

ROBERT S. PARKER

Associate Professor and CNG Faculty Fellow
Department of Chemical and Petroleum Engineering
University of Pittsburgh; 1249 Benedum Hall; Pittsburgh, PA 15261
Phone: (412) 624-7364; FAX (412) 624-9639; Email: rparker@pitt.edu
URL: <http://www.engr.pitt.edu/chemical/facstaff/parker.html>

RESEARCH INTERESTS

Modeling, analysis, and control of biomedical systems, with foci on cancer and diabetes; nonlinear input-output model identification using Volterra and Laguerre series expansion; simultaneous process identification and control; model predictive control theory.

EMPLOYMENT & AFFILIATIONS

2006 – present Associate Professor of Chemical Engineering
2003 – present Member, McGowan Institute for Regenerative Medicine, UPMC
2001 – present Member, Molecular Therapeutics / Drug Discovery Program, UPCI
2000 – 2006 Assistant Professor of Chemical Engineering

EDUCATION

Ph.D. Chemical Engineering, University of Delaware, August 1999
Thesis Title: Model-based Analysis and Control for Biosystems
B.S., Chemical Engineering, University of Rochester, May 1994

AWARDS

University of Pittsburgh

National Science Foundation CAREER Award (2002-2006)
School of Engineering Board of Visitors Award (2002)
Engineering Student Council Faculty Honor Roll (2002, 2004)
CNG Faculty Fellowship (2005-2007)
Fulton C. Noss Faculty Fellowship (2002-2004)
Lai Family Foundation New Faculty Fellow (2000-2001)

University of Delaware

NSF Engineering Education Workshop Participant (1999)
Chemical Engineering Teaching Fellowship (1998)
American Control Conference Best Talk in Session (1998)

Purdue University

International Society for Artificial Organs Graduate Student Award (1997)
Kenan Award Symposium Speaker, Union Carbide (WVa.) (1997)
IEEE-EMBS Whitaker Foundation Student Paper Competition Finalist (1996)
National Science Foundation Fellowship Honorable Mention (1995)
Andrews Fellowship, Purdue University (1994-1996)
Chemical Engineering Merit Scholarship, Purdue University (1994)

University of Rochester

B.S. degree in Chemical Engineering with Distinction (1994)
NCAA Division III Academic All-American (1992)
Bausch and Lomb Scholarship (1990-1994)

PROFESSIONAL MEMBERSHIPS

American Institute of Chemical Engineers, 1996–
 Institute of Electrical and Electronics Engineers
 Engineering in Medicine and Biology Society, 1996–
 Control Systems Society, 1999–
 American Society for Engineering Education, 1994–
 American Chemical Society, 2001–2005
 Order of the Engineer, 2002–

PROJECT FUNDING*Current*

- NIH P01 (#2P01CA078039-06A2), “Combinatorial Approaches for Novel Anticancer Agents,” ≈\$1,000,000/year, 09/30/05-08/31/10 (co-I, animal pharmacology core; PI: J.S. Lazo, UPMC Pharmacology)
- NIH NCI (#1U54CA104677-01), “Optical Spectroscopy for Management of Cancer Treatment,” \$5,396,585, 09/30/03-8/31/08 (technical core co-director, PI: I.J. Bigio, Boston University)
- NSF (EEC #0342713), “An Integrated Modular Chemical Engineering Curriculum,” \$1,312,556, 09/01/03-8/31/07 (co-PI; PI: J.J. McCarthy, U. Pittsburgh)
- NSF CAREER Award (CTS #0134129), “Control Design using Data-Driven Models: Exploiting Model Structure,” \$375,000, 01/01/02-12/31/07
 – NSF CAREER Award Supplement, “Globally Optimal Nonlinear Model Predictive Control – Algorithm Design”, \$6,000, 05/01/02-09/01/02
- DOE-NETL University Collaboration (Project ID 91), “Design and Testing of Multi-contaminant Sorbent Materials”, \$262,000, 6/1/06-5/31/07 (co-PI; PI: J.K. Johnson, U. Pittsburgh)

Funding History

- The Whitaker Foundation, Biomedical Engineering Research Grant, “Model-Based Optimal Scheduling for Cancer Chemotherapy,” \$240,000, 01/01/02-9/30/05
- University of Pittsburgh Center for International Studies Small Grant, “Mathematical Model Development for Biomedical and Process Applications”, \$500, 03/03/05-12/31/05
- American Chemical Society – Petroleum Research Fund, Type G Grant, “Data-Driven Volterra-Based Predictive Control: Third-Order Model Identification and Analytical Nonlinear Controller Synthesis,” \$35,000, 09/01/02-08/31/05
- Eli Lilly Corporation, “Evaluation of Gemcitabine Exposure after 30-min Infusion,” \$40,000, 11/01/03-10/31/04
- NSF (EEC #0230613), “An Integrated, Modular Chemical Engineering Curriculum,” \$100,000, 01/01/03-12/31/03 (co-PI; PI: J.J. McCarthy, U. Pittsburgh)
- University of Pittsburgh, Central Research Development Fund, “Model-Based Optimal Control for Systems Governed by Multi-Scale Models,” \$16,000, 07/01/01-06/30/03

Submitted

- NIH NIDDK R25, “Diabetes Teaching Modules for the Undergraduate Chemical Engineering Curriculum,” \$400,000 (direct costs), 01/01/07-12/31/10 (co-PI; PI: F.J. Doyle III, UCSB)

REVIEWER

- Chemical Engineering & Process Control Journals — Automatica; Journal of Process Control; Chemical Engineering Science; AIChE Journal; Industrial & Engineering Chemistry Research; Chemical Engineering Communications; IEEE Transactions on Control Systems Technology; IEEE Transactions on Signal Processing; International Journal of Robust and Nonlinear Control
- Biomedical Journals — Cancer Chemotherapy and Pharmacology; Diabetes; IEEE Transactions on Biomedical Engineering; IEEE Engineering in Medicine and Biology Magazine; Advances in Drug Delivery Reviews
- Biotechnology Journals — Journal of Biotechnology; Biotechnology and Bioengineering
- Funding Agencies — National Science Foundation (CTS, BES); American Chemical Society

TEACHING EXPERIENCE*Course Instructor [U. Pittsburgh]*

- Systems Engineering I: Dynamics and Modeling (ChE 0500)
 - Fall 2005 (06-1): 7 students; Fall 2006 (2071): 26 students
- Process Dynamics and Control (CHE 1034, 9 offerings)
 - Fall 2000 (01-1) – 58 students; Fall 2001 (02-1) – 56 students; Spring 2002 (02-2) – 40 students; Summer 2002 (02-3) – 10 students; Spring 2003 (03-2) – 30 students; Spring 2004 (04-2) – 27 students; Summer 2004 (04-3) – 12 students; Summer 2005 (05-3) – 6 students; Summer 2006 (06-3) – 3 students
- Applied Mathematics in Chemical Engineering (ChE 2410)
 - Fall 2002 (03-1): 20 graduate students; Fall 2003 (04-1): 22 graduate students; Fall 2006 (2071): 4 graduate students
- Robust Process Control (CHE 2471)
 - Spring 2001 (01-2): 7 graduate students
- Nonlinear Dynamical Analysis (CHE 3472)
 - Fall 2004 (05-1): 12 graduate students

ASEE Summer School Session Co-Instructor (Summer 2002)

- ASEE Summer School for Chemical Engineering Faculty
- Process Control Modules introduction and demonstration
- Prepared session plan and instructed ~40 faculty

Teaching Fellow: [U. Delaware] (Fall 1998)

- Kinetics and Reactor Design, CHEG 332
- Course co-instructor, including exam and lecture preparation and presentation.

Shortcourse: Advanced Process Control (December 1997)

- Co-instructor, assisting course attendees during computer exercises.
- Prepared MATLAB/SIMULINK based computer exercises to complement lecture.

Software Development Director for PCM Fall 1995–Fall 1997

The Process Control Modules (PCM) are a MATLAB/SIMULINK based educational software package with industrial-style graphical user interface for use in the laboratory portion of the senior level process control course.

- Co-authored textbook **Process Control Modules** and simulation software.
- Coordinated programmer activities (undergraduate and graduate students).
- Trained other teaching assistants in the use of the software and GUI.

INDUSTRIAL CONSULTING

- Process Modeling and Control Consultant, Roche Diagnostics (*Fall 1999–2000*)
- Process Modeling and Control Consultant, BD Technologies (*Spring 2002–present*)

STUDENT SUPERVISION*Ph.D. Graduates*

- John M. Harrold, “Model-based Optimal Treatment for Cancer Chemotherapy”, *Ph.D.*, 8/2005
- Abishek S. Soni, “Control-Relevant System Identification using Nonlinear Volterra and Volterra-Laguerre Models” *Ph.D.*, 4/2006

M.S. Graduates

- Abishek Soni, “A Multi-Scale Modeling Approach to Bioreactor Control”, *M.S.*, 12/2002

Honors B.S. Graduates

- Philip J. Lenart, “Exercise Modeling for Glucose Control in Type I Diabetes”, *B. Phil.* (Undergraduate Honors Thesis), 5/2001

Current Graduate Students

- Jeffrey A. Florian Jr., “Distributed Modeling of Cancerous Tumor Growth”, *Ph.D.*, expected 4/2007
- S. Chad Kanick, “Pharmacokinetic/Pharmacodynamic Modeling of Optically Active Compounds using Optical Spectroscopy”, *Ph.D.*, expected 12/2007
- Anirban Roy, “Modeling the Dynamics of Fatty Acid Interactions in Healthy and Diabetic Patients”, *Ph.D.* expected 12/2007
- Selasi Blavo, “Effect of Model Complexity on Anticancer Treatment Regimen Design”, *M.S.* expected 8/2007

Undergraduate Research Students

- Philothei M. Papas, UP, “Process-Scale Modeling of Multi-Contaminant Sorbent Beds,” *Fall/Spring 2006*
- Philothei M. Papas, UP, “Modeling and Control for Real-Time Irrigation,” (MSI Intern, UP) *Summer 2006*
- Chris Lucas, UP, “Effect of Physiological Transport Processes on Intracellular Gemcitabine Pharmacokinetics,” (PTEI Intern, Penn State Univ.) *Summer 2006*

- Steven R. Saunders, UP, “Experiment and Simulation Design for the Systems Engineering Pillar,” (ChE 1097 / NSF EEC Intern, UP) *Spring-Summer 2006*
- Mihaela Krasteva, UP, “A Physiologically-Based Pharmacokinetic Model of Docetaxel in SCID Mice,” (PTEI Intern, Mt. Holyoke Univ.) *Summer 2005*
- Samantha Sanford, UP, “Graphical User Interface Design for Visualizing Optical Spectroscopy Pharmacokinetic Data,” (CMU BMEH Intern) *Summer 2005*
- Erik Johnson, UP, “Modeling Saturating-Rate Ht29 Tumor Growth and 9NC Treatment Effects,” *Spring 2005*
- Craig T. Anderson, UP, “Educational Software Development for the Systems and Dynamics Pillar,” *Summer/Fall 2004*
- Jason W. Fisher, UP, “Evaluation of Excessive Gemcitabine Dosing by 30-Minute Infusion,” *Fall 2003-Fall 2004*
- Holly Nadorlik, UP, “Physiologically-Based Pharmacokinetic Model of 9NC in SCID Mice Bearing Human Ht29 Colon Carcinoma Xenografts,” (PTEI Intern, St. Francis Univ.) *Summer 2004*
- Jennifer Solovon, UP, “Net Physiological Glucose Balance Studies,” (Duquesne U.) *Fall 2003-Spring 2004*
- Anthony DiNinno, UP, “Control Algorithm Synthesis for Robot Testing of Joint Kinematics,” *Fall 2003*
- Shilpa Reddy, UP, “Cycle-Specific Modeling and 9-Nitrocamptothecin Therapy of Ht29 Tumor Xenograft Growth in SCID Mice”, (PTEI Intern, CMU) *Summer 2003*
- Trent Balius, UP, “Evaluating Multi-Drug Synergy in Cancer Chemotherapy”, (UP Greensburg) *Summers 2003, 2004, 2005, and 2006*
- Mary M. DeFrancesco, UP, “Level-Flow Experiment Modeling and Operation – the ChE 1034 Class Laboratory,” *Fall 2002*
- Sarah M. Pitzer, UP, “Level-Flow Experiment Modeling and Operation – the ChE 1034 Class Laboratory,” *Fall 2002*
- Justin D. Rubb, UP, “Empirical Controller Synthesis for Diabetic Patient Glucose Control,” *Fall 2002*
- Gregory P. Botta, UP, “Retinoid Compound Modeling for Cancer Treatment,” (PTEI Intern, CMU) *Summer 2002*
- Rachel M. Funyak, UP, “Modeling Intense Exercise Response in Healthy and Insulin Dependent Diabetic Patients,” (NSF-REU student) *Summer 2002*
- H. James Hosfield III, UP, “Globally Optimal Nonlinear Model Predictive Control – Algorithm Design,” (NSF-REU student) *Summer 2002 – present*
- Richard H. Miller, UP, “Vertically Integrated Problems for the Chemical Engineering Curriculum,” *Summer 2002*
- Jeffrey M. Savard, UP, “Data-Driven Uncertainty Characterization for Personalized Patient Modeling – Time versus Frequency Domain Approaches,” (NSF-REU student, WPI) *Summer 2002*
- Jason Archuleta, UP, “Modeling and Control of the Feedback Level-Temperature System,” *Spring 2002*
- Bart Sievenpiper, UP, “Modeling and Control of the Feedback Level-Temperature System,” *Spring 2002*
- John Copley, UP, “Continuous Biological Reactor Control Using Multi-Scale Models,” *Spring 2002*
- David Markowski, UP, “The Level-Temperature Apparatus Laboratory Manual,”

Fall 2001

- Leah N. DiMascio, UP, “Prolonged Exercise Modeling in Type I Diabetic Patients,” (NSF-REU student, Va. Tech) *Summer 2001*
- Jeffrey A. Florian Jr., UP, “Nonlinear Data-Driven Approaches to Type I Diabetic Patient Modeling,” (Pittsburgh Tissue Engineering Initiative Intern, PSU) *Summer 2001*
- Nicholas Bianco, UP, “A Physiological Model of Free-Fatty-Acid Dynamics,” (NSF-REU Student) *Summer 2001*
- Philip J. Lenart, UP, “Exercise Modeling for Glucose Control in Type I Diabetes.” (Honors Thesis) *Spring 2000 - Summer 2001*
- Nathan C. Mitterling, UP, “Nonlinear Empirical Modeling of Glucose Concentration in Diabetic Patients.” *Fall 2000 - Spring 2001*
- William Stine, UP, “A Diabetic Patient Case Study for PCM.” *Summer 2000*

SERVICE*Department Committees*

- Faculty Search Committee
- Graduate Recruiting
- Graduate Program Coordinator
- Curriculum Redesign (Chair: McCarthy)
- Academic Advisor, students W-Z

School/University Committees

- Math (250) Curriculum Reform (SoE)
- Faculty Advisor, Order of the Engineer (SoE)
- Council on Academic Computing (UP)
- University Council on Graduate Studies (UP)

Past Committee Service

- Graduate Recruiting (chair) (ChE, 2000-2006)
- Graduate and Professional Admission and Recruiting (UP, 2003-4)
- Chemical Engineering Chair Search (SoE, 2001-2)
- Graduate Recruiting and Training Ad-Hoc (SoE, 2002-3)
- Graduate Student Recruiting (SoE, 2004-6)
- Chemical Engineering Faculty Search (ChE, 2000-1)
- QUIC Committee (ChE, 2000-2)
- SPIN, Technology in Education (ChE, 2000)
- Faculty Trainee Program (ChE, 2000)
- Curriculum Redesign (ChE, 2000)
- Seminar Committee (ChE, 2000-2004)

Dissertation / Thesis Committees

<i>Student</i>	<i>Degree</i>	<i>Year</i>	<i>Primary Advisor</i>
C. Neatpisarnvanit	Ph.D.	2000	B. Boston (EE)
S. Nase	M.S.	2000	J. McCarthy
A. Gulati	M.S.	2001	A. Balazs
W. Vargas	Ph.D.	2002	J. McCarthy
K. Jain	M.S.	2002	J. McCarthy
T. Zhu	Ph.D.	2002	M. Ataa
D. Green	M.D./Ph.D.	2003	K. Achim (UPMC)
Y. Feng	Ph.D.	2006	joint with R. Bies (Pharmacy)
A. Abatan	Ph.D.	2006	J. McCarthy
D. Shi	Ph.D.	2007 (expected)	J. McCarthy

Conference Organizer/Planning Committee

- CPC VII – Planning Committee, Vendor and Software Display
- ADCHEM 2006 – Planning Committee, Chemical Process Applications

Conference Session Organizer/Chair

- AIChE 2000 – Modeling and Operation Methods in Biosystems
- AIChE 2001 – Modeling and Control of Biomedical Systems
- ACC 2002 – Modeling And Control Of Biological Systems
- AIChE 2002 – Modeling and Control of Biomedical Systems
- AIChE 2002 – Diabetes Modeling and Control
- ACC 2003 – Applications and Novel Techniques in Bioprocess Engineering
- ACC 2003 – Process Control Education
- ADCHEM 2003 – Control of Biochemical and Biomedical Systems
- AIChE 2003 – Advances in Sensors, Optimization and Control for Biological Systems
- ACC 2004 – Biomedical Systems Analysis and Control
- ACC 2004 – Nonlinear Control of Chemical Processes
- AIChE 2004 – Modeling and Control of Biomedical Systems
- ACC 2005 – Modeling and Control of Biological Systems
- AIChE 2005 – Modeling, Analysis, and Control in Biomedicine
- AIChE 2006 – Modelling and Control of Biomedical Systems
- AIChE 2006 – Nonlinear Control Analysis and Applications
- AIChE 2006 – Artificial Organs and Tissue Engineering
- ACC 2007 – Analysis and Control of Biological Systems
- AIChE 2007 – Modeling, Analysis, and Control in Biomedicine

Community Education

- Johns Hopkins Center for Talented Youth College Preparatory Workshop, Panel Moderator and Engineering speaker, (2002-2004)
- Johns Hopkins Center for Talented Youth Career Workshop, Engineering Careers speaker, (2004-2005)

ChE Community

- Member, IEEE Technical Committee on Industrial Process Control
- Member, CACHE Bio Task Force
- Member, CACHE Virtual Graduate Process Control Textbook Task Force

REFEREED JOURNAL ARTICLES

1. S.C. Kanick, J.L. Eiseman, E. Joseph, J. Guo, and R.S. Parker. "Non-invasive Optical Spectroscopic Measurement of Motexafin Gadolinium in Murine Tissues: Comparison to High-Performance Liquid Chromatography." *J. Photochemistry and Photobiology B: Biology* (submitted).
2. A. Roy and R.S. Parker. "Dynamic Modeling of Exercise Effects on Plasma Glucose and Insulin Levels," *J. Diabetes Science and Technology* (submitted).
3. J.A. Florian Jr., J.L. Eiseman, and R.S. Parker. "Nonlinear Model Predictive Control for Dosing Daily Anticancer Agents: A Tamoxifen Treatment of Breast Cancer Case Study," *Comput. Biol. Med.* (submitted).
4. A.S. Soni and R.S. Parker. "Data-Efficient Input Sequence Design for Third-Order Volterra Model Identification," *IEEE Trans. Signal Proc.* (submitted).
5. F.J. Doyle III, D. Seborg, R.S. Parker, B.W. Bequette, A. Jeffrey, X. Xia, I. Craig, and T.J. McAvoy. "A Tutorial on Biomedical Process Control," *J. Process Control* (in press).
6. A.S. Soni and R.S. Parker. "Tailored Input Sequence Design for Third-Order Volterra Model Identification," *Ind. & Eng. Chem. Res.* vol. 46 (3), 818-829, 2007.
7. A. Roy and R.S. Parker. "Dynamic Modeling of Free Fatty Acids, Glucose, and Insulin: An Extended Minimal Model," *Diabetes Technology and Therapeutics* 8(6), 617-626, 2006.
8. J.H. Beumer, E. Joseph, M.J. Egorin, R.S. Parker, D.Z. D'Argenio, J.M. Covey and J.L. Eiseman. "A Mass Balance and Disposition Study of the DNA-methyltransferase Inhibitor Zebularine (NSC 309132) and Three of its Metabolites in Mice." *Clinical Cancer Res.* vol. 12 (19), 5826-5833, 2006.
9. R.S. Parker, F.J. Doyle III, and M.A. Henson. "Integrating Biological Systems Content in the Process Dynamics and Control Curriculum." *Chemical Engineering Education* vol. 40 (3), 181-188, 2006.
10. J.A. Florian, Jr., J.L. Eiseman, and R.S. Parker. "Accounting for Quiescent Cells in Tumor Growth and Cancer Treatment." FOSBE Conference Special Issue of *IEE Systems Biology* vol. 152, 185-192, 2005.
11. J.A. Florian Jr. and R.S. Parker. "Empirical Modeling for Glucose Control in Diabetes and Critical Care." *European Journal of Control, Special Section on Automatic Drug Delivery for Anesthesia and Critical Care*, vol. 11 (6), 616-616, 2005.
12. P.W. Barone, R.S. Parker, and M.S. Strano. "In-Vivo Fluorescence Detection of Glucose using a Single Walled Carbon Nanotube Optical Sensor: Design, Fluorophore Properties, Advantages, and Disadvantages." *Analytical Chemistry* vol. 77 (23), 7556-7562, 2005.
13. J.M. Harrold, W.C. Zamboni, J.L. Eiseman, and R.S. Parker. "A Pharmacokinetic / Pharmacodynamic Model of 9-Nitrocamptothecin in SCID Mice." *J. Pharmacokinetics and Pharmacodynamics* vol. 32 (1), 65-83, 2005.
14. J. J. McCarthy and R. S. Parker. "The Pillars of Chemical Engineering: A Block Scheduled Curriculum." *Chemical Engineering Education* vol. 38 (4), pp. 292-301, 2004.
15. A.S. Soni and R.S. Parker. "Closed-Loop Control of Fed-Batch Bioreactors: A Shrinking-Horizon Approach." *Ind. & Eng. Chem. Res.* vol. 43, pp. 3381-3393, 2004.

16. C. Komives and R.S. Parker. "Bioreactor State Estimation and Control." *Current Opinions in Biotechnology* vol. 14, pp. 468-474, 2003.
17. R.S. Parker and F.J. Doyle III. "Control-relevant Modeling in Drug Delivery." *Advances in Drug Delivery Reviews*, vol. 48, pp. 211-248, 2001.
18. R.S. Parker and F.J. Doyle III. "Optimal Control of a Continuous Bioreactor Using an Empirical Nonlinear Model." *Ind. & Eng. Chem. Res.*, vol. 40(8), pp. 1939-1951, 2001.
19. R.S. Parker, D.H. Heemstra, F.J. Doyle III, R.K. Pearson, and B.A. Ogunnaike. "The Identification of Nonlinear Models for Process Control Using Tailored "Plant-Friendly" Input Sequences." *J. Proc. Control*, vol. 11(2), pp. 237-250, Sp. Iss. SI, 2001.
20. R.S. Parker, F.J. Doyle III, and N.A. Peppas. "Blood Glucose Control in Diabetic Patients using the Intravenous Route." *IEEE Eng. Med. Biol.*, vol. 20(1), pp. 65-73, 2001.
21. R.S. Parker, J.H. Ward, F.J. Doyle III, and N.A. Peppas. "Robust H_∞ Glucose Control in Diabetes Using a Physiological Model." *AIChE Journal*, vol. 46(12), pp. 2537-2549, 2000.
22. R.S. Parker, F.J. Doyle III, and N.A. Peppas. "A Model-based Algorithm for Blood Glucose Control in Type I Diabetic Patients." *IEEE - Transactions on Biomedical Engineering*, vol. 46(2), pp. 148-158, 1999.
23. F.J. Doyle III, E.P. Gatzke, and R.S. Parker. "Practical Case Studies for Undergraduate Process Dynamics and Control Using the Process Control Modules (PCM)." *Computer Applications in Engineering Education*, vol. 6(3) pp. 181-191, 1998.

BOOK

1. F.J. Doyle III, with E.P. Gatzke and R.S. Parker. **Process Control Modules: A Software Laboratory for Control Design**. Prentice Hall PTR: New Jersey, 2000.

BOOK CHAPTERS

1. J.A. Florian, Jr. and R.S. Parker. "Feedback Control in Drug Delivery" in **Nanotechnology in Therapeutics: Current Technology and Applications**. N.A. Peppas, J.Z. Hilt, J.B. Thomas (Eds.). Horizon Bioscience; Norwich, UK, chapter 2, 2007 (in press).
2. R.S. Parker, J.M. Harrold, J.L. Eiseman, W.C. Zamboni, E. Joseph, S. Strychor, and M.J. Egorin. "Toward Model-Based Chemotherapy Treatment Design" in **Advanced Methods of Pharmacokinetic and Pharmacodynamic Systems Analysis, Volume III**. D.Z. D'Argenio (Ed.). Kluwer Academic Publishers; Norwell, MA, pp. 255-274, 2004.
3. R.S. Parker. "Insulin Delivery" in **Encyclopedia of Biomaterials and Biomedical Engineering**, G. Wnek and G. Bowlin (Eds.). Marcel Dekker, Inc.; New York, pp. 857-866, 2004.
4. R.S. Parker, E.P. Gatzke, R. Mahadevan, E.S. Meadows, and F.J. Doyle III. "Nonlinear Model Predictive Control: Issues and Applications" in **Advances in Non-Linear Model Predictive Control**, B. Kouvaritakis and M. Cannon (Eds.). IEE Publishing; London, UK, 272 pp., 2001.

REFEREED CONFERENCE PROCEEDINGS

1. A. Roy and R.S. Parker. "Mixed Meal Modeling and Disturbance Rejection in Type I Diabetic Patients." *Proc. 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, New York, NY, 2006.
2. A. Roy and R.S. Parker. "Dynamic Modeling of Exercise Effects on Plasma Glucose and

- Insulin Levels.” *Proc. ADCHEM 2006*, Gramado, Brazil, 2006.
3. A.L. Antoine and R.S. Parker. “An Analytical Solution to Multivariable Nonlinear MPC for Second-Order Laguerre Systems.” *Proc. ADCHEM '06*, Gramado, Brazil, 2006.
 4. J.M. Harrold and R.S. Parker. “Clinically-Relevant Cancer Chemotherapy Treatment Scheduling using Parameterized Mixed-Integer Programming.” *Chemical Process Control 7*, Lake Louise, Alberta, Canada, 2006.
 5. J.A. Florian Jr., J.L. Eiseman, and R.S. Parker. “Modeling Quiescent Cells in Tumor Growth and Cancer Treatment.” *Foundations of Systems Biology in Engineering*, Santa Barbara, CA, 2005.
 6. J.A. Florian Jr. and R.S. Parker. “A Population Balance Model of Cell Cycle-Specific Tumor Growth” *Proc. 16th IFAC World Congress on Automatic Control*, Prague, Czech Republic, 2005.
 7. A.S. Soni and R.S. Parker. “Efficient Input Signal Design for Third-Order Volterra Model Identification.” *Proc. 16th IFAC World Congress on Automatic Control*, Prague, Czech Republic, 2005.
 8. J.A. Florian Jr., J.L. Eiseman, and R.S. Parker. “A Nonlinear Model Predictive Control Algorithm for Breast Cancer Treatment.” *Proc. DYCOPS 7*, Cambridge, MA, 2004.
 9. R.S. Parker, F.J. Doyle III, and M.A. Henson. “Integration of Biological Systems Content into the Process Dynamics and Control Curriculum.” *Proc. DYCOPS 7*, Cambridge, MA, 2004.
 10. J.D. Rubb and R.S. Parker. “Glucose Control in Type I Diabetic Patients: A Volterra Model-Based Approach.” *Proc. ADCHEM '03*, Hong Kong, China, 2003.
 11. P.J. Lenart and R.S. Parker. “Modeling Exercise Effects in Type I Diabetic Patients.” *Proc. 15th IFAC World Congress on Automatic Control*, Barcelona, Spain, 2002.
 12. J.A. Florian Jr. and R.S. Parker. “A Nonlinear Data-Driven Approach to Type I Diabetic Patient Modeling.” *Proc. 15th IFAC World Congress on Automatic Control*, Barcelona, Spain, 2002.
 13. R.S. Parker. “Efficient Nonlinear Model Predictive Control: Exploiting the Volterra-Laguerre Model Structure.” *Proc. CPC 6*, Tucson, AZ, AIChE Symposia Series #326, pp. 418-422, 2001.
 14. R. Rengasamy, R.S. Parker, and F.J. Doyle III. “Issues in Design of Input Signals for the Identification of Nonlinear Models of Process Systems.” *Proc. ADCHEM '00*, Pisa, Italy, 2000.
 15. F.J. Doyle III, R.S. Parker, R.K. Pearson, and B.A. Ogunnaike. “Plant-friendly Identification of Second Order Volterra Models.” *Proceedings of the Fifth European Control Conference*, Karlsruhe, Germany, 1999.
 16. R.S. Parker, F.J. Doyle III, K.L. Rabinovitch, and N.A. Peppas. “Time and Frequency Domain Analysis of Blood Glucose Regulation Algorithms.” *Proceedings of the IEEE-Engineering in Medicine and Biology Society 19th Annual International Conference*, Chicago, IL, 1997.
 17. R.S. Parker, F.J. Doyle III, J.E. Harting, and N.A. Peppas. “Model Predictive Control for Infusion Pump Insulin Delivery.” *Proceedings of the IEEE-Engineering in Medicine and Biology Society 18th International Conference*, Paper no. 265, Amsterdam, The Netherlands, 1996.
 18. F.J. Doyle III, N.A. Peppas, R.S. Parker, J.E. Harting, and K. Podual. “Robust Model-based Control of Insulin Pumps and Devices.” *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, 23, pp. 174-5, 1996.

NON-REFEREED CONFERENCE PROCEEDINGS

1. S.C. Kanick and R.S. Parker. "Monte-Carlo of Elastic Scattering Spectroscopic Measurement using the Optical Pharmacokinetic System (OPS): Analysis of Sensitivity to Heterogeneous Chromophore Distribution.." *SPIE – Photonics West*, San Jose, CA, 2007
2. J.M. Harrold, and R.S. Parker. "Comparative Analysis of Chemotherapy Dose Scheduling Design Methodologies." *Proceedings of the American Control Conference*, Boston, MA, 2004.
3. A.S. Soni and R.S. Parker. "Control-Relevant Identification for Third-Order Volterra Systems: A Polymerization Case Study." *Proceedings of the American Control Conference*, Boston, MA, 2004.
4. A.S. Soni and R.S. Parker. "Fed-Batch Bioreactor Control using Multi-Scale Models." *Proceedings of the American Control Conference*, Denver, CO, 2003.
5. A.B. Asoor, K.R. Muske, W.J. Kelly, and R.S. Parker. "Dynamic Cellular Modeling for Continuous Fermentation." *Proceedings of the American Control Conference*, Denver, CO, 2003.
6. R.S. Parker. "Nonlinear Model Predictive Control of a Continuous Bioreactor Using Approximate Data-Driven Models." *Proceedings of the American Control Conference*, Anchorage, AL, 2002.
7. P.J. Lenart and R.S. Parker. "Glucose Control During Exercise in Type I Diabetic Patients." *Proceedings of the Topical Conference on Bioinformatics and Genomics at the AIChE Annual Meeting*, Reno, NV, 2001.
8. R.S. Parker, E.P. Gatzke, and F.J. Doyle III. "Advanced Model Predictive Control (MPC) for Diabetic Patient Blood Glucose Control." *Proceedings of the American Control Conference*, Chicago, IL, 2000.
9. R.S. Parker and F.J. Doyle III. "Nonlinear Model Predictive Control of a Continuous Bioreactor at Near-Optimum Conditions." *Proceedings of the American Control Conference*, pp. 2549-54, Philadelphia, PA, 1998.
10. R.S. Parker, K.L. Rabinovitch, F.J. Doyle III, and N.A. Peppas. "Control Analysis of Pancreas Models for Optimal Insulin Delivery." *Proceedings of the Topical Conference on Biomaterials, Carriers for Drug Delivery, and Scaffolds for Tissue Engineering at the AIChE Annual Meeting*, Los Angeles, CA, 1997.

INVITED PRESENTATIONS

1. R.S. Parker. "Model-based Cancer Chemotherapy Design: from Developmental Therapeutics to First-Line Care" Department of Chemical and Petroleum Engineering, University of Kansas, April 2007.
2. R.S. Parker. "Model-based Cancer Chemotherapy Design: from Developmental Therapeutics to First-Line Care" Department of Chemical Engineering, University of Arkansas, March 2007.
3. R.S. Parker. "Model-based Cancer Chemotherapy Design: from Developmental Therapeutics to First-Line Care" Department of Chemical Engineering, Texas A&M University, February 2007.
4. R.S. Parker. "Glucose Control in Diabetes and Critical Care." Fifth International Conference for Complexity in Acute Illness, Washington, D.C., October 2006. (plenary presentation)
5. R.S. Parker. "Advancing Cancer Treatment Design via Systems Analysis and Optimiza-

- tion.” Centre for Process Systems Engineering, Department of Chemical Engineering, Imperial College London, June 2006.
6. R.S. Parker, J.W. Fisher, J.A. Florian, Jr., A.P. Venook, M.J. Ratain, and M.J. Egorin. “Development of a Pharmacokinetically-Guided Gemcitabine (dFdC) Dosing Schedule to Reduce Potentially Excessive Plasma dFdC Concentrations.” At the Sixth Annual Symposium on Experimental Therapeutics in Oncology, Detroit, MI, July 2005.
 7. R.S. Parker. “Engineering Cancer Treatment - A Process Systems Approach.” Department of Chemical Engineering, University of South Carolina, April 2005.
 8. R.S. Parker and M.J. Egorin. “Efficient Gemcitabine Delivery.” Cancer and Leukemia Group B, Pharmacology and Experimental Therapeutics Core meeting, January 2005.
 9. R.S. Parker. “Engineering Cancer Treatment - A Process Systems Approach.” School of Chemical and Biomolecular Engineering, Georgia Tech, November 2004.
 10. R.S. Parker. “Engineering Cancer Treatment - A Process Systems Approach.” Department of Chemical and Biological Engineering, University of Wisconsin - Madison, October 2004.
 11. R.S. Parker. “Engineering Cancer Treatment - A Process Systems Approach.” Department of Chemical and Biological Engineering, Tufts University, September 2004.
 12. J.A. Florian Jr., J.L. Eiseman, and R.S. Parker. “A Nonlinear Model Predictive Control Algorithm for Breast Cancer Treatment.” Keynote Presentation, *DYCOPS 7*, Cambridge, MA, 2004.
 13. R.S. Parker. “Cancer Chemotherapy Treatment Design Using Pharmacokinetic / Pharmacodynamic Models” School of Pharmacy, University of Pittsburgh, December 2003.
 14. R.S. Parker. “Using Pharmacokinetic / Pharmacodynamic Models in Cancer Chemotherapy Treatment Design” Department of Biomedical Engineering, University of Rochester, October 2003.
 15. J.J. McCarthy and R.S. Parker. “The Pillars of Chemical Engineering: A Block Scheduled Curriculum.” NSF EEC Workshop, Washington, DC, September 2004.
 16. J.M. Harrold, R.S. Parker, M.J. Egorin, J.L. Eiseman, E. Joseph, L. Jung, S. Strychor, and W.C. Zamboni. “A Model-Based Approach to Chemotherapy Treatment Design.” At the Fourth Annual Symposium on Experimental Therapeutics in Oncology, Cleveland, OH, July 2003.
 17. R.S. Parker. “Model-based Approaches to Chemotherapy Treatment Design.” 10th Workshop on Advanced Methods of PK (pharmacokinetic)/PD (pharmacodynamic) Systems Analysis, Los Angeles, CA, June 2003.
 18. R.S. Parker. “Interfacing Process Systems with Medicine: Case Studies in Cancer and Diabetes.” Department of Chemical Engineering, Cleveland State University, Cleveland, OH, March 2003.
 19. R.S. Parker and E.P. Gatzke. “Using the Process Control Modules for Undergraduate Chemical Engineering Control Education.” ASEE Summer School for ChE Faculty, Boulder, CO, July/August 2002.
 20. R.S. Parker. “Control & Biomedical Systems – Theory and Diabetes Applications.” BD Technologies, Research Triangle Park, NC, June 2002.
 21. R.S. Parker. “Empirical Model Identification & Model Predictive Control.” BD Technologies, Research Triangle Park, NC, June 2002.
 22. R.S. Parker. “Modeling and Controlling the Human Glucose–Insulin System.” BD Technologies, Research Triangle Park, NC, April 2002.
 23. R.S. Parker. “A Process Systems Approach to Biomedicine.” Department of Chemical Engineering, Drexel University, Philadelphia, PA, February 2002.
 24. R.S. Parker. “A Process Systems Approach to Biomedicine.” Department of Bioengineer-

- ing, University of Pittsburgh, Pittsburgh, PA, January 2002.
25. R.S. Parker. "A Process Systems Approach to Biomedicine." Department of Chemical Engineering, University of Massachusetts Amherst, Amherst, MA, November 2001.
 26. R.S. Parker. "A Model-Based Approach to Glucose Concentration Control in Insulin-Dependent Diabetic Patients." Department of Chemical Engineering, Auburn University, February 2001.
 27. F.J. Doyle III (speaker) and R.S. Parker. "Model-based Approaches to the Control of Glucose for Diabetes." *AAMI Annual Meeting*, Boston, MA, June 1999.
 28. R.S. Parker. "Model-based Bioreactor Control." Technology Exchange Forum, E.I. duPont de Nemours and Company, May 1999.
 29. R.S. Parker. "Model-based Control for Bioprocesses." Department of Chemical Engineering, Pennsylvania State University, University Park, PA, February 1999.
 30. R.S. Parker. "Model-based Control for Bioprocesses." Department of Chemical and Environmental Engineering, University of Arizona, Tucson, AZ, February 1999.
 31. R.S. Parker. "Model-based Control for Bioprocesses." Department of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, PA, January 1999.
 32. R.S. Parker. "Model-based Control for Bioprocesses." Department of Chemical Engineering, Clemson University, Clemson, SC, January 1999.
 33. R.S. Parker (speaker) and F.J. Doyle III. "Optimal Bioreactor Operation using Input-Output Model Based Predictive Control." Biological and Chemical Sciences and Engineering, E.I. duPont de Nemours and Company, January 1998.
 34. R.S. Parker (speaker) and F.J. Doyle III. "Model-based Control of a Complex Bioreactor." Kenan Award Symposium, Union Carbide, Charlottesville, WV, April 1997.
 35. R.S. Parker (speaker), F.J. Doyle III, and N.A. Peppas. "Robust Model-based Control for Insulin Delivery in Diabetes." Twente Institute of Technology, Enschede, The Netherlands, November, 1996.
 36. R.S. Parker (speaker), F.J. Doyle III, and N.A. Peppas. "Chemical Engineering Process Control and the Application of those Principles to the Diabetic Patient." Leiden University, Leiden, The Netherlands, November, 1996.

ABSTRACTS and CONFERENCE PRESENTATIONS

1. J.A. Florian, Jr., M.J. Egorin, W.C. Zamboni, J.L. Eiseman, T.F. Lagattuta, C.P. Belani, G.S. Chatta, H.I. Scher, D.B. Solit, and R.S. Parker. "A Physiologically-Based Pharmacokinetic (PBPK) and Pharmacodynamic Model of Docetaxel (Doc) and Neutropenia in Humans." At the *American Society of Clinical Oncology Annual Meeting*, Chicago, IL, 2007 (submitted).
2. S.C. Kanick (speaker) and R.S. Parker. "Monte-Carlo of Elastic Scattering Spectroscopic Measurement using the Optical Pharmacokinetic System (OPS): Analysis of Sensitivity to Heterogeneous Chromophore Distribution." At the *SPIE - Photonics West Meeting*, San Jose, CA, 2007.
3. J.A. Florian Jr. (speaker) and R.S. Parker. "Influence of Toxicity Effects on Model-Based Docetaxel Treatment Design." At the *AIChE Annual Meeting*, San Francisco, CA, 2006.
4. A. Roy and R.S. Parker (speaker). "Dynamic Modeling and Model-Based Control of Exercise Response in Type 1 Diabetic Patients." At the *AIChE Annual Meeting*, San Francisco, CA, 2006.
5. F.J. Doyle III (speaker), L. Jovanovic, C.C. Palerm, M.A. Henson, R.S. Parker, and B.W. Bequette. "A Proposal for Diabetes Teaching Modules for the Undergraduate Chemical

- Engineering Curriculum.” At the *AIChE Annual Meeting*, San Francisco, CA, 2006.
6. J.J. McCarthy (speaker), R.S. Parker, and M. Besterfield-Sacre. “Pillars of Chemical Engineering: a Block-Scheduled Curriculum.” At the *AIChE Annual Meeting*, San Francisco, CA, 2006.
 7. A.L. Antoine (speaker) and R.S. Parker. “Analytical Nonlinear Model Predictive Control Using Third - Order Volterra-Laguerre Models.” At the *National Organization of Black Chemists and Chemical Engineers Annual Meeting*, Los Angeles, CA, 2006.
 8. A.L. Antoine (speaker) and R.S. Parker. “Analytical Nonlinear Model Predictive Control Using Third - Order Volterra-Laguerre Models.” Poster at the *National Society of Black Engineers Annual Meeting*, Pittsburgh, PA, 2006.
 9. S.C. Kanick, J. Guo, E. Joseph, M.J. Egorin, R.S. Parker, and J.L. Eiseman. “Plasma Pharmacokinetics and Tissue Distribution of the Photodynamic Therapy (PDT) Agent, Pc4, in Mice: Measurement Comparison of Optical Pharmacokinetic System (OPS) with High Performance Liquid Chromatography (HPLC).” At the *American Association for Cancer Research Annual Meeting*, Washington, DC, 2006.
 10. J.A. Florian Jr. (speaker), W.C. Zamboni, J.L. Eiseman, M.D. Krasteva, S. Strychor, E. Joseph, R.A. Parise, M.J. Egorin, and R.S. Parker. “A Physiologically-Based Pharmacokinetic (PBPK) Model of Docetaxel in SCID Mice Bearing SKOV3 Human Ovarian Cancer Xenografts.” At the *American Association for Cancer Research Annual Meeting*, Washington, DC, 2006.
 11. A. Roy and R.S. Parker (speaker). “An ”Extended Minimal Model” of Glucose, Insulin, and Fatty Acid Dynamics.” At the *Diabetes Technology and Therapeutics Annual Meeting*, San Francisco, CA, 2005.
 12. A.S. Soni (speaker) and R.S. Parker. “Optimal Projection of Nonlinear Volterra Models onto the Laguerre Basis.” At the *AIChE Annual Meeting*, Cincinnati, OH, 2005.
 13. J.A. Florian, Jr. (speaker) and R.S. Parker. “A Population Balance Model of Senescent Tumor Modeling and Cancer.” At the *AIChE Annual Meeting*, Cincinnati, OH, 2005.
 14. S.C. Kanick (speaker), J.L. Eiseman, E. Joseph, J. Guo, and R.S. Parker. “Pharmacokinetic Analysis of Motexafin Gadolinium in Mouse Tissues using a Non-Invasive Optical Measurement System.” At the *AIChE Annual Meeting*, Cincinnati, OH, 2005.
 15. A. Roy (speaker) and R.S. Parker. “Dynamic Modeling of Fatty Acid, Glucose, and Insulin Interactions.” At the *AIChE Annual Meeting*, Cincinnati, OH, 2005.
 16. J.J. McCarthy, A.A. Abatan, R.S. Parker (speaker), and M. Besterfield-Sacre. “The Pillars of Chemical Engineering: A Work in Progress.” At the *AIChE Annual Meeting*, Cincinnati, OH, 2005.
 17. T. Balius (speaker), J.L. Eiseman, A.S. Soni, and R.S. Parker. “A MATLABTM Tool for Analyzing Multi-Drug (2-Drug) Chemotherapy.” At the *8th Annual Undergraduate Research Symposium in the Chemical and Biological Sciences* hosted by UMBC, Baltimore, MD, 2005.
 18. J.J. McCarthy, A.A. Abatan, R.S. Parker, and M. Besterfield-Sacre. “The Pillars of Chemical Engineering: A Work in Progress.” At the *Frontiers in Education Conference*, Indianapolis, IN, 2005.
 19. R.S. Parker (speaker), J.W. Fisher, J.A. Florian, Jr., A. Venook, M.J. Ratain, and M.J. Egorin. “Development of a Pharmacokinetically-Guided Gemcitabine (dFdC) Dosing Schedule to Reduce Potentially Excessive Plasma dFdC Concentrations.” Poster Discussion at the *American Society of Clinical Oncology Annual Meeting*, Orlando, FL, 2005.
 20. E. Joseph (speaker), R.S. Parker, J. Guo, S.C. Kanick, M.J. Egorin, and J.L. Eiseman. “Non-Invasive Optical Pharmacokinetic System (OPS) Measurement of Motexafin Gadolinium (GdTex) Concentrations in Tumors of SCID Mice Bearing MDA-MB-231 Breast Cancer

- Xenografts.” At the *American Association for Cancer Research Annual Meeting*, Anaheim, CA, 2005.
21. J.M. Harrold (speaker), J.L. Eiseman, W.C. Zamboni, and R.S. Parker. “Modeling of Toxicity Effects and Nonlinearities in Pharmacokinetics of 9-Nitrocamptothecin in Mice.” At the *AICHE Annual Meeting*, Austin, TX, 2004.
 22. J.W. Fisher (speaker), J.A. Florian Jr., R.S. Parker, A.P. Venook, M.J. Ratain, and M.J. Egorin. “Evaluation of Potentially Excessive and Ineffective Plasma Gemcitabine (dFdC) Concentrations Produced by 30-Minute dFdC Infusions.” Poster Discussion Section at the *American Society of Clinical Oncology Annual Meeting*, New Orleans, LA, 2004.
 23. J.L. Eiseman (speaker), R.A. Parise, E. Joseph, S. Strychor, R.S. Parker, M.J. Egorin, and W.C. Zamboni. “Pharmacokinetics of 9-Nitrocamptothecin (9NC) and 9-Aminocamptothecin (9AC) in SCID Mice Bearing Human Colon Xenografts, HT29.” Poster at the *American Association for Cancer Research 95th Annual Meeting*, (45: 1246, Abstract 5401) Orlando, FL, 2004.
 24. R.S. Parker, “Clinically Relevant Control.” At the *AICHE Annual Meeting*, San Francisco, CA, 2003.
 25. J.M. Harrold (speaker), J.L. Eiseman, W.C. Zamboni, and R.S. Parker, “A Clinically Relevant Mixed Integer Approach to Chemotherapy Treatment Design.” At the *AICHE Annual Meeting*, San Francisco, CA, 2003.
 26. J.A. Florian Jr. (speaker), J.L. Eiseman, and R.S. Parker, “Approximating Cancer Tumor Growth Dynamics using Cell Cycle Models in Series.” At the *AICHE Annual Meeting*, San Francisco, CA, 2003.
 27. J.T. Comerci (speaker), E. Joseph, L. Rippole, R.S. Parker, M.J. Egorin, and J.L. Eiseman. “Cervical Pharmacokinetics of Motexafin Lutetium Measured Non-Invasively by Elastic Scattering Spectrometry (ESS).” At the *American Society of Clinical Oncology Annual Meeting*, Chicago, IL, 2003.
 28. J.M. Harrold (speaker), J.L. Eiseman, W.C. Zamboni, and R.S. Parker. “A Pharmacokinetic/Pharmacodynamic Model of Cancer Chemotherapy in SCID Mice.” At the *AICHE Annual Meeting*, Indianapolis, IN, 2002.
 29. P.J. Lenart, L.N. DiMascio, and R.S. Parker (speaker). “Modeling Glycogen-Exercise Interactions in Type I Diabetic Patients.” At the *AICHE Annual Meeting*, Indianapolis, IN, 2002.
 30. H.J. Hosfield III (speaker) and R.S. Parker. “Analytical Solutions to Nonlinear Model Based Predictive Control Problems.” *AICHE Annual Meeting National Student Poster Competition*, Indianapolis, IN, 2002. *First Place*, “Best of the Rest” Division
 31. J.M. Savard (speaker) and R.S. Parker. “A Frequency-Domain Parameter Estimation Algorithm for Improved Blood Glucose in Type I Diabetic Patients.” *AICHE Annual Meeting National Student Poster Competition*, Indianapolis, IN, 2002.
 32. P.J. Lenart and R.S. Parker. “Glucose Control During Exercise in Type I Diabetic Patients.” At the *AICHE Annual Meeting*, Reno, NV, 2001.
 33. R.S. Parker. “Control-Relevant Empirical Modeling for Bioreactor Regulation.” At the *221st ACS National Meeting*, San Diego, CA, 2001.
 34. P.J. Lenart and R.S. Parker. “Exercise Effects in Type I Diabetic Patient Blood Glucose Control.” At the *AICHE Annual Meeting*, Los Angeles, CA, 2000.
 35. R.S. Parker. “Insulin Delivery to Diabetic Patients under Uncertainty: A Robust Discrete-Time Approach.” At the *World Congress on Medical Physics and Biomedical Engineering, and the 22nd Annual International Conference of the IEEE – Engineering in Medicine and Biology Society Meeting*, Chicago, IL, 2000.

36. R.S. Parker, A.T. Stamps, N.A. Peppas and F.J. Doyle III. "Robust H-infinity Control of Type I Diabetic Patient Blood Glucose." At the *AICHE Annual Meeting*, Dallas, TX, 1999.
37. P. Blowers (speaker), E. Kokkoli (speaker), and R.S. Parker (speaker). "Panel Discussion - Academic Interviewing/Choosing a Post-Doc." At the *AICHE Annual Meeting*, Dallas, TX, 1999.
38. R.S. Parker (speaker), F.J. Doyle III, and N.A. Peppas. "Uncertainty and Robustness in Diabetic Patient Blood Glucose Control." At the *AICHE Annual Meeting*, Miami, FL, November 1998.
39. R.S. Parker (speaker) and F.J. Doyle III. "Nonlinear Internal Model Control (IMC) of a Continuous Bioreactor with Unknown Reaction Pathways." At the *AICHE Annual Meeting*, Miami, FL, November 1998.
40. E.P. Gatzke (speaker), F.J. Doyle III (speaker), and R.S. Parker (speaker). "Interactive Multimedia for the Process Control Modules (PCM)." Software demonstration at the *AICHE Annual Meeting*, Miami, FL, November 1998.
41. R.S. Parker (speaker), F.J. Doyle III, and D. Ramkrishna. "Nonlinear Adaptive Horizon-based Predictive Control of a Bioreactor using a State-Space Laguerre Model." At the *AICHE Annual Meeting*, Los Angeles, CA, 1997.
42. R.S. Parker (speaker), F.J. Doyle III, and N.A. Peppas. "Variable-rate Implantable Insulin Infusion Pumps - Closed-loop maintenance of Normoglycemia Under Patient Variability for Type I Diabetes." Poster at the *XIth Congress of the International Society for Artificial Organs*, Providence, RI, 1997.
43. E.P. Gatzke (speaker), R.S. Parker (speaker), and F.J. Doyle III. "Process Control Modules for MATLAB 5.1 with Improved Graphics and Fermenter Case Study." Software demonstration at the *AICHE Annual Meeting*, Los Angeles, CA, 1997.
44. R.S. Parker (speaker), F.J. Doyle III, and N.A. Peppas. "Insulin Delivery Using Model-based Control of Infusion Pumps." Poster at the *AICHE Annual Meeting*, Chicago, IL, 1996.
45. F.J. Doyle III (speaker), R.S. Parker (speaker), and V. Venkatasubramanian. "Practical Case Studies for Undergraduate Process Control Using the Purdue Control Modules (PCM)." Software demonstration at *AICHE Annual Meeting*, Chicago, IL, 1996.

PATENT

1. S. Keith, R.S. Parker, N.G. Harvey, R.J. Pettis, D. Denuzzio, and G. Vonk. "System and Method for Initiating and Maintaining Continuous, Long-Term Control of a Concentration of a Substance in a Patient Using a Feedback or Model-Based Controller Coupled to a Single-Needle or Multi-Needle Intradermal (ID) Delivery Device." U.S. Patent 7,060,059 B2; June 13, 2006.