dynamics and Control Courses," *Comp. Applic. Eng. Educ.* **6**(3) 193-200 (1998).
45. **Bequette, B.W.**, K.D. Schott, V. Prasad, V. Natarajan and R.R. Rao "Case Study Projects in an Undergraduate Process Control Course," *Chemical Engineering Education* **32**(3) 214-219 (1998).
46. Russo, L.P. and **B.W. Bequette** "Operability of Chemical Reactors. Multiplicity Behavior of a Jacketed Styrene Polymerization Reactor," *Chem. Eng. Sci.* **53**(1), 27-45 (1998).
47. Rao, R., J.W. Huang, **B.W. Bequette**, H. Kaufman and Rob J. Roy "Modeling and Control of a Nonsquare Drug Infusion System," in *Modelling*

- and Control in Biomedical Systems, D.A. Linkens and E.R. Carson (Eds.), pp 215-220, Elsevier (1997).
48. **Bequette, B.W.** "An Undergraduate Course in Process Dynamics," *Comp. Chem. Engng.* **21**(Suppl), S261-S266 (1997).
 49. Russo, L.P. and **B.W. Bequette** "Process Design for Operability: A Styrene Polymerization Application," *Comp. Chem. Engng.* **21**(Suppl), S571-S576 (1997).
 50. Russo, L.P. and **B.W. Bequette** "State Space vs. Input/Output Representations for Cascade Control of Unstable Systems," *Ind. Eng. Chem. Res.* **36**(6), 2271-2278 (1997).
 51. **Bequette, B.W.** "Operability of Batch Reactors: Temperature Profile Feasibility," in *Chemical Process Control V*, J.C. Kantor, C.E. Garcia and B. Carnahan (eds.), AIChE Symposium Series, No. 316, Vol. 93, 315-318 (1997).
 52. **Bequette, B.W.** "Operability Analysis of an Exothermic Semi-Batch Reactor," *Comp. Chem. Eng.*, **20** (Suppl. B), S1583-8 (1996).
 53. Russo, L.P. and **B.W. Bequette**, "Effect of Process Design on the Open-Loop Behavior of a Jacketed Exothermic CSTR," *Comp. Chem. Engng.* **20**(4), 417-426 (1996).
 54. Sistu, P.B. and **B.W. Bequette**, "Nonlinear Model Predictive Control. Closed-loop Stability Analysis," *AIChE J.* **42**(12), 3388-3402 (1996).
 55. Gopinath, R.S., **B.W. Bequette**, R.J. Roy, H. Kaufman and C. Yu, "Issues in the Design of a Multirate Model-Based Controller for a Nonlinear Drug Infusion System," *Biotechnology Progress* **11**(3), 318-332 (1995).
 56. Russo, L.P. and **B.W. Bequette**, "Impact of Process Design on the Multiplicity Behavior of a Jacketed Exothermic CSTR", *AIChE Journal* **41**(1), 135-147 (1995).
 57. Sistu, P.B. and **B.W. Bequette**, "Model Predictive Control of Processes with Input Multiplicities," *Chemical Engineering Science* **50**(6), 921-936 (1995).
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- Bequette, B.W.** "Hypoglycemia Prediction Based on Continuous Subcutaneous Measurements," *Diabetes Technology and Therapeutics*, **6**(2), 230-231 (2004). Abstract from 2003 Diabetes Technology Meeting, San Francisco (Nov., 2003).
- Bequette, B.W.** "Denver Hosts ACC 2003" *IEEE Cont. Sys. Mag.*, **23**(6), 80-81 December (2003).
- Bequette, B.W.** "Identification and Control of Sheet and Film Processes" by A.P. Featherstone, J.G. VanAntwerp and R.D. Braatz. Book review. *IEEE Cont. Sys. Mag.*, **22**(3) 102-3 June (2002).
- Bequette, B.W.** "Top 10 Problems with Control Students," *IEEE Cont. Sys. Mag.*, **21**(6), 96, Dec. (2001).
- Bequette, B.W.** "Lectures and Events at the Workshop: A Cartoon Summary," in *Nonlinear Model-based Process Control*, NATO ASI Series, Ser. E, Vol. 353, pp. 875-877, R. Berber and C. Kravaris (eds.), Kluwer, Dordrecht (1998).
- B.W. Bequette** "Views on Issues and Research Directions," in *Methods of Model-Based Process Control*, NATO ASI Series, Vol. E-293, R. Berber (ed.), p. 801, Kluwer, Dordrecht (1995).
- B.W. Bequette** "Summary of the Control Research Presented at the Institute: A Cartoon Representation," in *Methods of Model-Based Process Control*, NATO ASI Series, Vol. E-293, R. Berber (ed.), pp. 804-5, Kluwer Academic Publishers, Dordrecht (1995).
- B.W. Bequette** "Keeping with the Tradition: Special Awards' of the Meeting," in *Methods of Model-Based Process Control*, NATO ASI Series, Vol. E-293, R. Berber (ed.), 807-8, Kluwer Academic Publishers, Dordrecht (1995).
- Bequette, B.W.**, "Measurement Selection and Control System Design for Multivariable Interacting Processes", Ph.D. Thesis, The University of Texas at Austin, Austin, TX (1986).

Yu, C., R.J. Roy, H. Kaufman, and **B.W. Bequette**, “Multiple-Model Predictive Control of Drug Infusion,” Abstract of presentation at the AAMI 25th Annual Meeting, Anaheim, CA (May, 1990).

Bequette, B.W. “Analysis and Design of Discrete Linear Control Systems” by V. Kucera. Book review. *Chem. Eng. Educ.*, 29(1), 16 (1995).

Contributed to “Process Control Education in the Year 2000 - A Round Table Discussion,” *Chemical Engineering Education*, 24(2), 72-77 (1990).

Professional and Public Lectures

Conference Presentations (presentations by students and colleagues listed separately)

1. “A Model of Glucagon-Glucose Dynamics for Closed-loop Glycemic Control,” 2010 Diabetes Technology Meeting, Bethesda, MD (Nov., 2010). With Hyunjin Lee, Jing Sun, Joseph El Youssef, Jessica R. Castle and W. Kenneth Ward.
2. “Insulin Infusion Set Failure Detection,” 2010 Diabetes Technology Meeting, Bethesda, MD (Nov., 2010). With Ruben Rojas, Bruce A. Buckingham and Darrell M. Wilson.
3. “An Overview of Tom Edgar’s Contributions to Chemical Process Systems Engineering,” 2010 AIChE Annual Meeting (Nov., 2010). Salt Lake City. With Dale Seborg.
4. “Algorithms for ICU blood glucose control,” 2009 Diabetes Technology Meeting (Nov., 2009). San Francisco.
5. “An Augmented Multiple Model Strategy for Disturbance Estimation and Control,” 2009 American Control Conference, St. Louis (June, 2009). With Matthew Kuure-Kinsey.
6. “The Importance of Human Factors in Control Systems and Knowledge Management,” AIChE Annual Meeting, Philadelphia (November, 2008). With Kevyn Renner and William H. Bosler.
7. “Human-Friendly and Control-Relevant Modeling for a Closed-loop Artificial Pancreas,” AIChE Annual Meeting, Philadelphia (November, 2008). With Hyunjin Lee.
8. “Meal Size Estimation Using Continuous Glucose Monitoring: Toward a Closed-Loop Artificial Pancreas,” EASD annual meeting, Rome, Italy (September, 2008). With H. Lee, K. Caswell, E. Dassau, F.J. Doyle III, B.A. Buckingham.
9. “Multiple Model Predictive Control of Nonlinear Systems,” NMPC '08, Pavia, Italy (September, 2008). With Matthew Kuure-Kinsey.
10. “Model Predictive Controller Design for Multiple Disturbances,” American Chemical Society annual meeting, Philadelphia, PA (August, 2008). Co-author: Matthew Kuure-Kinsey.
11. “A Closed-loop Artificial Pancreas: Status and Challenges,” TADE (Taiwanese Association of Diabetes Educators) Annual Meeting, Taipei (July, 2008). *Invited keynote speaker.*
12. “A Closed-loop Artificial Pancreas based on MPC: human-friendly identification and automatic meal disturbance rejection,” 17th IFAC World Congress, Seoul (July, 2008). Co-author: Hyunjin Lee.
13. “Improved Nonlinear Predictive Control Performance using Recurrent Neural Networks,” 2008 American Control Conference, Seattle, WA (June, 2008). With Matthew Kuure-Kinsey.
14. “Algorithms for ICU Blood Glucose Control” 2008 American Control Conference, Seattle, WA (June, 2008).
15. “Development of an Integrated Fuel Cell System Model,” 2007 AIChE Annual Meeting, Salt Lake City, November, 2007.

16. "Glucose Monitoring and Control Technologies for Diabetes Care," 2007 Tech Valley Symposium, Rensselaer Polytechnic Institute, April, 2007. Co-authors: H. Lee, J. Desemone, J.P Willis.
17. "A Fuel Cell Module for a Chemical Process Control Course," 2006 AIChE Annual Meeting, San Francisco, November, 2006. Poster presentation.
18. "Nonlinear Model Predictive Control," Canadian Society of Chemical Engineers (CSCChE) Annual Conference, Sherbrooke, QC. October, 2006. *Invited Keynote lecture.*
19. "A Dual-Rate Kalman Filter for Continuous Glucose Monitoring," IEEE Engineering in Medicine and Biology Conference, New York. August, 2006.
20. "Sensors and Algorithms for Continuous Glucose Monitoring and Control," Special Session on Biological Control Systems: Endogenous and Exogenous Analysis and Design. 2006 American Control Conference, Minneapolis, MN. June, 2006.
21. "Diabetes Technology: Continuous Glucose Monitoring," Workshop on Improving Health Care Accessibility Through Point of Care Technologies, Arlington, VA, April 10-11, 2006.
22. "Algorithms for Glucose Monitoring and Control," NIDDK Workshop on Obstacles and Opportunities on the Road to the Artificial Pancreas, Bethesda, 19 December, 2005. Invited lecture.
23. "Calibration of Continuous Glucose Sensors Based on Optimal Estimation Theory," Diabetes Technology Meeting, San Francisco, 10-12 November, 2005. Poster presentation.
24. "Twin-Screw Food Extruder: A Multivariable Case Study for a Process Control Course" AIChE Annual Meeting, Cincinnati, November, 2005.
25. "Disturbance Estimation and Prediction in Model Predictive Control," AIChE-IChE Joint Meeting, Mumbai, 28-30 December, 2004. *Keynote lecture.*
26. "A Laptop-Based Studio Course for Process Control" AIChE Annual Meeting, Austin, TX, 7-12 November, 2004.
27. "Incorporation of Glucose Meter Uncertainty in the Calibration of Continuous Glucose Sensors" Diabetes Technology Meeting, Philadelphia, 28-30 October, 2004. Poster presentation.
28. "Hypoglycemia Warning System Using Optimal Estimation for Prediction Using Continuous Glucose Monitoring" Diabetes Technology Meeting, Philadelphia, 28-30 October, 2004. Poster presentation.
29. "Optimal Estimation Applications to Continuous Glucose Monitoring" 2004 American Control Conference, Boston, 30 June – 2 July, 2004.
30. "Optimal Estimation of Blood Glucose" 30th Northeast Bioengineering Conference, Springfield, MA, April 17-18, 2004.
31. "A Critical Assessment of Control Algorithms and Challenges," Third La Jolla Conference on Glucose Monitoring and Control, La Jolla, Feb 12-14, 2004.
32. "Batch to Batch Optimization and Control of Nonlinear Chromatographic Processes," AIChE Annual Meeting, November, 2003.
33. Hypoglycemia Prediction based on Continuous Subcutaneous Measurements," Third Annual Diabetes Technology Meeting, San Francisco, November 6-8, 2003. Poster presentation.
34. "Regulation of Hemodynamic and Anesthetic States," European Control Conference (ECC '03), Cambridge, UK, September 1-4, 2003.
35. "Model Predictive Control Tutorial," AIChE Spring Meeting, New Orleans, March 30 - April 3, 2003.

36. "Control of Blood Glucose Based on Subcutaneous Measurements," Second La Jolla Conference on Glucose Monitoring and Control, La Jolla, Feb 13-15, 2003.
37. "Model Predictive Control of Nonlinear Systems," ISPSEC '03, Mumbai, India, Jan. 3-4, 2003. *Invited Plenary Speaker.*
38. "Regulation of Blood Glucose Based on Subcutaneous Measurements," Second Annual Diabetes Technology Meeting, Atlanta, Oct. 31, Nov. 1-2, 2002. *Invited Keynote Speaker.*
39. "Nonlinear System Identification and Estimation Using Artificial Neural Networks," AIChE Annual Meeting, Indianapolis, IN, November, 2002.
40. "Direct Model Reference Adaptive Control and Saturation Constraints," IFAC World Congress, Barcelona, July, 2002.
41. "Automation and Control Issues in the Design of a Pharmaceutical Pilot Plant," IFAC World Congress, Barcelona, July, 2002.
42. "Biomedical Applications of Feedback Control," BECON 2002 Symposium: Sensors for Biological Research and Medicine, Natcher Conference Center, NIH, Bethesda, MD, June, 2002. Poster presentation.
43. "Closed-loop Regulation of Blood Glucose Based on Subcutaneous Measurements," Workshop on The Future of Metabolic Monitoring of Glucose: Identifying Complementary Measurable Parameters, Arlington, VA, May, 2002.
44. "Systems and Control Challenges in Biotechnology," NSF Workshop on the Research Needs in the Modeling, Dynamics, Control, and Monitoring of Complex Engineering Systems, Anchorage, May, 2002. *Invited Plenary Speaker.*
45. "Behavior of a CSTR with a Recirculating Jacket Heat Transfer System," 2002 American Control Conference, Anchorage, May, 2002. *Best Presentation of Session Award.*
46. "Model Predictive Control of Blood Glucose in Type I Diabetics Using Subcutaneous Glucose Measurements," 2002 American Control Conference, Anchorage, May, 2002.
47. "A Multiple Model Approach for Adaptation in Drug Delivery," Workshop on Automation and Robotics: The Key for Computer Integrated Healthcare Delivery, Vancouver, BC, April, 2002. *Invited Plenary Speaker.*
48. "A Closed-loop Approach to Regulate Blood Glucose Concentrations in Type 1 Diabetics," Diabetes Technology Conference, San Francisco, November, 2001.
49. "Model Predictive Control of Nonlinear Processes: Two Approaches," 2nd Pan-American Workshop on Process Systems Engineering, Guarujá, Sao Paulo, Brazil, September, 2001.
50. "Control Applications in Biotechnology and Biomedical Engineering, Biotechnology in the Capital Region, Rensselaerville, NY (September, 2001). Poster presentation.
51. "Auto-tuning of Cascade Controlled Open-loop Unstable Reactors," American Control Conference, Arlington, VA, June, 2001.
52. "A Minimal Knowledge Controller with Variable Tuning," American Control Conference, Arlington, VA, June, 2001.
53. "A Process Control Experiment Designed for a Studio Course", AIChE Annual Meeting, Los Angeles, Nov. 2000.
54. "Model Predictive Control of Nonlinear Processes," Canadian Chemical Engineering Conference, Montreal, October, 2000. Keynote address, session on model-based control.

55. "An Interdisciplinary Control Education Studio", 38th IEEE Conference on Decision and Control, Phoenix, AZ, December 1999.
56. "Systems and Control Education: A Drug Infusion Case Study," BMES/EMBS, Atlanta, October, 1999.
57. "Nonlinearity in Estimation and Control," Gordon Research Conference on Statistics in Chemistry and Chemical Engineering, Plymouth, NH, July 1999.
58. "Chemical Process Control Education and Practice," American Control Conference, San Diego, June 1999.
59. "Operability Analysis and Nonlinear Model Predictive Control of a Styrene Polymerization Reactor," 37th IEEE Conference on Decision and Control, Tampa, FL, December 1998.
60. "Nonlinear Model Predictive Control of a Styrene Polymerization Reactor," Workshop on Nonlinear Model Predictive Control, Ascona, Switzerland, June 1998.
61. "Operability Studies for Safety in Pilot Plant Reactors," DYCOPS-5, Corfu, Greece, June 1998.
62. "Effect of Process Scale-up on Batch Reactor Operability," AIChE Spring Meeting, New Orleans, Mar. (1998).
63. "Gain Scheduling Theory and Applications," AIChE Spring Meeting, New Orleans, Mar. (1998).
64. "Case Study Projects in an Undergraduate Process Control Course," Control-97, Sydney, 20-22 Oct. (1997).
65. "Control of Hemodynamic and Anesthetic States in Critical Care Patients," Control-97, Sydney, 20-22 Oct. (1997).
66. "Gain Scheduled Process Control: A Review," NATO ASI on Nonlinear Model-based Process Control, Antalya, Turkey, 10-20 Aug. (1997).
67. "MMAC: Using a Bank of Linear Models to Control a Nonlinear System," NATO ASI on Nonlinear Model-based Process Control, Antalya, Turkey, 10-20 Aug. (1997).
68. "Industrial Applications of Nonlinear Control," NATO ASI on Nonlinear Model-based Process Control, Antalya, Turkey, 10-20 Aug. (1997).
69. "An Undergraduate Course in Process Dynamics," PSE '97 - ESCAPE-6, Trondheim, Norway (May 1997).
70. "Process Design for Operability: A Styrene Polymerization Application," PSE '97 - ESCAPE-6, Trondheim, Norway (May 1997).
71. "Modeling and Control of a Nonsquare Drug Infusion System," IFAC-sponsored conference on Modeling and Control in Biomedical Systems, University of Warwick (March, 1997).
72. "Model Development for Anesthetic and Hemodynamic Monitoring and Control," AIChE Annual Meeting, Chicago, IL (November, 1996).
73. "Operability Analysis of an Exothermic Semi-batch Reactor," ESCAPE-6, Rhodes, Greece (May, 1996).
74. "Issues in the Scale-up and Control of Batch Reactors," 1996 AIChE Spring Meeting, New Orleans (February, 1996).
75. "Operability of Batch Reactors: Temperature Profile Feasibility" CPC-V, Lake Tahoe, CA (January, 1996).
76. "Reaction Calorimetry for Scale-up and Control of Batch Reactors," 1995 AIChE Annual Meeting, Miami Beach (November 1995).
77. "Performance and Bifurcation Analysis of Cascade Control of Chemical Reactors," 1995 AIChE Annual Meeting, Miami Beach (November 1995).

78. "Limitations to Input-Output Analysis of Cascade Control of Unstable Chemical Reactors," DYCORD+ '95, 4th IFAC Symposium on Dynamics and Control of Chemical Reactors, Distillation Columns and Batch Reactors, Helsingor, Denmark, (June 1995).
79. "Control of Chemical Reactors Using Multiple-Model Adaptive Control (MMAC)" DYCORD+ '95, 4th IFAC Symposium on Dynamics and Control of Chemical Reactors, Distillation Columns and Batch Reactors, Helsingor, Denmark, (June 1995)
80. "Limitations to Input-Output Analysis of Cascade Control of Unstable Chemical Reactors," 1994 AIChE Annual Meeting, San Francisco, CA (November 1994).
81. "Nonlinear Model Predictive Control. A Closed-loop Stability Analysis, 1994 AIChE Annual Meeting, San Francisco, CA (November 1994).
82. "Feedback Control of Growth Rate in a CVD Reactor Using Spectroscopic Ellipsometry," Topical Conference on the Synthesis and Processing of Electronic Materials, 1994 AIChE Annual Meeting, San Francisco, CA (November 1994).
83. "The Design of Nonlinear Predictive Controllers: Application to A Drug Infusion System," NATO ASI on Model-Based Process Control, Antalya, Turkey (August, 1994).
84. "A Stability Analysis of Nonlinear Model Predictive Control," NATO ASI on Model-Based Process Control, Antalya, Turkey (August, 1994).
85. "Multirate MPC Design for a Nonlinear Drug Infusion System," 1994 American Control Conference, Baltimore, MD (June, 1994).
86. "Effect of Process Design on the Open-Loop Behavior of a Jacketed Exothermic CSTR," IFAC Conference on IPDC'94, Baltimore, MD (June, 1994).
87. "Impact of Process Design on the Behavior of a Jacketed Exothermic CSTR," PSE '94, Kyongju, Korea (June, 1994).
88. "A Disturbance Estimator for Model Predictive Control," ADCHEM '94, Kyoto, Japan (May, 1994).
89. "Multirate Model Predictive Control: Application to a Nonlinear Multivariable Drug Delivery System," 1993 AIChE Annual Meeting, St. Louis (November 1993)
90. "Recent Advances in the Control of Drug Delivery Systems" 1992 AIChE Annual Meeting, Miami Beach (November 1992).
91. "Control of Nonlinear Nonminimum-Phase Processes," 1992 American Control Conference, Chicago, IL (June, 1992).
92. "Multirate Model Predictive Control of Unconstrained Single Input-Single Output Processes," 1992 American Control Conference, Chicago, IL (June, 1992).
93. "CSTR Performance Limitations Due to Cooling Jacket Dynamics", DYCORD+ '92, College Park, Maryland, USA (April, 1992).
94. "Nonlinear Predictive Control of Exothermic Chemical Reactors," ADCHEM '91, Toulouse, France (October, 1991).
95. "Nonlinear Predictive Control of Uncertain Chemical Processes," 1990 AIChE Annual Meeting, Chicago, IL (November, 1990).
96. "An Undergraduate Model-Based Process Control Course," 40th Canadian Chemical Engineering Conference, Halifax, Nova Scotia (July, 1990).

97. "Nonlinear Predictive Control of Chemical Processes," 40th Canadian Chemical Engineering Conference, Halifax, Nova Scotia (July, 1990).
98. "Process Control using Nonlinear Programming Techniques," Ninth International Conference on Analysis and Optimization of Systems, Antibes, France (June, 1990).
99. "Process Identification using Nonlinear Programming Techniques," 1990 American Control Conference, San Diego, CA (May, 1990).
100. "Data Reconciliation of Systems with Unmeasured Variables Using Nonlinear Programming Techniques," 1990 AIChE Spring National Meeting, Orlando, FL (March, 1990).
101. "Disturbance and Parameter Estimation of Nonlinear Dynamic Systems in a Predictive Control Framework," 1989 AIChE Annual Meeting, San Francisco, CA (November, 1989).
102. "A One-Step-Ahead Approach to Nonlinear Process Control," ISA/89 International Conference, Philadelphia, PA (October, 1989).
103. "Electrochemical Etching using Scanning Electrochemical and Tunneling Microscopy," 1988 AIChE Annual Meeting, Washington, D.C. (November, 1988).
104. "Modeling for Design of Feedback Controllers", ISA/87 International Conference, Anaheim, CA (October, 1987).
105. "Resilient and Robust Control of an Energy-Integrated Distillation Column", 1987 American Control Conference, Minneapolis, MN (June, 1987).
106. "Improvements in Compartmental Modeling for Distillation", 1986 American Control Conference, Seattle, WA (June, 1986).
107. "The Equivalence of Non-Interacting Control System Design Methods in Distillation", 1986 American Control Conference, Seattle, WA (June, 1986).
108. "Selection of Process Measurements in Distillation Column Control to Minimize Multivariable Interactions", 1984 AIChE Annual Meeting, San Francisco, CA (Nov, 1984).

Conference Presentations by Students and Colleagues

109. "Model-based Control of Blood Glucose in Intensive Care Unit (ICU) Patients," 2010 AIChE Annual Meeting, Salt Lake City (Nov., 2010). Presented by Jing Sun.
110. "Dynamic Modeling and Control of Heat Recovery Steam Generator and Steam Turbine Units as Part of IGCC Power Plants," AIChE Annual Meeting, Salt Lake City (Nov., 2010). Presented by Priyadarshi Mahapatra.
111. "Plantwide Controller Design for IGCC with Co-Production of Hydrogen and External Steam," AIChE Annual Meeting, Salt Lake City (Nov., 2010). Presented by Priyadarshi Mahapatra.
112. "Process Design and Control Studies of an Elevated-Pressure Air Separations Unit for IGCC Power Plants," 2010 American Control Conference, presented by Priyadarshi Mahapatra.
113. "A Comparison of Clinical Control Strategies for the Hyperglycemia of Injury and Illness," 2010 American Control Conference, presented by Jing Sun.
114. "Improving Closed-loop Control by Considering Uncertainty and Minimizing Clinical Risk," 2010 Diabetes Technology Meeting, Bethesda, MD (Nov., 2010). Fraser Cameron, Gunter Niemeyer, Bruce A. Buckingham, Hyunjin Lee, B. Wayne Bequette and Darrell M. Wilson. Presented by Fraser Cameron.
115. "A lecture, demonstration and simulation to teach chemical process control basics to high school STEM instructors," 2009 AIChE Annual Meeting (Nov., 2009). D.E Weber, B.W. Bequette, D. Kaminski. Presented by Dale Weber.

116. "Rigorous dynamic modeling and model predictive control of an air separation unit as part of an IGCC power plant," 2009 AIChE Annual Meeting (Nov., 2009). P. Mahapatra and B.W. Bequette. Presented by Priyadarshi Mahapatra.
117. "Comparison of different controller designs for plantwide IGCC control," 2009 AIChE Annual Meeting (Nov., 2009). P. Mahapatra and B.W. Bequette. Presented by Priyadarshi Mahapatra.
118. "Advances in control algorithms for blood glucose regulation in the intensive care unit (ICU)," AIChE Annual Meeting (Nov., 2009). J. Sun, B.W. Bequette, H. Lee. Presented by Jing Sun.
119. "A closed-loop artificial pancreas using model predictive control and sliding meal size estimation," 2009 Diabetes Technology Meeting (Nov., 2009). H. Lee, B.W. Bequette, B.A. Buckingham, D.M. Wilson, F. Cameron. Presented by Hyunjin Lee.
120. "A comparison of glycemic strategies under uncertain meal sizes and timings: a 1-week in silico study involving 20 subjects," 2009 Diabetes Technology Meeting (Nov., 2009). H. Lee, B.W. Bequette, B.A. Buckingham, D.M. Wilson, F. Cameron. Presented by Hyunjin Lee.
121. "Closed-loop control by hypoglycemia risk management," 2009 Diabetes Technology Meeting (Nov., 2009). F. Cameron, G. Niemeyer, B.A. Buckingham, H. Lee, B.W. Bequette, D.M. Wilson. Presented by Fraser Cameron.
122. "Probabilistic, evolving meal detection," 2009 Diabetes Technology Meeting (Nov., 2009). F. Cameron, G. Niemeyer, B.A. Buckingham, H. Lee, B.W. Bequette, D.M. Wilson. Presented by Fraser Cameron.
123. "Oxygen Purity Control in the Air Separation Unit of an IGCC Power Generation System during Rapid Production Fluctuations," 2009 Pittsburgh Coal Conference (Sept., 2009). Presented by Priyadarshi Mahapatra.
124. "Decentralized vs. Centralized Control of IGCC Power Plants," 2009 Pittsburgh Coal Conference (Sept., 2009). Presented by Priyadarshi Mahapatra.
125. "Model Predictive Control of Integrated Gasification Combined Cycle Power Plants," 2009 University Coal Research & HBCU Conference, Morgantown, WV (June, 2009). Presented by Priyadarshi Mahapatra.
126. "Design of a Closed-Loop Artificial Pancreas Incorporating Knowledge of Insulin-on-Board: Results based on the FDA-Approved Simulator," 2nd International Conference on Advanced Technologies and Treatments for Diabetes (ATTD), Athens (25-28 February, 2009). H. Lee, B.A. Buckingham, D.M. Wilson, B.W. Bequette, H. Lee. Presented by Bruce A. Buckingham
127. "The Stanford-UCSB-RPI-Sansum-Schneider Progress Towards a Closed-Loop," 2nd International Conference on Advanced Technologies and Treatments for Diabetes (ATTD), Athens (25-28 February, 2009). B.A. Buckingham, E. Dassau, H. Lee, B.W. Bequette et al. Presented by Bruce A. Buckingham and Eyal Dassau.
128. "Dynamics and Control of Air Separation Unit-Gas Turbine-Gasifier Integrated Power Cycle of IGCC Plants," AIChE Annual Meeting (November, 2008). Presented by Priyadarshi Mahapatra.
129. "A Systematic Methodology for the Evaluation of Alternative Thermochemical Cycles for Hydrogen Production," AIChE Annual Meeting (November, 2008). Presented by Ryan J. Andress. Co-authors: Lealon L. Martin, B. Wayne Bequette.
130. "An Insulin-on-Board Formulation of a Proportional-Integral-Derivative Controller for a Closed-Loop Artificial Pancreas," Diabetes Technology Meeting, Bethesda (November, 2008). Presented by Hyunjin Lee. Co-author: Bruce Buckingham.
131. "Comparison of IMC and MPC for a Closed-Loop Artificial Pancreas," Diabetes Technology Meeting, Bethesda (November, 2008). Presented by Hyunjin Lee. Co-authors: Bruce Buckingham and Darrell M. Wilson.

132. "Effect of Gas-Turbine ASU Integration in Dynamics and Control of IGCC Power Plants," 2008 International Pittsburgh Coal Conference (September, 2008). Presented by Priyadarshi Mahapatra.
133. "Solving Dynamic Traffic Routing Problems using Advanced Process Control Algorithms," XV Pan-American Conference of Traffic and Transportation Engineering (September, 2008). Presented by M. Jaller. Co-author Q. Wang.
134. "Real-time Hypoglycemia Prediction Using Continuous Glucose Monitoring (CGM), A Safety Net to the Artificial Pancreas," American Diabetes Association Annual Meeting (June 2008). Dassau, E., F.M Cameron, H. Lee, B.W. Bequette, F.J. Doyle III, G. Niemyer, P. Chase and B.A. Buckingham. Presented by Eyal Dassau.
135. "Model Predictive Control of Integrated Gasification Combined Cycle Power Plants," 2008 University Coal Research Conference, Pittsburgh (June, 2008). Presented by Priyadarshi Mahapatra.
136. "The JDRF Artificial Pancreas Project, the Consortium of Stanford, UCSB, Rensselaer Polytechnic Institute and the Barbara Davis Center," International Conference on Advanced Technologies and Treatments for Diabetes (ATTD), Prague (27 Feb – 1 March, 2008). B.A. Buckingham, D.M Wilson, F.J. Doyle III, E. Dassau, B.W. Bequette, H. Lee, H.P. Chase and E.C. Cobry. Presented by Bruce Buckingham.
137. "Multiple Model Predictive Control of a Fuel Cell System," 2007 AIChE Annual Meeting, Salt Lake City (November, 2007). Matthew Kuure-Kinsey, Judy O'Rourke and B. Wayne Bequette. Presented by Priyadarshi Mahapatra.
138. "Modeling and Control of an Air Separations Unit for an IGCC Power Plant," 2007 AIChE Annual Meeting, Salt Lake City (November, 2007). Presented by Priyadarshi Mahapatra.
139. "Early Detection of Hypoglycemia Combining Multiple Predictive Methods on Retrospective Clinical Continuous Glucose Monitoring Data," Seventh Annual Diabetes Technology Meeting, San Francisco (25-27 October, 2007). Fraser Cameron, Gunter Niemyer, Cesar C. Palerm, Eyal Dassau, Francis J. Doyle III, Hyunjin Lee, B. Wayne Bequette, H. Peter Chase and Bruce Buckingham. Presented by Fraser Cameron.
140. "Time-varying Insulin Sensitivity in an in Silico Model of Subjects with Type 1 Diabetes," Seventh Annual Diabetes Technology Meeting, San Francisco (25-27 October, 2007). Hyunjin Lee, Cesar C. Palerm, Wendy Bevier, Howard Zisser, Lois Janvonovic, Bruce Buckingham, Francis J. Doyle III and B. Wayne Bequette.
141. "Meal Detection and Meal Magnitude Estimation based on Glucose Monitoring," Seventh Annual Diabetes Technology Meeting, San Francisco (25-27 October, 2007). Hyunjin Lee, Francis J. Doyle III, Bruce Buckingham and B. Wayne Bequette.
142. "Model Predictive Control of Integrated Fuel Cell Systems," 2007 Fuel Cell Seminar, San Antonio, 15-19 October, 2007. Presented by Matthew Kuure-Kinsey.
143. "Integrated Reformer/Combustor Models for High Temperature Fuel Cell Systems," 2007 Fuel Cell Seminar, San Antonio, 15-19 October, 2007. Presented by Thomas Horgan.
144. "Multiple Model Predictive Control: A State Estimation Based Approach," 2007 American Control Conference, New York, 11-13 July, 2007. Presented by Matthew Kuure-Kinsey.
145. "Detection of a Meal Using Continuous Glucose Monitoring (CGM): Implications for Model Predictive Control Using a Real-Time CGM," American Diabetes Association 67th Scientific Sessions, Chicago, June 22-26, 2007. Presented by Eyal Dassau. Co-authors: Cesar C. Palerm, Bruce Buckingham, Laura Gandrud and Francis J. Doyle III.
146. "Human-Friendly Testing to Develop Models for a Closed-loop Artificial Pancreas," American Diabetes Association 67th Scientific Sessions, Chicago, June 22-26, 2007. Poster presented by Hyunjin Lee and Dan Finan. Co-author: Dale Seborg.
147. "Modeling and Control of a Rotating Disk Bioreactor," 2006 AIChE Annual Meeting, San Francisco, November. Presented by Dale Weber. Co-authors: Joel Plawsky, Harry Bungay and Matthew Kuure-Kinsey.

148. "A Proposal for Diabetes Teaching Modules for the Undergraduate Chemical Engineering Curriculum," 2006 AIChE Annual Meeting, San Francisco. November. Presented by Frank Doyle. Co-authors: Michael Henson, Robert Parker and Cesar Palerm.
149. "Computationally Efficient Neural Predictive Control based on a Feedforward Architecture," 2006 American Control Conference, June, 2006. Presented by Matthew Kuure-Kinsey.
150. "Modeling and Predictive Control of a Rotating Disk Bioreactor," 2005 American Control Conference, June, 2005. Presented by Matthew Kuure-Kinsey. Co-authors: Joel Plawsky, Harry Bungay and Dale Weber.
151. "Issues on Hypoglycemia Detection," 30th Northeast Bioengineering Conference, Springfield, MA, April 17-18, 2004. Poster presented by Cesar C. Palerm.
152. "Continuous Glucose Monitoring for Hypoglycemia Detection," Third La Jolla Conference on Glucose Monitoring and Control, La Jolla, Feb 12-14, 2004. Presented by Cesar C. Palerm.
153. "Physical Programming Based Multiobjective Optimization Strategies for Chromatographic Processes," Prep. Meeting (May, 2003). Presented by Deepak Nagrath.
154. "Multiobjective Optimization Strategies for Preparative Chromatography Using Physical Programming," 226th ACS Annual Meeting, New Orleans (March, 2003). Presented by Deepak Nagrath.
155. "Batch-to-Batch Optimization and Control of Chromatographic Processes using Physical Programming," AIChE Annual Meeting, Indianapolis (Nov., 2002). Presented by Deepak Nagrath.
156. "Comparison of Control Strategies for the Artificial Pancreas," AIChE Annual Meeting, Indianapolis (Nov., 2002). Presented by Brian Aufderheide.
157. "Model based batch-to-batch optimization and control of nonlinear chromatographic processes," 224th ACS National Meeting, Boston (August, 2002). Presented by Deepak Nagrath.
158. "Novel Strategies for Optimization of Chromatographic Processes," 224th ACS National Meeting, Boston (August, 2002). Presented by Deepak Nagrath.
159. "A Comparison of Fundamental Model-based and Multiple Model Predictive Control," IEEE Conference on Decision and Control, Orlando, FL (December, 2001). Presented by Brian Aufderheide.
160. "Nonlinear Model-Based Operation and Control of Chromatographic Processes," AIChE Annual Meeting, Reno, NV (November, 2001). Presented by Deepak Nagrath.
161. "Evolutionary Operation of Chromatographic Processes," Symposia on Preparative/Process Chromatography, Washington, CD (May, 2001). Presented by Steve Cramer.
162. "Evolutionary Operation of Chromatographic Processes," 221st ACS National Meeting, San Diego (April, 2001). Presented by Deepak Nagrath.
163. "Estimation-based Model Predictive Control of Blood Glucose in Type I Diabetics: A Simulation Study," in Proceedings of the 27th Northeast Bioengineering Conference, Storrs, CT (March, 2001). Presented by Sandra Lynch.
164. "Constrained Estimation of Batch Processes," AIChE Annual Meeting, Los Angeles (Nov., 2000). Presented by Vinay Prasad.
165. "Canine Experimental Studies on Automated Hemodynamic Regulation," The 2000 World Congress on Medical Physics and Biomedical Engineering, Chicago (July, 2000). Presented by Brian Aufderheide.
166. "Validation of an Adaptive Multivariable Hemodynamic Controller," The 2000 World Congress on Medical Physics and Biomedical Engineering, Chicago (July, 2000). Presented by Cesar Palerm.

167. "Robust Control of Drug Infusion with Time Delays using Direct Adaptive Control: Experimental Results," American Control Conference, Chicago (June, 2000). Presented by Cesar C. Palerm. Best paper of session award.
168. "Model Predictive Control of Open-loop Unstable Cascade Systems," American Control Conference, Chicago (June, 2000). Presented by Vinay Prasad.
169. "Multi-rate Estimation and Model Predictive Control of a Styrene Polymerization Reactor," AIChE Annual Meeting, Dallas (November, 1999). Presented by Vinay Prasad.
170. "Multiple Model Predictive Control: A Design to Handle Highly Variable Plants with Hard Constraints," AIChE Annual Meeting, Dallas (November, 1999). Presented by Brian Aufderheide.
171. "Advanced Control of a Glass Cooling Forehearth," AIChE Annual Meeting, Dallas (November, 1999). Presented by Ramesh Rao.
172. "Validation of an Adaptive Hemodynamic Controller" BMES/EMBS Conference, Atlanta (October, 1999). Presented by Cesar Palerm.
173. "Multiple Model Predictive Control of Canine Hemodynamic Variables," BMES/EMBS Conference, Atlanta (October, 1999). Presented by Brian Aufderheide.
174. "Multiple Model Predictive Control of Hemodynamic Variables: An Experimental Study," American Control Conference, San Diego (June, 1999). Presented by Ramesh Rao.
175. "Automated Hemodynamic Regulation with Model Predictive Control," Northeast Bioengineering Conference, Hartford, CT (April, 1999). Presented by Brian Aufderheide.
176. "Pilot Plant Reaction Calorimetry," AIChE Spring Meeting, Houston, TX (Mar. 1999). Presented by Glenn Spencer, Merck.
177. "Methods for Assessing Thermal Runaway Risks in Batch and Semi-Batch Reactors," AIChE Annual Meeting, Miami Beach, FL (Nov. 1998). Presented by Vinay Prasad.
178. "Modeling and Control of Hemodynamic and Anesthetic Drug Infusion," AIChE Annual Meeting, Los Angeles, CA (Nov. 1997). Presented by Ramesh Rao.
179. "Optimization of Protein Purification in Gradient and Displacement Ion Exchange Chromatography," AIChE Annual Meeting, Los Angeles, CA (Nov. 1997). Presented by Venkatesh Natarajan.
180. "Case Study Applications in an Undergraduate Process Control Course," ASEE Summer Workshop, Snowbird, UT (Aug 1997). Presented by Kevin Schott.
181. "Bifurcation Analysis of Cascade Controlled Nonlinear Systems," 13th World Congress of IFAC, session 7a-11 (Chemical Process Control II), San Francisco, CA (July 1996). Presented by Lou Russo.
182. "Using MPC within the Multiple-Model Adaptive Control (MMAC) Framework" 1996 AIChE Spring National Meeting, New Orleans (February 1996). Presented by Kevin D. Schott
183. "Control of Nonlinear Chemical Processes Using Multiple-Model Adaptive Control (MMAC)" 1994 AIChE Annual Meeting, San Francisco, CA (November 1994). Presented by Kevin D. Schott
184. "Impact of Process Design on the Operation and Performance of a Jacketed Exothermic CSTR", 1993 AIChE Annual Meeting, St. Louis (November 1993). Presented by Lou Russo.
185. "Model Predictive Control of Processes with Input Multiplicities," 1993 AIChE Annual Meeting St. Louis (November 1993). Presented by Phani B. Sistu.
186. "CSTR Performance Limitations Due to Cooling Jacket Dynamics - Open and Closed Loop Considerations," 1992 AIChE Annual Meeting Meeting, Miami Beach (November 1992). Presented by Louis P. Russo.

187. "Data Reconciliation and Fault Detection in Dynamic Processes," 1991 AIChE Annual Meeting Los Angeles, CA (November 1991). Presented by Yoga Ramamurthi.
188. "Parallels Between Predictive Control and Global Linearization Methods," 1991 AIChE Annual Meeting, Los Angeles, CA (November 1991). Poster presented by Phani B. Sistu.
189. "Multirate Model Predictive Control: An Analysis for Single-Input Single-Output Systems," PSE '91, Montebello, Quebec (August 1991). Poster presented by Ravi S. Gopinath.
190. "Implementation Issues in Nonlinear Predictive Control," 1991 American Control Conference, Boston, MA (June 1991). Presented by Phani. B. Sistu.
191. "Multivariable Predictive Control of Multirate Sampled Data Systems," 1990 AIChE Annual Meeting, Chicago, IL (November 1990). Poster presented by Ravi S. Gopinath.

Invited Lectures

- "Therapeutic Decision Support Through Automation of Drug Delivery Systems"
Hospira, Lake Forest, IL (April, 2010)
- "Systems and Control Applications in Diabetes"
Illinois Institute of Technology, Chicago (March, 2010)
Fields Institute, Toronto, ON (February, 2010)
- "Chemical, Energy, and Biomedical Systems and Control"
Alstom, Hartford, CT (December, 2009)
- "Multiple Model Probabilistic Predictive Control"
JDRF APP Track 2 Meeting, San Francisco, CA (4 November, 2009)
- "Model Predictive Control: An Overview and Selected Applications"
AIChE Webinar, 30 September 2009
- "Applications of Systems Engineering in Diabetes"
Carnegie-Mellon University, Process Systems Engineering Seminar Series (January 2009)
- "*In Silico* Studies for Controller Design"
JDRF APP Track 2 Meeting, Washington, DC (13 November, 2008)
- "A Closed-loop Artificial Pancreas"
Industrial Technology Research Institute, Hsinchu, Taiwan (July, 2008)
- "Multiple Model Predictive Control for Nonlinear Systems and Improved Disturbance Rejection"
McMaster Advanced Control Consortium (MACC), Hamilton, ON (May, 2008)
- "An Overview of Model Predictive Control"
National Institute of Technology (NIT), Tiruchirappalli (Trichy), by videoconference (7 March 2008)
- "Biomedical and Pharmaceutical Applications of Systems and Control"
Purdue University, West Lafayette, IN (February, 2008)
- "Control Algorithms for a Closed-loop Artificial Pancreas"
JDRF-DEKA Meeting, New Bedford, MA (29 August, 2007)
- "Operability and Control of Nonlinear Systems"
NTNU, Trondheim, Norway (December, 2007)
University of Alberta (May, 2007)
- "Biomedical Applications of Control and Estimation Theory"

University of Arkansas (March, 2007)
Rutgers University (October, 2006)

“Process Systems Engineering: Using Lab Data for Effective Scale-up”
Bristol-Meyers Squibb, New Brunswick, NJ (May 2006)

“Biomedical Estimation and Control”
Medtronic Minimed, Thousand Oaks, CA (March 2006)

“Control of Processes with Long and/or Variable Time-Delay”
Plug Power, Latham (November, 2005)

“Operability and Control of Nonlinear Processes”
Ford Motor Company, Dearborn (October, 2005)
University of Michigan, Control Seminar Series (October, 2005)

“A Process Systems Engineering View of Process Analytical Technologies”
Bristol-Myers Squibb, New Brunswick, NJ (May, 2005)

“Operability and Control of Chemical and Biological Processes”
General Electric Global R&D, Niskayuna, New York (April, 2005)

“Biomedical Applications of Control and Estimation Theory”
University of Florida, Department of Chemical Engineering, Gainesville (March, 2005)
University of Notre Dame, Department of Chemical Engineering, South Bend, Indiana (April, 2005)
University of Michigan, Department of Chemical Engineering, Ann Arbor (October, 2005)
University of California, Center for Control and Dynamical Systems, Santa Barbara (November, 2005)
Texas A&M University, Department of Chemical Engineering, College Station (December, 2005)

“Operability and Control of Integrated Chemical Processes: Potential Applications of Fuel Cells”
Plug Power, Latham, New York (July, 2004)

“Model Predictive Control Tutorial”, “Workshop on MPC” and “Model Predictive Control Applications”
Programa de Academicos Visitantes 2003, Universidad Iberoamericana, Mexico City (Dec. 2003)

“Biomedical Applications of Advanced Control”
Roche Diagnostics, Mannheim, Germany (September, 2003)
Colorado State University, Biomedical Engineering Program, Fort Collins (May, 2003)
University of Minnesota, Control Sciences Research Center (April, 2003)

“Chemical Process Control”
TATA Consultancy Services, Pune, India (January, 2003)

“Operability and Control of Chemical Processes: Nonlinear Effects”
University College London, Process Systems Engineering Group (May, 2002)

“MPC for Nonlinear Processes”
General Electric, Schenectady, NY (December, 2002)
Industrial Process Automation Consortia Meeting, Polytechnic University, Brooklyn (April, 2002)

“Biomedical Applications of Process Control”
University of Arkansas, Fayetteville (November, 2002)
Worcester Polytechnic Institute, Worcester, MA (September, 2002)
Imperial College, London, Process Systems Engineering Group (May, 2002)
The University of Texas at Austin (November, 2001)

“A Review of Closed-Loop Drug Delivery”
Baxter Healthcare, Round Lake, Illinois (June, 2001)

“Operability and Control of Chemical Processes: Nonlinear Effects”

University of Arizona, Tucson (January, 2001)

“Automated Drug Infusion for Surgical Applications”

University of Delaware, Doyle Process Control Group (April, 2001)

University of Southern California, Department of Biomedical Engineering (November, 2000)

Medical Research Group, Sylmar, CA (November, 2000)

University of Pittsburgh (September, 2000)

“The Effect of Nonlinearity on the Operability and Control of Chemical Processes”

University of Oklahoma, Norman (November, 1999)

University of Pennsylvania, Philadelphia (October, 1999)

Georgia Institute of Technology, Atlanta (October, 1999)

Syracuse University, Syracuse (October, 1999)

“Automated Control of Physiological Variables Using Continuous Drug Infusion”

Arizona State University - Systems and Control Class, Tempe (December, 1999)

Roche Diagnostics, Indianapolis, IN (June, 1999)

"Recent Developments in the Operability and Control of Nonlinear Systems"

Scientific Systems, Woburn, MA (July, 1999)

Air Products, Allentown, PA (March, 1999)

“Chemical Process Operability: Chemical Reactor Applications”

University of Washington, Seattle (October, 1998)

Oklahoma State University, Stillwater (November, 1998)

“Operability of Chemical Processes: Analysis of an Exothermic Chemical Reactor”

University of California, Los Angeles (April, 1998)

Illinois Institute of Technology, Chicago (April, 1998)

University of Massachusetts, Amherst, MA (March, 1997)

Lehigh University, Bethlehem, PA (March, 1997)

University of Maryland, College Park, MD (February, 1997)

“Control Loop Interaction Analysis”

Westvaco, Laurel Technical Center, Laurel, MD (January, 1998)

“Batch Reactor Process Monitoring and Control”

Merck Research Laboratories, Rahway, NJ (July, 1998)

G.D. Searle, Skokie, IL (May, 1997)

“Operability and Control of a Styrene Polymerization Reactor”

University of Rhode Island, Kingston, RI (March, 1997)

Montell Polyolefins, Elkton, MD (March, 1997)

“Applied Optimal Estimation”

Merck Research Laboratories, Rahway, NJ (January, 1997)

“Model Development for Batch Reactor Calorimetry and Control”

International Flavors and Fragrances, Union Beach, NJ (October, 1997)

G.D. Searle, Skokie, IL (July, 1996)

“Recent Advances in Operability and Nonlinear Control”

Exxon Chemicals, Baytown, TX (May, 1996)

"Process Design for Operability: An Introduction to the Available Mathematical Tools"

Technochem '96, Session Ia - Analysis Concepts and Techniques, Houston, TX (May, 1996)

“Operability of Chemical Processes: Analysis of an Exothermic Chemical Reactor”

University of Arkansas, Fayetteville, AR (October, 1996)

General Electric CR&D, Schenectady, NY (October, 1996)

E.I. DuPont de Nemours, Wilmington, DE (May, 1996)
Northwestern University, Evanston, IL (May, 1996)
Rice University, Houston, TX (May, 1996)
Purdue University, West Lafayette, IN (April, 1996)
University of Illinois, Urbana-Champaign, IL (April, 1996)
University of Wisconsin, Madison, WI (April, 1996)

“Batch Reactor Modeling and Simulation for Control”

Merck Research Laboratories, Rahway, New Jersey (March, 1996)

“Operability Considerations in the Scale-up of Batch Reactors”

Sandoz Pharmaceuticals, East Hanover, New Jersey (March, 1996)

International Flavors and Fragrances, Union Beach, New Jersey (March, 1996)

“Feedback Control of Drug Infusion Systems”

Midwest Process Control Workshop, Ann Arbor, MI (April, 1996)

Northwestern University, Evanston, IL (February, 1996)

“Reaction Calorimetry in Pilot and Manufacturing Scale Reactors”

Merck Research Laboratories, Rahway, New Jersey (December, 1995)

“Operability of Semi-Batch Reactors”

Merck Research Laboratories, Rahway, New Jersey (November, 1995)

“Operability of Batch Reactors - Temperature Profile Feasibility”

Merck Research Laboratories, Rahway, New Jersey (September, 1995)

“Impact of Process Design on the Multiplicity Behavior of a Jacketed Exothermic CSTR”

Department of Chemical Engineering, Queens University, Kingston, Ontario (April, 1995)

Merck Research Laboratories, Rahway, New Jersey (November, 1994)

Department of Chemical Engineering, Stevens Institute of Technology, Hoboken, NJ (Nov., 1994)

“Analysis of the Multiplicity Patterns in a Jacketed Exothermic CSTR: A Process Design and Control Perspective”

Department of Chemical Engineering, University of California at Davis (Nov., 1994)

“Impact of Process Design on the Multiplicity Behavior of a Jacketed Exothermic CSTR”

Department of Chemical Engineering, University of Florida (December, 1993)

Department of Chemical Engineering, University of Texas at Austin (October, 1993)

“Impact of Process Design on the Operation of Chemical Reactors”

AIChE, Central New England Section, Springfield, MA (October, 1993)

“Impact of Modeling and Design on the Control of CSTR's”

Department of Chemical Engineering, Clarkson University (September, 1992)

E.I. Du Pont de Nemours, Wilmington, DE (February, 1992)

“An Optimization-Based Approach to Nonlinear Control of Chemical Processes”

Department of Chemical Engineering, University of Connecticut (April, 1991)

Dow Chemical, Midland, MI (March, 1991)

“Research in Chemical Engineering: What Does the Future Hold?”

Northeastern New York AIChE (February, 1991)

“Nonlinear Predictive Control of Chemical Processes”

Department of Chemical Engineering, Queen's University, Kingston, Ontario (October, 1990)

“Research Directions in Chemical Process Control and Optimization”

RPI Industrial Advisory Council, New York, NY (November, 1988)

Westvaco, Laurel, MD (January, 1989)

- “Robust Multivariable Process Control”
Department of Chemical Engineering, University of Kansas (May, 1988)
Department of Chemical Engineering, Columbia University (May, 1988)
Department of Chemical Engineering, Rensselaer Polytechnic Institute (May, 1988)
- “The Structured Singular Value for Modeling Nonlinearities as Uncertain Linear Regions: A Tight Bound, or a Rigorous Mathematical Exercise Providing Minimal Insight?”
Department of Chemical Engineering, University of California at Davis (January, 1988)
- “Modeling of Horizontal and Barrel CVD Reactors”
Department of Chemical Engineering, University of California at Davis (November, 1987)
Department of Chemical Engineering, University of Oklahoma (February, 1988)
- “Non-Interacting Material Balance Control Schemes in Distillation”
Department of Chemical Engineering, Purdue University (June, 1987)
Department of Chemical Engineering, University of South Florida (December, 1987)
- “Recent Advances in Process Control”
Dallas AIChE 1987 Spring Technical Meeting on Control and Automation (May, 1987)
- “Resilient and Robust Control of a Heat Integrated Distillation Column”
Department of Chemical Engineering, Lehigh University, Bethlehem, PA (April, 1987)
- “Modeling of an Electrochemical Etching Process Using Scanning Tunneling Microscopy”
Department of Chemistry, The University of Texas at Austin (January, 1987)
- “Robust Control System Design for Distillation Columns”
Department of Chemical Engineering, University of Minnesota (October, 1986)
- “Measurement Selection and Control System Design for Multivariable Interacting Processes”
Department of Chemical Engineering, City College of CUNY (March, 1986)
Pulp and Paper Science Department, University of Washington, Seattle (May, 1986)
Department of Chemical Engineering, University of Arkansas (September, 1986)
Department of Chemical Engineering, University of British Columbia (September, 1986)
- “Energy Conservation at American Petrofina”
Golden Triangle Energy Society, Port Arthur, TX (March, 1981)

Research Grants

- “In Home Closed Loop Reduction of Nocturnal Hypoglycemia and Daytime Hyperglycemia” NIDDK, \$760,000/year, 9/30/2009 – 8/31/2012 (Co-investigator. PI: Roy Beck, Jaeb Center for Health Research). Bequette portion is \$96,326/year.
- “Collection of Continuous Glucose Monitoring and Insulin Infusion Pump Data for Use in the Development of a Closed Loop Algorithm” Juvenile Diabetes Research Foundation (JDRF), \$257,053, 8/01/2009-7/31/2010 (co PI. PI: Bruce Buckingham, Stanford).
- “Development of Algorithms for a Hypoglycemic Prevention Alarm” Juvenile Diabetes Research Foundation (JDRF), \$190,296, 8/01/2009-7/31/2010 (co-PI. PI: Bruce Buckingham, Stanford).
- “GK-12: Building Bridges from High School to Grad School: Inspiring Students Through Discovery-based Activities in Energy and the Environment,” National Science Foundation, \$2,738,000, 2/1/08-1/31/13 (Participant. PI: D. Kaminski).
- “Fuel Cell Modeling and Control,” Plug Power, \$50,000, 2/5/07. Match from Future Energy CAT, \$10,000
- “Model Predictive Control of Integrated Gasification Combined Cycle Power Plants,” DOE. \$300,000. 1/1/07-12/31/09 (PI. Co-PIs: Lealon Martin and Joe Chow)

- “Control of Blood Glucose in Critical Care,” Luminous Medical. \$36,000. 6/01/06.
- “Optimizing Control of an Artificial Pancreas: From In Silico to Outpatients,” Juvenile Diabetes Research Foundation,” \$900,000, 8/01/06-7/31/09 (co PI. PI: Bruce Buckingham, Stanford).
- “DRU: Contending with Materiel Convergence: Optimal Control, Coordination, and Delivery of Critical Supplies to the site of Extreme Events,” NSF, \$749,209, 1/01/07-12/31/09 (Participant. PI: Jose Holguin-Veras).
- “A Partnership for Development of NYS Fuel Cell Companies” NYSERDA, \$200,000 (July, 2006) (Co PIs: Jensen et al.).
- “Alternate Thermochemical Cycles for Hydrogen Production,” Argonne National Laboratories, \$42,000, 6/01/06-8/31/06 (Co-PI. PI: Lealon Martin)
- “IGERT: An Entrepreneurial Ph.D. Education in Fuel Cell Manufacturing, Materials Development and Modeling” National Science Foundation (DGE-0504361), \$3,160,000, 9/01/05-8/31/10 (Participant. Co-PIs: M.K. Jensen, B.C. Benicewicz, D. Walczyk, M.D. Ensley, R.H. Puffer).
- “Fuel Cell Modeling and Control,” Plug Power, \$74,000, 1/1/05
- “Miniature Fuel Cell Car Development” General Motors, 6/1/2005, \$5000 (with Glenn Eisman).
- “Mechanism of Particle Incorporation into Microbial Cellulose,” National Science Foundation (BES-0411693), \$200,000, 5/15/04-5/14/07 (PI. Co-PIs: J.L. Plawsky and H.R. Bungay)
- “Pharmaceutical Process Modeling and Control,” Honeywell, \$20,000, 11/1/03
- “Biotechnology and Bioprocessing Laboratory in Chemical Engineering at Rensselaer Polytechnic Institute,” Merck Foundation, 12/1/2002, \$65,000 (co-PI with Susan Sharfstein and Jon Dordick).
- “Scale-up, Estimation and Control of Batch Reactors,” Merck Research Laboratories, \$15,000, 12/1/99
- “Optimization, Scale-up and Robustness of Protein Ion Exchange Chromatography,” National Science Foundation (CTS-9813801), \$160,000, 11/1/98-10/30/00 (with S.M. Cramer).
- “Reaction Calorimetry Research,” Merck Research Laboratories, \$10,000, 7/15/98.
- “Control and Information Engineering Studio,” Procter and Gamble Curriculum Development Grant Program, 5/15/1998-5/14/2001, \$150,000 (PI. Faculty participants: J. Chow, H. Kaufman, J. Li, E. Maby, J. Newell).
- “Research Experience for Undergraduates”, National Science Foundation, 5/1/98, \$20,000 (co-PI with H. Kaufman).
- “Control Studio Development”, Strategic Initiatives Funds, 2/1/98, \$200,000 (co-PI with E. Maby et al.).
- “Human-Aided Hierarchical Drug Delivery System Control,” National Science Foundation (BES-9522639), \$419,960, 3/15/97 - 3/1/2000 (with H. Kaufman and R.J. Roy).
- “Faculty Internship in Industry,” National Science Foundation (CTS-9523393), \$22,182, 10/1/95 - 2/1/96.
- “Faculty Internship in Industry,” Merck Research Laboratories, \$20,174, 10/1/95 - 2/1/96.
- “Optimization of Protein Purification by Ion Exchange Chromatography”, National Science Foundation, \$190,000, 8/1/95 - 7/31/98 (with Steven Cramer).
- “Dynamics and Control of Batch Chemical Reactors,” American Chemical Society, The Petroleum Research Fund (#30220-AC9), \$50,000, 7/1/95 - 8/31/98.
- “Intelligent Control of Drug Infusion Systems”, Whitaker Foundation, \$180,000, 12/1/94 - 1/31/99.

“Graduate Student Internship,” Merck Research Laboratories, Summer 1997 and Summer 1998.

“Mathematics in the Context of Engineering and Science: Building the Links”, National Science Foundation, 10/1/95-9/30/2000, \$4,000,000 (estimated) (faculty participant; PI’s: W.E Boyce and R.L. Spilker)

“Development of a Fermentation Laboratory Experiment for the Chemical Engineering Undergraduate Laboratory at Rensselaer”, The Dreyfus Foundation, 1/22/93, \$20,000 (with J.L. Plawsky and T.M. Przybycien)

“Graduate Student Fellowship”, Schenectady Chemicals, 1/1/92 - 12/31/92, \$22,320

“Graduate Student Fellowship”, Schenectady Chemicals, 1/1/91 - 12/31/91, \$22,320

“Robust Multiple Drug Infusion Control”, National Science Foundation, BES-9005678, \$98,882, 8/15/90 - 1/31/93 (with Rob J. Roy and Howard Kaufman).

“Nonlinear Predictive Process Control”, National Science Foundation, CTS-8910362, \$60,000, 8/1/89 - 1/31/92.

Travel Grants

“International Travel Grant for Participants in ADCHEM 2000 (Pisa, Italy)”, The National Science Foundation, CTS-0073860, 2/1/00, \$20,800

“International Travel Grant for Participants in DYCOPS-5 (Corfu, Greece)”, The National Science Foundation, CTS-9811927, 5/1/98, \$24,800

“Student Travel to CCA (Albany, NY) and CDC”, The National Science Foundation, ECS-9525828, \$24,000 (with Joe Chow)

“International Travel Grant for Participants in DYCOPD+ ‘95 (Helsingor, Denmark)”, The National Science Foundation, CTS-9520777, 6/1/95 - 9/1/95, \$12,000

Consulting

Plug Power, Latham, NY. 2004. Short Course on Model Predictive Control

Washington Advisory Group, 2003

Ontario Council on Graduate Studies, Appraisal of Queen’s University, March, 2002

Baxter Healthcare, Round Rock, IL, 2001-2

Roche Diagnostics, Indianapolis, IN, 2000-1, 2003

Biomec, Inc., Columbus, OH, 2000

Emhart Glass, 2000, 2003

Merck Research Laboratories, Rahway, NJ, 1996-2001

G.D. Searle, Skokie, IL, 1996-8

Corning, Inc., Corning, NY, 1998

Simulation Sciences, Fullerton, CA., 1987

Reviews of Manuscripts

Adaptive Control and Signal Processing; AIChE Journal; American Control Conference; ASME Journal of Dynamic Systems and Control; Automatica; Biotechnology and Bioengineering; Biotechnology Progress; Canadian Journal of Chemical Engineering; Chemical Engineering Communications; Chemical Engineering Education; Chemical Engineering Journal; Chemical Engineering Science; Computers and Chemical Engineering; Diabetes Technology and Therapeutics; Indian Journal of Technology; European Journal of Control; Industrial and Engineering Chemistry Research; IEEE Control Systems Magazine; IEEE Transactions on Automatic Control; IEEE Transactions on Control Systems Technology; IEEE Transactions on Biomedical Engineering; ISA Transactions; Journal of Diabetes Science and Technology; Journal of Guidance, Control and Dynamics; Journal of Process Control; Oxford Press (monographs); Physics Letters A; Prentice-Hall (textbooks), Separation Science and Technology.

Proposal Reviews

NSBRI panel (May, 2007; February, 2008; January, 2009)

National Institutes of Health, SBIR panel (July, 2004); mail reviews, 2004-present
 National Science Foundation, various panel reviews, 1999-present
 National Science Foundation, mail reviews, 1990-present
 State of Connecticut, Department of Higher Education, 1991, 1993
 New York State Energy Research and Development Authority, 1991
 Natural Sciences and Engineering Research Council of Canada, 1993
 Louisiana Education Quality Support Fund, 1995-96
 American Chemical Society, Petroleum Research Fund, 1995-present

External Dissertation Reviews

P. J. McLellan, Queens University, Kingston, Ontario, 1990
 M. Pleau, Queens University, Kingston, Ontario, 1995
 R. Ross, University of Cape Town, 1997
 S. Norquay, University of Sydney, 1997
 M. Thomas, IIT-Bombay, 1998
 Q. Hu, National University of Singapore, 1999
 Keming Ma, University College London, 2002
 Yutong Qi, University of Alberta, 2007
 Rambabu Kandepu, NTNU, Trondheim, Norway, 2007

Service to University

Department

Acting Chair, 2002-4; Acting Head, 2006-7
 Chair, Faculty Search Committee, 2005-6
 Chair, Graduate Affairs Committee, 2001-2002, 2007-8
 Chair, Faculty Search Committee, 1998-99, 2000-01
 AIChE Student Chapter Co-advisor, 1988 - present
 Seminar organizer, Spring and Fall 1989, 1992-94 academic years
 Cooperative Education Program Co-advisor, 1989 - present
 Committee Chair, Design and Laboratory Curriculum, 1988-1989
 Department Head Search Committee, 1992
 CACHE Representative, 1988 - present
 SACHE Representative, 1997 - present
 Undergraduate (Curriculum) Committee, 1993, 1996 - 2002

University

Institute Curriculum Committee, 2010-11
 Faculty Representative, SOE P&T Committee, 2001-2, 2005-6
 Institutional Review Board, 1998 - 2003
 Dean's Committee on Women in Engineering, 1996 - 1998
 Committee for Integrating Mathematics Across the Curriculum, 1994
 Committee for an International Center for Multimedia Education, 1993
 Engineering Design Task Force, 1993
 Committee on Computing in Engineering Education (C2E2), 1991-3
 Engineering School Council (ESC) Representative, 1989-1991, Secretary, 1991-92
 ESC Faculty Affairs Committee, 1989-91
 ESC Research Committee, 1990-92
 Freshman Seminar Facilitator, 1990
 Track Team, assist with pole-vault, 1990-98

Doctoral Thesis Committees (excluding my own students)

John Boyle	ECSE	2003	Stuart Gallant	Chemical Eng.	1995
Clayton Brooks	Chemical Eng.	1993	Haluk Gorgun	Electrical Eng.	2003
Aranya Chakraborty	ECSE	2008	Pete Gostomski	Chemical Eng.	1993
Hornng-Bin Chen	ECSE	1994	Claudio Held	Biomedical Eng.	1995
Rajit Date	ECSE	1991	Rocco Jerry	Chemical Eng.	1992
Rafael Escalante	ECSE	2007	Young Kim	Chemical Eng.	1993
Guilherme de Oliveira	Math	2006	Ramana Kolluri	Chemical Eng.	1994

Yen-Han Lin	Chemical Eng..	1995	Shoepang Wang	ECSE	2000
Kelley Mohrman	Mathematics	1993	Dauh-rurng Wu	Chemical Eng.	1992
Richard Mormino	Chemical Eng.	2002	Xiaoqiu Wu	Chemical Eng.	2002
Xiaodun Mou	Chemistry	2007	Daewon Yang	Chemical Eng.	1999
Venkatesh Natarajan	Chemical Eng	2000	Clem Yu	Biomedical Eng.	1990
Mike Phillips	Chemical Eng.	1991			
Gang Wang	Chemical Eng.	2008			

Courses Taught

Rensselaer (1988-current)

Fuel Cell Systems Engineering (first offered Fall, 2006; team-taught with Ray Puffer and Lealon Martin)

Advanced Process Control (undergraduate and graduate)

Advanced Process Design (graduate)

Chemical Process Control (undergraduate) - *textbook published* (Prentice Hall)

Dynamic Systems (undergraduate) - *textbook published* (Prentice Hall)

Material and Energy Balances (undergraduate)

Modeling and Simulation in Chemical Engineering (graduate)

Model Predictive Control (advanced undergraduate and graduate)

Process Design (undergraduate)

Unit Operations Laboratory (undergraduate; process control and fluid flow experiments)

UC-Davis (1987-88)

Chemical Process Control (undergraduate), Advanced Heat Transfer (graduate), Transport Laboratory (undergraduate), Unit Operations Laboratory (undergraduate)

Texas (1985, 1987)

Industrial Chemical Calculations (undergraduate), Elements of Modern Control Theory (graduate; 1/4 of lectures)

Outside Activities

Active sports such as skiing, softball, biking and pole-vaulting (USTAF, Empire Liberty Tour – Masters Division).