Curriculum Vitae

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I. PROFESSIONAL EXPERIENCE

A. Education

Postdoctoral Research Associate, Massachusetts Institute of Technology, 1994
Postdoctoral Fellow, University of California at Berkeley, 1992
Ph.D. Chemical Engineering. Vienna University of Technology (with highest distinction), 1992
Business Management Education. Vienna University of Economics. (with distinction). 1990
Diploma Chemical Engineering. Vienna University of Technology (with highest distinction), 1989

B. Awards and Honors

Best Paper Award - European Stroke Conference, 2015 (senior author)
Best Paper Computers and Chemical Engineering Journal, 2013 (corresponding author)
Elected Editorial Board Member – Computers and Chemical Engineering, Premier Journal in Process Systems Engineering, 2012.
Best Poster Honorable Mention for Scientific Visualization, VisWeek 2012, Seattle, WA, 2012. (senior author)
Keynote Lecture, ESCAPE-22, Systems Biology and Healthcare Engineering, London, 2012
First place Kosaka award for basic science research, International Anesthesia Research Society, 2012. (senior author)
Best poster award in Regional Anesthesia Category - International Anesthesia Research Society 2012 (senior author).
2nd Place Mimics Innovation Award, Personalized gene-silencing therapies, 2012
Keynote Lecture, 1st International Chemical Engineering Symposium, Tlaxcala, Mexico, 2011
Keynote Lecture, ESCAPE-21, Biomedical Engineering, Chalkidiki, Greece, 2011
Plenary Lecture, 8th International Conference on Chemical Engineering, Puebla, Mexico, 2011
Editor, Chemical Engineering Research and Design, Subject: Process Systems Engineering, 2010
AICHE CAST Directors Award, 2nd prize (honorable mention) in AIChE Student Poster competition, Salt Lake City, Utah, 2010. (corresponding author)
Keynote Lecture, Intl. Symposium on Process Systems Engineering, Salvador, Brazil, 2009
Organizer Foundation Conference of Computer-Aided Process Design, FOCAPD 2009
College of Engineering Teaching Award, 2009
Best Paper Computers and Chemical Engineering Journal, 2008 (corresponding author)
Keynote Lecture, Medical Innovation Conference, Vienna, 2008
Mimics Innovation Award, Innovative Medical Procedures, 2006
Distinguished Lecture, Imperial College, 2005
Mimics Innovation Runner Up Award, 2005
Best Paper of the Conference Award, Cybernetics and Systems Research, 2004
Best Paper of Symposium Award, Cybernetics and Systems Research, 2004
College Faculty Research Award, 2004

Faculty Scholar Award, 2003
Inaugural Faculty Scholar Award, 2002
Teaching Recognition Program Award, 2002
Keynote Lecture, Annual International Meeting of the Austrian Society of Metallurgy, 2001
Keynote Lecture, Japan Society for the Promotion of Science, Yokohama, 2000
Best Paper Award, Cybernetics and Systems Research, 1998
Research Scholarship of the Austrian Chamber of Commerce, 1994
Best doctoral dissertation of the Vienna University of Technology award and winner of the Hrabak
    Foundation Investigation Scholarship, 1992
Mobility Scholarship of the Austrian Department of Science and Arts, 1990

C. Academic Positions (at UIC unless stated otherwise)
Professor of Bioengineering, Chemical Engineering and Computer Science, 2010-date
Research Professor, Faculty in the Department of Neurosurgery, 2012-date
Sabbatical Year, Medical University of Vienna, 2014.
Director of Graduate Studies, Bioengineering, 2010-2011
Sabbatical Year, Department of Surgery, Section Neurosurgery, University of Chicago and Centre
    for Process Systems Engineering, Imperial College, London, 2007
Visiting Faculty, Department of Surgery, Neurosurgery, University of Chicago, 2004-2007
Associate Professor of Bioengineering, 2005-2010
Adjunct Professor of Bioengineering, 2003-2005
Adjunct Professor of Computer Science, 2002-date
Associate Professor of Chemical Engineering, 2002-2010
Assistant Professor of Chemical Engineering, 1997-2002
Research Associate, Massachusetts Institute of Technology, 1996-1997
Postdoctoral Research Associate, Massachusetts Institute of Technology, 1994-1996
Postdoctoral Fellow, University of California at Berkeley, 1992
Visiting Scientist, Laboratory for Petrochemical Technics, Rijksuniversiteit Gent, 1990
Research Associate and Lecturer, Vienna University of Technology, 1989

D. Industrial Experience
President and Founder, Metis Medical LLC, Medical imaging start-up company, 2015-present
President and Founder, System Science Incorporation, Biomedical technology start-up company,
    2010-present
Industrial Consultancy Services, 1992 - present
Research Scientist, VOEST-ALPINE Industrieanlagenbau (VAI), Austria, 1993
Visiting Research Engineer, VOEST-ALPINE Industrieanlagenbau (VAI). Development Corex
    coal gasifier technology, 1989-1992

E. Offices
Faculty, North American Neuromodulation Society (NANS), NANS 2016 Annual Meeting.
Faculty, North American Neuromodulation Society (NANS), NANS 2014 Annual Meeting.
Faculty, 4th International Multidisciplinary Pain Congress, Eindhoven, 2014.
Director of the AIChE CAST Computers and Systems Technology Division, 2013
International Program Committee International Process Systems Engineering Conference,
    Singapore, 2012

International Program Committee Member, Escape-22, London, 2012
International Program Coordinator ESCAPE-21 on Biomedical Systems, Chalkidiki, Greece, 2011
Subject Editor, Chemical Engineering Research and Design, Official Journal of the European Federation of Chemical Engineering, 2010-date
Organizer Foundation Conference of Computer-Aided Process Design, FOCAPD 2009
Director, AICHE Environmental Division, 2008-2011
Program Coordinator, AICHE Division 10A, Computers and Systems Technology, 2005-2006
Steering Committee Member, Institute for Environmental Science and Policy, UIC, 2006-date
Editor Proc. of the Seventh International Conference on the Foundations for Computer Aided Process Design, Taylor and Francis, NY, 2009.
Guest Editor, Computers and Chemical Engineering Journal, *Design for Energy and the Environment,* 2009.
Editorial Advisory Board, Recent Patents on Drug Delivery and Formulation, Online Journal by Bentham Science Publishers

F. Review Panels
NASA-HERO and FLAGSHIP Research and Technology Development to Support Crew Health and Performance in Space Exploration Missions, Vision impairment in space flight.
NIH Center for Scientific Review Special Emphasis Panel ZRG1 IMST-G
NIH Center for Scientific Review – Innovations in Biomedical Computational Science and Technology Initiative
NIH Center for Scientific Review - Emerging Technologies and Training in Neuroscience (ETTN-K 10) - Small Business
NIH Center for Scientific Review - ZRG1 ETTN-K (10) B - Small Business: Clinical Neurophysiology, Devices, Auditory Devices and Neuroprosthesis
NIH Center for Scientific Review - ZRG1 ETTN-H (90) S - Advanced Tools and Technologies for Cerebrospinal Fluid Shunts SBIR
NSF-Biotechnology, Biochemical and Biomass Engineering (BBBE) Program
NSF-Process and Reaction Engineering Program
NSF-Biomedical Engineering Program
NSF-Cyber-Enabled Discovery and Innovation (CDI) Program
NSF-Engineering Division - Process and Reaction Engineering
NSF-Information Technology Research (ITR)
NSF-Research Experiences for Teachers (RET) Sites Program
NSF-Research Experiences for Undergraduates (REU) Sites Program
DOE-NRC Board on Energy and Environmental Systems for Fossil Energy Carbon Sequestration Program
Faculty Scholarship Cluster Panel-Institute of Environmental Science and Policy

Proposal Review:
ACS Petroleum Research Fund – American Chemical Society
French National Research Agency
Foundation for Polish Science Team for Programmes Financed from Structural Funds
Netherlands Organization for Scientific Research (NWO, the Dutch Research Council)
Netherlands Organization for Health Research and Development (ZonMw)
South African National Research Foundation (NRF) - Specialist Committee

Swiss National Science Foundation - Division for Physical and Engineering Science
Research Grants Council of Hong Kong
NIH Center for Scientific Review Shared Instrumentation Review Panel
NSF-Reviewer for Engineering Division - Process and Reaction Engineering
NSF-Biotechnology, Biochemical and Biomass Engineering (BBBE) Program
NSF-Cyber-Enabled Discovery and Innovation (CDI) Program
NSF-Engineering Division - Process and Reaction Engineering
NSF-Information Technology Research (ITR)

G. Grants

Pending Applications:
NIH NIBIB. A vascular tree topology inspired platform to predict intracranial blood flow. 2016.

NIH NINDS. Cerebral Blood Flow during Endovascular Surgery from Whole-Tree Digital Subtraction Angiography. 2016

Federal Agencies:

NSF CBET, Intrathecal magnetic drug targeting to the central nervous system with superparamagnetic nanoparticles PI, $289,969, 2014-2017.

NSF RET Chicago Science Teacher Research (CSTR) Program, $499,000. Biomedical research projects for math and science teachers. PI A. Linninger with 12 Co-PIs in bioengineering, medicine and pharmacy, 2012-2016.

XSEDE Resource Allocations Committee (XRAC), A Fluid-Structure Interaction Model for Cerebral Vasculature, Brain Tissue, and Cerebrospinal Fluid, PSC SGI Altix UV (Blacklight): 71,306.0 SUs, MCB130186, $10,266.65, 2014-2016.

NSF EAGER: Computational investigation of the distributed decentralized control of cerebral blood flow," $70,000, PI Andreas A. Linninger, 2013-2015.

NIH R43 Small Business Grant - A Cerebrospinal Fluid Volume Monitor and Control System, $694,000, System Science Incorporation (Start-up company - A. Linninger, founder and president). 2011-2015.

Animal Validation of a New Volume Sensor for Feedback Treatment of Hydrocephalus, PI, $423,783, NIH NINDS R-21, 2010-2013

Interstitial dynamics of the poroelastic brain and cerebral vasculature in humans, PI, $239,987, NSF CBET, 2008-2012

Collaborative Research: Mathematical optimization for targeted macro-molecules delivery to the brain, PI (with Collaborator R. Penn), $321,951 (UIC part $201,951), NSF CBET, 2007-2010

Modeling, Monitoring and Control of Hydrocephalus, PI, $429,000, NIH-NIBIB R21, 2007-2009

New Design Methods and Algorithms for Highly Energy-efficient and Low-cost Multi-component Distillation Processes, Co-PI (PI Agrawal, Purdue University), $1,500,000 (UIC part $429,000), DOE–Energy Efficiency and Renewable Energy, 2006-2012

Novel Processes and Materials in Bioengineering and Biomedical Engineering, PI, $297,323, NSF-REU, 2008-2011

Integrated Design and Control Under Uncertainty, PI, $275,453, NSF CBET, 2006-2009

Chicago Science Teacher Research (CSTR) Program, PI and Director, $509,807, NSF-RET, 2007-2010

Organization of FOCAPD Conference, Co-Chair with El-Halwagi, Chair, $30,000, NSF CBET, 2007-2009

Chicago Science Teacher Research (CSTR) Program, PI and Director, $420,806, NSF-RET, 2005-2009

Novel materials and processing in Chemical and Biomedical Engineering, Co-PI and Co-Director (Takoudis, PI), $277,568, NSF-REU, 2005-2007

Clean Batch Manufacturing with Uncertainty Management, PI, $345,000, NSF-EPA TSE, 2003-2006

Novel Materials and Processing in Chemical Engineering, Co-PI and Co-Director (Takoudis, PI), $249,758, NSF-REU, 2002-2005

Long Term Planning of Site Recovery and Treatment Options, PI, $212,000, NSF-GOALI, 2001-2004

Symbolic Numerical Index Analysis, PI, $32,200, ACS-PRF, 2000-2002

Industrial Agencies and Private Research Sponsors:
(current total balance available for unrestricted spending ~475,000$)

Hydrocephalus Association – Molecular Intervention for Brain Water Regulation in Hydrocephalus, PI, 2015 Innovator Award 2015, $49,785. 2016-present.

Office of Vice Chancellor of Research – Walk-in Brain, PI, 2015, $50,000. 2015-present. (seed funding).

Pediatric Hydrocephalus Foundation – A non-surgical clearance system for pediatric hydrocephalus, PI, Seed fund, $7,300. 2013-2014.

UIC Office of Vice Chancellor of Research, 3D Walk-In Immersive Brain Model for Big Data Visualization, PI, $50,000, 2013-2014

Invasive Drug Delivery to the Brain, PI, $60,000, JNCL Research Fund, 2007-2010.

Development of a Volume Sensor for the Treatment of Hydrocephalus, PI, $50,000, STARS – Kids Foundation, 2006-2008

Drug Delivery into the Human Brain, PI, $90,000, Medtronic (v. University of Chicago Brain Research Center), 2003-2006

Hydrocephalus Research, PI, $50,000, The Susman and Asher Foundation, 2005-2006

Fundamental Research on Hydrocephalus, $50,000, University of Chicago, 2004-2006

A Corporate-wide Environmental Planning System, PI, $84,000, Abbott Laboratories, 2003-2005

Automatic Model Generation, PI, $150,000, VAII-USA, 2000-2002

Process Control Laboratory, PI, $5,000, Abbott Laboratories, 1999

Hybrid Simulation-TechTool, PI, $150,000, VAI VATECH Austria, 1999-2001

Mathematical modeling environment-TechTool, PI, $150,000, VAI VATECH Austria, 1998-1999

H. Patents and Inventions
Monitoring and Controlling Hydrocephalus, U.S. Patent No. 8,457,733. June 4, 2013.
Batch-Design Kit for Windows 3.2, Technology Disclosure - M.I.T. Case Number 7628S, 9/4/1997. Computer-aided design software for batch pharmaceutical processes with ecological considerations; with G. Stephanopoulos (licensed to HyproTech).
Waste Treatment Selector, Technology Disclosure - M.I.T. Case Number 7626S, 9/4/1997. Planning software for assessing treatment options, with G. Stephanopoulos.

II. PUBLICATIONS

A. Books and Special Issues:

1. E. Korovessi and A. Linninger (Eds). *Batch Processes. Design, Modeling and Operation of Batch Processes in the Pharmaceutical, Food and Specialty Chemical Industries*, CRC Press, Taylor and Francis, NY, 2005.

2. M. El-Halwagi and A. Linninger (Eds). *Design for Energy and the Environmen*t: Proc. of the Seventh International Conference on the Foundations for Computer Aided Process Design, Taylor and Francis, NY, 2009.
3. A. Linninger and M. El-Halwagi (Eds). Special Issue of Computers and Chemical Engineering on *Design for Energy and the Environmen*t: Select articles of the Seventh International Conference on the Foundations for Computer Aided Process Design, Elsevier, 34, 9, pp 1321-1564, 2010.
4. A. Linninger. Biotransport Processes: Computational Fluid Mechanics in the Brain and Central Nervous System, Cambridge University Press, Monograph on fluid mechanics of the central nervous system, book proposal accepted, 2014.
5. Y. Androulakis, and A. Linninger. Biosystems and Modeling: Special Issue for Computers and Chemical Engineering, Elsevier, 2014.

B. Book Chapters

1. A. Linninger; *"Image-based Computational Fluid Dynamics for Patient-specific Therapy Design and Personalized Medicine.* In *Patient-Specific Modeling in Tomorrow's Medicine*; A. M. Lozano, A. Gefen (Eds) Springer Series Studies in Mechanobiology, Tissue Engineering and Biomaterials. Springer Verlag, NY, 2011.
2. R. Penn, and A. Linninger; Intraparenchymal Drug Delivery For Parkinsons's Disease. In *Stereotactic and Functional Neurosurgery*; A. M. Lozano, P. L. Gildenberg, R. R. Tasker (Eds.) ISBN: 978-3-540-69959-0, Springer Verlag, NY, 2009.
3. A. Linninger and A. Malcolm. Pollution Prevention in Batch Processes. In *Batch Processes* edited by E. Korovessi and A. Linninger, CRC Press, Taylor and Francis, NY, pp 255-301, 2005.
4. E. Korovessi and A. Linninger. General Overview and Introduction. In *Batch Processes* edited by E. Korovessi and A. Linninger, CRC Press, pp 3-5, 2005.
5. K. G. Tomazi, A. Linninger and J. Daniel. Batch Process Industries. In *Batch Processes,* E. Korovessi and A. Linninger (Eds), CRC Press, pp 7-39, 2005.
6. E. Korovessi and A. Linninger. The Future of Batch Processing. In *Batch Processes*, E. Korovessi and A. Linninger (Eds), CRC Press, pp 517-524, 2005.
7. A. Linninger, A. Chakraborty, and G. Stephanopoulos. Screening of Recovery and Treatment Options for Waste Minimization. In *Process Design Tools for the Environment*, S. K. Sikdar and M. El-Halwagi, (Eds), Taylor and Francis, NY, ISBN 1-56032-824-X, 2001. (invited)
8. Bahl, V. and Linninger, A. A. Modeling of Event-Driven Continuous-Discrete Processes, In *Lecture Notes in Computer Science*, 2034, Springer Verlag, pp 387 - 402, 2001.

C. Papers in Refereed Journals
1. K Tangen, NS Narasimhan, K Sierzega, T Preden, A Alaraj, AA Linninger, "Clearance of Subarachnoid Hemorrhage from the Cerebrospinal Fluid in Computational and In Vitro Models", Annals of Biomedical Engineering 44 (12), 3478-3494, 2016.
2. IG Gould, P Tsai, D Kleinfeld, A Linninger, "The capillary bed offers the largest hemodynamic resistance to the cortical blood supply", Journal of Cerebral Blood Flow & Metabolism, 0271678X16671146, 2016.

3. B Desai, Y Hsu, B Schneller, JG Hobbs, AI Mehta, A Linninger, "Hydrocephalus: the role of cerebral aquaporin-4 channels and computational modeling considerations of cerebrospinal fluid", Neurosurgical Focus 41 (3), E8, 2016.

4. A. Ivanov, Linninger A, CY Hsu, S Amin-Hanjani, VA Aletich, FT Charbel, "Correlation between angiographic transit times and neurological status on admission in patients with aneurysmal subarachnoid hemorrhage", Journal of Neurosurgery 124 (4), 1093-1099, 2016.

5. *CY Hsu, Schneller B, Alaraj A, Flannery M, Zhou XJ, Linninger A, "Automatic recognition of subject-specific cerebrovascular trees", Magnetic Resonance in Medicine, 2016.*

6. A Linninger, K Tangen, C Hsu, D Frim, "Cerebrospinal fluid mechanics and its coupling to cerebrovascular dynamics", *Annual Review of Fluid Mechanics, 48, p219-257,* 2016.

7. KM Yenkie, UM Diwekar, A Linninger, "Simulation-free Estimation of reaction propensities in cellular reactions and gene signaling networks", *Computers & Chemical Engineering,* 2016.

8. I Venugopal, R Sirhan, S Basati, A Linninger, "Prototype Biosensor for Detection of Myelin Basic Protein Biomarker in Hydrocephalus Diagnosis", *Sensor Letters 14 (1), 84-92,* 2016.

9. I Venugopal, S Pernal, A Duproz, Bentley, J., Engelhard, H. and A. Linninger. "Magnetic field-enhanced cellular uptake of doxorubicin loaded magnetic nanoparticles for tumor treatment", *Materials Research Express*, Accepted March, 2016.

10. M. Tobin, J. Geraghty, H. Engelhard, A. Linninger, A. Mehta, "Intermedullary spinal cord tumors: a review of current and future treatment strategies", *Journal of Neurosurgery, 39, p1-10,* 2015.

11. Y Hsu, M Tran, A Linninger. "Dynamic regulation of aquaporin-4 water channels in neurological disorders". *Croatian Medical Journal*. 2015;56(5):401-421. doi:10.3325/cmj.2015.56.401.

12. K Tangen, Y Hsu, D Zhu, A Linninger, "CNS wide simulation of flow resistance and drug transport due to spinal microanatomy", *Journal of Biomechanics, 48, p2144-2154,* 2015

13. E. Lueshen, I. Venugopal, T. Soni, A. Alaraj, and A. Linninger, "Implant-Assisted Intrathecal Magnetic Drug Targeting to Aid in Therapeutic Nanoparticle Localization for Potential Treatment of Central Nervous System Disorders", *Journal of Biomedical Nanotechnology, 11, p253-261,* 2015.

14. S. Basati, K. Tangen, Y. Hsu, H. Lin, D. Frim and A. Linninger, "Impedance Changes Indicate Proximal Ventriculoperitoneal Shunt Obstruction In-Vitro", *IEEE Transactions on Biomedical Engineering*, 62 (12), pp2787-2793, 2015.

15. J Bushias, I Gould, and A Linninger, "A computational model of cerebral spinal fluid model production and reabsorption driving by Starling forces", Croatian Medical Journal, *55.5: 481-497,* 2014.

16. S Kim, Y Hsu and A Linninger, Interpretation of Cellular Imaging and AQP4 Quantification Data in a Single Cell Simulator. *Processes* 2.1: 218-237, 2014.

17. Y Hsu and A Linninger, Quantitative Integration of Biological, Pharmacokinetic, and Medical Imaging Data for Organ-Wide Dose-Response Predictions, *IEEE Transaction on Biomedical Engineering*, 60 (3), 625-632, 2013.

18. A. Mossat', E. Lueshen, M. Heitzig, C. Hall, A. A. Linninger, G. Sin, and R. Gani, First Principles Pharmacokinetic Modeling; A Quantitative Study on Cyclosporin, *Comp. Chem. Eng.*, 54 (2013), 97–110, 2013.

19. A. Linninger, I. G. Gould, T. Marrinan, C.-Y. Hsu, M. Chojecki and A. Alaraj, Cerebral Microcirculation and Oxygen Tension in the Human Secondary Cortex, Annals of Biomedical Engineering, 41 (11), 2264-2284, 2013.

20. E. Lueschen, I. Venugopal, J. Kanikunnel, T. Soni, A. Alaraj, and A. Linninger, Intrathecal magnetic drug targeting using gold-coated magnetite nanoparticles in a human spine model, *Nanomedicine*, 1-15, 2013 (accepted).

21. Y. Hsu, M. H.D.M. Hettiarachchi, D. Zhu and A. Linninger, Frequency and magnitude of cerebrospinal fluid pulsations influence intrathecal drug distribution: Key factors for interpatient variability, *Anesthesia & Analgesia*, 115 (2) , 386-394, 2012.

22. S. Basati, B. Desai, A. Alaraj, F. Charbel, and A. Linninger Cerebrospinal fluid volume measurements in hydrocephalic rats, *Journal of Neurosurgery*, (10), 347-354, 2012.

23. C. Hall; A. Mošat, E. Lueshen, and A. Linninger, Mechanistic Interspecies Scaling in Pharmacokinetic Modeling, *Journal of Pharmaceutical Sciences*, 101 (3), 1221–1241, 2012.

24. A. Linninger, Biomedical systems research - new perspectives opened by quantitative medical imaging", Position paper in *Comp. Chem. Eng*, 36, 1-9, 2012.

25. O. Ivanchenko, O, N. Sindhwani, and A. Linninger, Exact solution of the convection-diffusion problem in cylindrical geometry, *AICHE J*, 58 (4), 1299-1302, 2012.

26. J. Moon, S. Kim, and A. A. Linninger, Integrated design and control under uncertainty: Embedded control optimization for plantwide processes, *Comp. Chem. Eng* 35 (2011) 1718–1724, 2011.

27. H.D.M. Hettiarachchi, Y. Hsu, T. J. Harris, and A. Linninger, The effect of pulsatile flow on the intrathecal drug delivery in the spinal canal, *Annuals of Biomedical Engineering*, 39 (10): 2592–2602, 2011.

28. R. Penn, S. Basati, B. Sweetman, X. Guo, and A. Linninger, Ventricular wall movements and cerebrospinal fluid flow in hydrocephalus. *Journal of Neurosurgery*. 115 (1), 159-164, DOI: 10.3171/2010.12.JNS10926, 2011.

29. B. Sweetman, M. Xenos, L. Zitella, and A. Linninger. Three-dimensional prediction of cerebrospinal fluid flow in the human brain. *Computers in Biology and Medicine*, 41, 67-75, 2011.

30. G. Ruiz, S. B. Kim, L. Moes and A. Linninger, Rigorous synthesis and simulation of complex distillation networks, *AICHE J*, 57(1), 136-148, 2011.

31. S. Basati, T. Harris, and A. Linninger. Dynamic brain phantom for continuous intracranial volume measurements. *IEEE Transaction on Biomedical Engineering*, 58 (5): 1450-1455, 2011.

32. N. Sindhwani, O. Ivanchenko, E. Lueshen, K. Prem and A. Linninger. Methods for determining agent concentration profiles in agarose gel during Convection-Enhanced Drug Delivery. *IEEE Transaction on Biomedical Engineering*, 58 (3), 626-632, 2011.

33. B. Sweetman and A. Linninger. Cerebrospinal fluid flow dynamics in the central nervous system. *Ann Biomed Eng*, 39 (1), 484-496, 2010.

34. O. Ivanchenko, N. Sindhwani, and A. Linninger. Experimental techniques for studying poroelasticity in brain phantom gels under high flow micro-infusion, *Journal of Biomechanical Engineering*, 132 (5): 051008, 2010.

35. Beneke, A. D., Kim, S., and Linninger, A. A. Pinch Point Calculations and Its Implications on Robust Distillation Design, *Chinese J. of Chem. Eng.*, 19(6): 911-925, 2011.

36. D. Beneke and A. Linninger. Graphical design and analysis of thermally coupled sidestream columns using Column Profile Maps and Temperature Collocation, AICHE *J*, 57 (9), 2406-2420, 2011.

37. S. Kim, G. Ruiz, and A. Linninger. Rigorous Separation Design: 1. Multicomponent Mixtures, Nonideal Mixtures and Prefractionating Column Networks. *Industrial and Engineering Chemistry Research*, 49 (14): 6499–6513, 2010.

38. S. Kim, and A. Linninger. Rigorous Separation Design. 2. Network Design Solutions for Mixtures with Various Volatility Differences and Feed Compositions. *Industrial and Engineering Chemistry Research*, 49 (18): 8670–8684, 2010.

39. G. Ruiz, S. Kim, J. Moon, L. Zhang, and A. Linninger. Design and optimization of energy efficient complex separation networks. *Comp. Chem. Eng.*, 34 (9): 1556-1563, 2010.

40. A. Linninger. Industry-wide energy saving by complex separation networks. *Comp. Chem. Eng.*, 33 (12): 2018-2027, 2009.

41. A. Linninger, M. Xenos, B. Sweetman, S. Ponkshe, X. Guo, and R. Penn. A mathematical model of blood, cerebrospinal fluid and brain dynamics. *Journal of Mathematical Biology,* 59(6): 729-759, 2009.

42. A. Linninger, B. Sweetman and R. Penn. Normal and hydrocephalic brain dynamics; reduced cerebrospinal fluid reabsorption and ventricular enlargement. *Annals of Biomedical Engineering,* 37 (7):1434-1447, 2009.

43. R. Penn and A. Linninger. The Physics of Hydrocephalus. *Pediatric Neurosurgery*, 45:161-174, 2009.

44. A. Linninger, S. Basati and R. Penn. An Impedance Sensor to Monitor and Control Cerebral Ventricular Volume. *Medical Engineering and Physics*. 31: 838-845, 2009.

45. J. Moon and A. Linninger. A Hybrid Sequential Niche Genetic Algorithm for Optimal Engineering Design with Solution Multiplicity. *Comp. Chem. Eng.*, 33 (7): 1261-1271, 2009.

46. A. Linninger, M. Somayaji, X. Guo, T. Erickson, X. Guo and R. Penn. Computational Methods for Predicting Drug Transport in Anisotropic and Heterogeneous Brain Tissue. *J of Biomechanics*, 41: 2176-2187, 2008.

47. K. Kulkarni, P. Larsen, and A. Linninger, Assessing Chronic Liver Toxicity Based on Relative Gene Expression Data. *Journal of Theoretical Biology*, 254: 308-318, 2008.

48. A. Linninger, M.R. Somayaji, L. Zhang, M.S. Hariharan and R. Penn. Rigorous Mathematical Modeling Techniques for Optimal Delivery of Macromolecules to the Brain. *IEEE Transaction on Biomedical Engineering*, 55 (9): 2303-2313, 2008.

49. J. Moon, K. Kulkarni, L. Zhang, and A. Linninger. Parallel Hybrid Algorithm for Process Flexibility Analysis. *Industrial and Engineering Chemistry Research*, 47 (21): 8324-8336, 2008.

50. K. Kulkarni, J. Moon, L. Zhang, A. Lucia, and A. Linninger. Multi-scale Modeling and Solution Multiplicity in Catalytic Pellet Reactors. *Industrial and Engineering Chemistry Research*, 47 (22): 8572-8581, 2008.

51. A. Lucia, R. Gattupalli, K. Kulkarni, and A. Linninger. A Barrier-Terrain Methodology for Global Optimization. *Industrial and Engineering Chemistry Research*, 47: 2666-2680, 2008.

52. A. Abuhabsah, A. Linninger and P. Rousche. Apprenticeships in Scientific Research: Exploring Brain Functioning in a Research Lab and in a Seventh Grade Classroom. *Spectrum – The Journal of the Illinois Science Teachers Association*, 34 (1): 18-23, 2008.

53. A. Linninger, M. R. Somayaji, M. Mekarski and L. Zhang. Prediction of convection-enhanced drug delivery to the human brain. *Journal of Theoretical Biology*, 250: 125-138, 2008.

54. M. B. Somayaj, M. Xenos, L. Zhang, M. Megarski and A. Linninger. Systematic Design of Drug Delivery Therapies. *Comp. Chem. Eng.*, (32): 89-98, 2008.

55. A. Malcolm, J. Polan, L. Zhang, B. Oguannaike and A. Linninger. Integrating systems design and control using dynamic flexibility analysis. *AICHE J*, 53(8): 2048-2061, 2007.

56. L. Zhang, K. Kulkarni, M. R. Somayaji, M. Xenos and A. Linninger. Discovery of Transport and Reaction Properties in Distributed Systems. *AICHE J*, 53 (2): 381-396, 2007.

57. A. Malcolm, L. Zhang, and A. Linninger. Optimal Regulations for Sustainable Drug Manufacturing. *International Journal of Environment and Pollution (IJEP)*, 29(1-3):144-164, 2007.

58. A. Linninger, M. Xenos, D. Zhu, M.B. Somayaji and R. Penn. Cerebrospinal Fluid Flow in the Normal and Hydrocephalic Human Brain. *IEEE Transactions on Biomedical Engineering*, 54(2), 291-302, 2007.

59. L. Zhang, C. Xue, A. Malcolm, K. Kulkarni and A. Linninger. Distributed System Design under Uncertainty. *Industrial and Engineering Chemistry Research*, 45 (25): 8252-8360, 2006.

60. D. Zhu, M. Xenos, A. Linninger and R. Penn. Dynamics of Lateral Ventricle and Cerebrospinal Fluid in Normal and Hydrocephalic Brain. *Journal of Magnetic Resonance Imaging*, 24 (4): 756-770, 2006.

61. K. Kulkarni, L. Zhang and A. Linninger. Model and Parameter Uncertainty in Distributed Systems. *Industrial and Engineering Chemistry Research*, 45(23): 7832-7840, 2006.

62. A. Malcolm, L. Zhang and A. Linninger. Design of Environmental Regulatory Policies for Sustainable Emission Reduction. *AIChE J,* 52 (8): 2792-2804, 2006.

63. L. Zhang and A. Linninger. Towards Computer-aided Separation Synthesis. *AIChE J,* 52(4):1392-1409, 2006.

64. W. Tang, L. Zhang, A. Linninger, R. S. Tranter and K. Brezinsky. Solving Kinetic Inversion Problems via a Physical Trust Region Gauss-Newton Method. *Industrial and Engineering Chemistry Research*, 44 (10): 3626-3637, 2005.

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D. Refereed Proceedings Articles

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117. A. Linninger and A. Chakraborty. Design and Analysis of Optimal Waste Treatment Policies, *AICHE Symposium Series*, 96 (323), pp 355-359, 2000.

118. G. Stephanopoulos, S. Ali, A. Linninger and E. Salomone. Batch Process Development: Challenging Traditional Approaches, *AIChE Symposium Series*, 96 (323), pp 46-57, 2000.

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121. A. Linninger. Towards computer-aided model Generation, *Proc. JSPS International Workshop on Safety-Assured Operation and Concurrent Engineering*, Sponsored by Japan Society for the Promotion of Science, Yokohama, Japan, pp C35-C49, December 3-5, 2000.

122. V. Bahl, S. Chowdhry and A. Linninger. A High Level Language for Hybrid Systems, *Proc. 19th IASTED International Conference on Modeling Identification and Control*, Innsbruck, Austria, Feb. 14-17, 2000, pp 608-614, ISBN 0-88986-282-6, 2000.

123. A. Chakraborty and A. Linninger. Decision Making for Batch Manufacturing Sites under Uncertainty, In *Computer-Aided Chemical Engineering*, S. Pierrucci (eds), pp 901-906, Elsevier, Amsterdam, 2000.

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127. A. Linninger and V. Bahl. Integrated Chemical Engineering & Industrial Outreach - A New Approach to Design and Chemical Engineering Practice, *Proc. International Conference on Engineering Education*, Prague, Czech Republic, pp 1-10, August, 1999.

128. A. Linninger, H. Krendl and H. Pinger. An Initiative for Integrated Computer-aided Process Engineering, *AIChE Symposium Series*, 94 (320), pp 494-500, 1998.

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131. A. Linninger and G. Stephanopoulos. Computer-Aided Pharmaceutical Process Development Using a Natural Design Language, *Cybernetics and Systems '98, Proc. of Fourth European Meeting on Cybernetics and Systems Research*, R. Trappl (Ed), Vol1, pp 221 - 226, Vienna, Austria, 1998.

132. A. Linninger, S. Ali and G. Stephanopoulos. Knowledge-based validation and waste management of batch pharmaceutical process designs, *Comp. Chem. Eng.*, 20, pp S1431 - 1436, 1996.

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134. A. Linninger, S. Ali, E. Stephanopoulos, C. Han and G. Stephanopoulos. Generation and Assessment of Batch Processes with Ecological Considerations, *Comp. Chem. Eng.*, 19, pp S7-S13, 1995.

135. A. Linninger and G. Stephanopoulos. Life-Cycle Design (LCD) - Reengineering the Process Design Procedure, *Proc. 88th Annual Meeting Air &Waste Management Association*, Paper 95-TA40A.02, pp 1-16, San Antonio, TX, 1995.

136. A. Linninger. Life Cycle Design, In *Proc. G2 User Group Conference*, Johannesburg, South Africa, pp12-24, 1995.

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E. Other publications

139. R. Penn, M. Lee, A. Linninger, K. Miesel, L Ning, and L Stylos. Response and Commentary: Pressure Gradients in the Brain: an Experimental Model of Hydrocephalus, *Journal of Neurosurgery*, 104: 9, 2008.

140. B. Dawe, T. Erickson (advisors: A Linninger, B. Somayaji) "Convection-enhanced delivery into agarose gel brain tissue phantoms". Journal of Young Investigators. Vol 18, 2008.

141. K. Tawse (advisors: A. Linninger, M. Xenos, B. Sweetman), "Cerebrospinal Fluid-Tissue Interactions in the Human Brain". Journal of Young Investigators. Vol 18, 2008.

142. M. Mekarski (advisors: A. Linninger, L. Zhang) "Bio-Transfer and Metabolism in the Distributed System Under Uncertainty". Journal of Young Investigators. Vol 18, 2008.

143. S. Ponkshe (advisors A Linninger, M. Xenos, L. Zhang), "Computer Modeling of Physiological Conditions for Better Understanding of Intracranial Blood Pressure and Brain Vasculature". Journal of Young Investigators. Vol 18, 2008.

144. S. Thomas and S. Naik (advisors B. Sweetman and A. Linninger). "Computer Generation of Three Dimensional Human Cerebral Vasculature Models", Journal of Young Investigators, 19 (17) 1-7, 2009.

G. Invited Lectures

1. "A 3D model of the human brain, cerebrospinal fluid flow. metabolism and drug delivery, LACDR Fall Symposium, <u>Keynote Lecture</u>, University of Leiden, Nov 22, 2016.

2. "Cellular level simulation of oxygen and solute transport in the human cortex", Departmental Seminar in Neuroscience, Oregon Health & Science University, Portland, OR, Oct 17, 2016.

3. "Cerebrospinal fluid flow in the central nervous system: mathematical models for better understanding of the oldest regional anesthesia procedure, <u>Invited lecture,</u> ESRA Annual Meeting of the European Society for Local Anesthesia and Pain Treatment, Bilbao, Oct 7, 2016.

4. "Delivery Modes and Intrathecal Drug Distribution, <u>Invited lecture,</u> ESRA Annual Meeting of the European Society for Local Anesthesia and Pain Treatment, Bilbao, Oct 7, 2016.

5. "Cellular level simulation of oxygen and solute transport in the cerebral cortex ", Clearance of Fluids from the Brain 2nd Annual Symposium, Toronto, Canada, July 22, 2016.

6. "Computing the CSF Dynamics in the Modern View", Invited lecture 1st Annual CSF Disorders Symposium, Providence, RI, June 25, 2016.

7. "The Virtual Brain – In silico mathematical modeling of cerebral blood flow regulation and metabolism", Invited presentation, Gordon Research Conference, Barriers of the Central Nervous System, Colby-Sawyer College, New London, NH, June 19-24, 2016.

8. "Drug Distribution in the Intrathecal Space", Seminar in the Department of Anesthesiology, Cleveland Clinic, Cleveland, OH, June 12, 2016.

9. "A model of cerebrospinal fluid production and reabsorption driven by Starling forces", Invited lecture, 1st Intl Spinal Analgesic Drug Delivery Symposium, Dublin, Ireland, April 9, 2016.

10. Drug distribution in the intrathecal space, Invited lecture Neuromodulation: The Science, San Francisco, CA, May 25-29, 2016.

11. "Intracranial Pressure and water exchange in the brain – What clinicians and scientists think they know", Invited keynote lecture, Research Colloquium of the Chiari and Syringomyelia Foundation, New Orleans, LA, Sep 26, 2015.

12. "CSF Dynamics and the Effect of Starling Forces on Intracranial Water Exchange, 3rd Cerebrospinal Fluid Dynamics Symposium, Invited Lecture, Amiens, France, Jul 9-10, 2015.

13. "Dynamics of Intrathecal Drug Delivery: Form bench to bedside", Invited Lecture, North American Neuromodulation Society (NANS), NANS 2014 Annual Meeting, Las Vegas, NV, Dec 11-14, 2014.

14. "Three-dimensional computational prediction of cerebrospinal fluid flow in human", Invited Lecture, 4th International Multidisciplinary Pain Congress, Eindhoven, NL, Oct 1-4, 2014.

15. "Frequency and magnitude of cerebrospinal fluid pulsations influence intrathecal drug distributions: key factors for interpatient variability", Invited Lecture, 4th International Multidisciplinary Pain Congress, Eindhoven, NL, Oct 1-4, 2014.

16. "Osmolarity, Water Exchange and Cerebrospinal Fluid Mechanics in Hydrocephalus", Seminar presentation, Department of Pharmacology at University of Zagreb School of Medicine (Prof. Klarica), Zagreb, Apr. 22, 2014.

17. "Pharmacokinetics modeling with PET data", Seminar presentation, Department of Bioinfomratics, Medical University of Vienna (Prof. Schreiner), Vienna, Apr. 16, 2014.

18. "Frequency and magnitude of CSF pulsations influence intrathecal drug administration: key factors for interpatient variability", Neuroscience Forum, Lausanne, CH, Feb. 7, 2014.

19. "Control of Cerebral Blood Flow", Process Systems Engineering Seminar, Massachusetts Institute of Technology (MIT), Cambridge, MA, Jan 30, 2014.

20. "Intrathecal Drug Delivery", Pfizer, Cambridge, MA, Jan 29, 2014.

21. Morphology and Hemodynamics of the Cortical Blood Supply in Humans", Departmental Seminar in mechanical Engineering, Ecole Polytechnique Federale de Lausanne (EPLF), Lausanne, Ch, Oct 11, 2012.

22. "The Virtual Human Simulator – Computer-Aided Exploration of Human Biology", Departmental Seminar in Neuroscience, Keynote Lecture, European Symposium on Computer-Aided Process Engineering (Escape 22), University College of London, London, UK, June 17-20, 2012.

23. "Morphology and Hemodynamics of the Cortical Blood Supply in Humans", Departmental Seminar in Neuroscience, University College of London, London, UK, Apr 24, 2012.

24. **"**The Virtual Human Simulator-Computer-aided Exploration of Human Biology", Departmental Seminar in Computer Science, University of Maryland Baltimore County, Baltimore, MD, Apr 13, 2012.
25. "Biomedical Engineering Problem Solving with Systems Engineering Methods", <u>Distinguished Seminar Series</u>, Auburn University, Auburn, AL, Mar 21, 2012.
26. "The future role of chemical engineers in biomedicine", <u>Keynote Lecture,</u> 1st International Chemical Engineering Symposium, Tlaxcala, Mexico, Sep 5, 2011.
27. "Physiology based Pharmacokinetic Modeling: Case Study of Cyclosporin A", Departmental Seminar, Department of Biopharmaceutical Sciences, University of Illinois Chicago, IL, Sep 21, 2011.
28. "Fluid Structure Interaction Models of Pulsatile Cerebrospinal Fluid Flow in Normal and Hydrocephalic Brains", <u>Invited Plenary Lecture</u>, 1st Cerebrospinal Fluid Hydrodynamics Symposium, Zuerich, July 8-9, 2011.
29. "Systems Engineers' Role in Biomedical Research", <u>Keynote Presentation</u>, Escape-21 Chalkidiki, Greece, May 30, 2011.
30. "Cerebrospinal Fluid Volume Monitoring for Hydrocephalus Therapy", *Design of Medical Devices Conference*, MN, April 14, 2011. (with S. Basati, M. LaRiviere and R. Penn)
31. "Systems Engineers' Role in Biomedical Research", <u>Plenary Lecture</u>, 8th International Conference on Chemical Engineering, Puebla, Mexico, April 9, 2011.
32. "Energy Efficient Distillation Process Design", <u>Keynote Lecture</u>, 8th International Conference on Chemical Engineering, Puebla, Mexico, April 9, 2011.
33. "Modeling of Cerebral Vasculature, Control of Cerebral Blood Flow", Process Control Group Seminar, Carnegie Mellon University, Pittsburgh, Feb 4, 2011.
34. "Biomedical Problem Solving with Systems Engineering Methods", Process Systems Engineering Seminar, Carnegie Mellon University, Pittsburgh, Feb 4, 2011.
35. "Integrated Design and Control – Applications to plant-wide scale processes", AICHE Midwest Regional Meeting 2010, Illinois Institute of Technology, Chicago, Oct 1, 2010.
36. "Brain Research with ANSYS FLUENT". <u>Keynote presentation</u> at the 2010 ANSYS Regional Conferences, Hyatt Lodge, Oak Brook, IL, June, 2010 (with B. Sweetman)
37. "Brain Physics - Hydrocephalus and Invasive Drug Delivery", Seminar at the Department of Chemical and Biological Engineering, Northwestern University, Evanston, IL, May 27, 2010.
38. "Biomedical Engineering Problem Solving - Hydrocephalus and Invasive Drug Delivery", Seminar at the ETH Zuerich, March 23, 2010.
39. <u>Keynote Presentation.</u> "Modeling and design of distributed systems; methods and algorithms, *Proc. 10th International Symposium on Process Systems Engineering, PSE'09,* Salvador-Bahia-Brazil, August 16–20, 2009.
40. "Transport Phenomena in the Human Brain", Chemical Engineering Departmental Seminar, Norman, Oklahoma, OK, Dec 4, 2008.
41. "Invasive Drug Delivery Options for Parkinson's Disease", Kinetics Foundation (Host: Andy Grove, former CEO Intel), Los Altos, CA, Oct 13-14, 2008.
42. "Industry-wide Energy Savings By Complex Separations", *FOCAPO*, Cambridge, MA, June 29-July 2, 2008.
43. <u>Keynote Presentation.</u> "Medical imaging for targeted delivery of macro-molecules to the human brain", Medical Innovation Conference, Vienna, Austria, May 30-31, 2008.

44. "Rational Design of Convection-Enhanced Drug Therapies", Twin Star Inc., Minneapolis, Minnesota, May 13, 2008.
45. "The Physics of Hydrocephalus", Biomechanics, Fields Institute, Toronto, Canada, July 27, 2007. (with R. Penn)
46. "Transport Processes in the Human Brain", 4th Mimics User Group Meeting, Washington, DC, June 1-2, 2007.
47. "Intracranial Dynamics of the Human Brain", Addenbrooke's Hospital and Neurosurgery Department, Cambridge University, Cambridge, UK, June 13, 2007.
48. "Drug Delivery and Transport in the Human Brain", Department of Chemical Engineering, Cambridge University, Cambridge, UK, June 12, 2007. "Problem Inversion in Distributed Systems", Department of Chemical Engineering, University of Surrey, Guildford, UK, June 11, 2007.
50. "Integrated Design and Control Under Uncertainty", Department of Chemical Engineering, Imperial College, London, UK, June 8, 2007.
51. "Invasive Drug Delivery To The Brain", Kings College, Blood-Brain Barrier Group, University of London, UK, June 7, 2007.
52. "Bio-transport in the Human Brain", Center for Neural Computation and Neural Engineering Research Seminar Series, University of Chicago, Chicago, IL, April 3, 2007.
53. "Distributed Chemical and Biomedical Systems Design and Analysis", Department of Chemical and Biomolecular Engineering, UCLA, CA, June 16, 2006.
54. "Drug Delivery to the Brain", Departmental Seminars Radiology and Surgery, Department of Neurosurgery, University of Chicago, Chicago, April 10, 2006.
55. "Synthesis of Distillation Separation Networks", AIChE Symposium, "Chemical Engineering at the Cross Roads of Technology", Illinois Institute of Technology (IIT), Chicago, IL, April 19-20, 2005.
56. "Intracranial Dynamics and Drug Delivery to the Human Brain", AIChE Symposium, "Chemical Engineering at the Cross Roads of Technology", Illinois Institute of Technology (IIT), Chicago, IL, April 19-20, 2005.
57. "Mathematical Modeling–The Language of Knowledge", Process Systems Engineering, Center for Process Systems Engineering, Imperial College, London, June 17, 2005.
58. "Determination of the Brain's Ventricular Volume", Medtronic Workshop, Brain Research Center of Excellence, Surgery, University of Chicago, Chicago, Dec. 12, 2005.
59. "Synthesis of Separation Networks", Vishwamitra Research Institute, Center for Uncertain Systems, Westmont, IL, May 19, 2005.
60. "Computer-Assisted Analysis and Design of Transport Phenomena", Medtronic, May 8-9, 2005, World Headquarters, Minneapolis, MN, 2005.
61. "Transport and Kinetic Inversion Problem for Drug Delivery in the Human Brain", Medtronic, World Headquarters, Minneapolis, May 8-9, 2005.
62. "Modeling and Control of Combustion Processes", Air Liquide, Chicago Research Center, Countryside, IL 60525, May 5, 2005.
63. "Mathematical Models of Hydrocephalus", Brain Child Conference (host Curt Steward), Hospital for Sick Children, Toronto, CN, April 21 - 22, 2004.
64. "Control of Hydrocephalus", Workshop with Medtronic, University of Chicago, Chicago, IL, (Dr. Penn, Department of Surgery: Host), March 9, 2004.
65. "Workshop on Modeling of Biological Systems", Argonne National Laboratories, Argonne, IL, (Dr. Tzanos, Reactor Analysis and Engineering Div.: Host), Feb 26, 2004. "On the

Hydrodynamics of the Human Brain, Conference for Computational Models of Hydrocephalus", Chicago, Nov 10-11, 2003.

67. "Pulsatile Flow of the Cerebrospinal Fluid and Hydrocephalus", Departmental Seminar in School of Medicine, University of Chicago, Chicago, IL, October 15, 2003.

68. "Hydrodynamics of the Human Brain", Department of Bioengineering, University of Illinois at Chicago, Chicago, IL, October 3, 2003.

69. "On computer-aided synthesis of process operations under uncertainty", Departmental Seminar, Carnegie Mellon University, Pittsburgh, PA, March 11, 2003.

70. "On the Hydrodynamics of the Human Brain", Department of Chemical and Biochemical Engineering, Rutgers University, Oct. 23, 2003.

71. "Systematic effluent handling for pollution prevention at pharmaceutical manufacturing sites", Abbott Laboratories, North Chicago, (F. Tranter, Host), April 18, 2003.

72. "An Algorithm for Finding Optimal Environmental Legislation", Sustainable Seminar 2003, US EPA, Sustainable Technology Division, Cincinnatti, OH, January, 28, 2003

73. "Long-term Management of Plant Infrastructure Under Uncertainty". Chemical Engineering Department, Illinois Institute of Technology, Chicago, IL, Sep. 18, 2002.

74. "Computer-aided Flowsheet Synthesis", Institute for System Dynamics and Process Engineering, University of Stuttgart, Stuttgart, 15 July, 2002.

75. "Long-term Management of Plant Infrastructure Under Uncertainty", Chemical Engineering Department, University of Oklahoma, Norman, OK, January 24, 2002.

76. "Long-term Management of Manufacturing Sites for Optimal Economic and Ecological Performance", UIC/ABBOTT Engineering Exchange, Abbott Park, IL, April 29, 2002.

77. "Optimal waste reduction and investment planning under uncertainty", Eastman Chemical Company, Kingsport, TN, March 3, 2002.

78. Arthur and Dorothy Sigel Lecture. "Synthesis of Plant-wide Waste Reduction Strategies under Uncertainty", Michigan Technological University, Houghton, MI, April 9, 2001.

79. "Recent Advances in Process Systems Engineering", Invited state-of-the-art lecture, IEEE Instrumentation and Measurement Technology Conference, Budapest, May 21 - 23, 2001.

80. Keynote Lecture. "Modeling and Simulation of Metallurgical Processes", Annual International Meeting of the Austrian Society of Metallurgy, Leoben, Austria, May 21-23, 2001.

81. "TechTool - Equation-oriented Modeling and Simulation of Metallurgical Processes", Austrian Forum Metallurgy, Linz, Austria, May 18, 2001.

82. Keynote Lecture. "Towards computer-aided model Generation", International Workshop on Safety-Assured Operation and Concurrent Engineering, Sponsored by Japan Society for the Promotion of Science, December 3-5, 2000 Yokohama, Japan.

83. "Synthesis of Plant-wide Waste Reduction Strategies under Uncertainty", Departmental Seminar, University of Massachusetts at Amherst, Amherst, MA, October 19, 2000.

84. "Synthesis of Operating Procedures via Superstructure Generation-An Overview of the deterministic and uncertain case", CIPEC Seminar, Purdue University, April 12, 2000.

85. "Advances in Simulation of large scale Dynamic Systems", May, 16-19, 2000; Automation Department, VAI, Linz Austria, 2000.

86. "Phase Stability and Equilibria of non-ideal mixture of slags and liquid metals", Division for Steel Technology, VAI, Linz Austria, May 15, 2000.

87. "Synthesis of Recovery and Treatment Flowsheets", Seminar at the University of Vezprem, Hungary, Dec 8 - 10, 1999.

88. "Combinatorial Process Design", Bayer, Leverkusen, Germany, August 19, 1999.
89. "Meta-Modeling - Equation-generation based on Physical Phenomena", VAI, Linz, Austria, Dec. 13-16, 1999.
90. "Thermodynamics Equilibrium of ionic solutions via Gibbs Free Energy minimization", Division for Steel Technology, Voest Alpine Industries(VAI), Linz, Austria, Dec. 17, 1999.
91. "Solution of Differential Algebraic Systems using Symbolic and Numerical Algorithms", Linz, Austria, March 14-22, 1999.
92. "Phenonena-driven Process Model Generation Environment", Vanderbilt University, Inst. Software Integrated Systems, Dept. of Computer Science, Nashville, TN, Aug 6 - 7, 1998.
93. "Computer-Aided Evolutionary Model Development", Dagstuhl Conference on Adaptation and Evolution in Embedded Information Systems, Dagstuhl, Germany Nov. 2-6, 1998.
94. "Generic Mathematical Language, Mathematical Modeling of multi-state systems", Voest Alpine Industries, Linz, Austria, Dec. 14-18, 1998.
95. "Computer-Aided Model Generation" and "Event Detection in Hybrid Discrete-Continuous Systems", Voest Alpine Industries (VAI), Linz, Austria, Aug. 10 - 14, 1998.
96. "From Reactions to Processes - Process Development and Design", Department of Chemical Engineering, University of Illinois at Chicago, April 25, 1997.
97. "Chemical Process Design Education - Current Trends and Perspectives", Chemical Engineering Department, University of Cambridge, UK, March 17 - 18, 1997.
98. "Post-combustion in Electric Arc Furnaces", Seminar at Air Liquide, Des-Plaines, IL, Dec. 12, 1997.
99. "BatchDesignKit", Batch Design Workshop: Haas Roehm, Searle, Gensym, Pfizer, Office of Naval Research (ONR), Cambridge, MA, Mar 10 -13, 1997. (with Stephanopoulos)
100. "Computer-Aided Systems Design", Seminar at the Lehrstuhl für Prozesstechnik RWTH Aachen, August 29-30, 1996.
101. "Design of Pharmaceutical Processes with Ecological Considerations", Workshop at Bayer, Leverkusen, Germany, Oct. 1996. (with Stephanopoulos)
102. "A Planning Framework for Computer-aided Management of Pharmaceutical Wastes", Lecture at Department of Chemical Engineering, ETH Zuerich, July 12, 1996.
103. "Design for the Environment", Lecture at Institute for Safety and Environmental Technology in Chemistry, ETH Zuerich, July 11, 1996.
104. "A Planning Framework for Computer-Aided management of Pharmaceutical Wastes", Chemical Engineering Department, University of Massachusetts, Amherst, June 26, 1996.
105. "Process Design with Ecological Considerations", Seminar in Department of Chemical Engineering, Tufts University, Medford, MA, April 23-25, 1996.
106. "Computer-Aided System Design-From Modeling to Synthesis". Industrial Engineering Department, Rutgers University, New Brunswick, April 15, 1996.
107. "Design and Assessment of Batch Pharmaceutical Processes", Lecture presented at ETH Zuerich, Department of Chemical Engineering, Oct 12, 1995.
108. "Ecology-oriented Process Design", Seminar, TU-Vienna, May 11, 1995.
109. "Planning of Propellant, Explosive and Pyrotechnic Manufacturing Processes", Workshop for PEP Manufacturing, Massachusetts Institute of Technology, Cambridge, MA, 1995.
110. "Computer-Aided Design of Manufacturing Systems", Anglo American Platinum Corporation Limited, Johannesburg, South Africa, Aug 19, 1995.

111. "Pollution Prevention and Waste Minimization Expert System" and "Systems Design in an Engineering Environment", G2 User Group Conference, Knowledge Based Engineering (Pty) Ltd and Gensym Corporation, Johannesburg, South Africa, Aug 17 - 18, 1995.
112. "Adaptation of the BatchDesign-Kit for the Synthesis of Pyrotechnics, Explosives and Propellants (PEP) Manufacturing Systems", presented at the SERDP Clean Agile Manufacturing of Energetics Workshop, ONR, Washington, DC, Nov 14 - 15, 1995.
113. "DynEaf - Optimizing Electric Arc Furnace Performance", Fuchs Systems Inc., Pittsburgh, Aug 28, 1995.
114. "Dynamic Modeling of the Kinetics in Electric Arc Furnaces", Air Products, Allentown, PA, Aug 3, 1995.
115. "Knowledge-based Design of Batch Pharmaceutical Processes", European Pharmaceutical Seminars Series by Gensym in Brussels, Frankfort, and Milan, Europe, June 20 - 25, 1995.
116. "The BDK Process Design Tool", Gensym Seminar for Eastman Chemical, Cambridge, MA, Oct. 30, 1995.
117. "The BatchDesign-Kit System", LaRoche, Nutley, NJ, May, 1994. (with Stephanopoulos)
118. "Product-integrated pollution prevention", Research and Development, Hafslund Nycomed Pharma, Linz, Dec. 15, 1993.
119. "Feasibility and Environmental Compatibility of the Corex Process", Citizens' Action Committee Linzer Luft, Linz, Austria, March 31, 1992.

H. Abstract, Posters and Presentations at Technical Conferences and Meetings:

1. K. Tangen, T. Gabor, L. Lu, Y. Pan, N. Sriram, A. Linninger. Digital Manufacturing and In Silico Modeling for Rational Design of Drug Delivery to the Central Nervous System, Poster SB3C2016-953, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), 2016, National Harbor, MD, June 29-July 2, 2016.
2. M. Ghaffari, B. Schneller, A. Alaraj, A. Linninger. Subject Specific Simulation of Entire Cerebral Arterial Tree: Implementation of Automatic Parametric Mesh Generation. Poster SB3C2016-171, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), 2016, National Harbor, MD, June 29-July 2, 2016.
3. B. Schneller, M. Ghaffari, S. Ghanavati, J. Sled, A. Linninger. Cerebral Blood Flow Simulation for the Whole Mouse Brain. Oral presentation SB3C2016-1062. Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), 2016, National Harbor, MD, June 29-July 2, 2016.
4. A. Linninger, K. Tangen, N. S. Narasimhan. Frequency and magnitude of cerebrospinal fluid pulsations influence intrathecal drug distribution: key factors for interpatient variability, 1st Intl Spinal Analgesic Drug Delivery Symposium, Dublin, Ireland, April 9, 2016.
5. A. Linninger, I. Venugopal, E. Lueshen. Intrathecal magnetic drug targeting using gold-coated magnetite nanoparticles in a human spine model, *1st Intl Spinal Analgesic Drug Delivery Symposium*, Dublin, Ireland, April 9, 2016.
6. M. Ghaffari, A. Alaraj, A. Linninger. A novel method for patient-specific analysis of cerebral blood flow, 25th *Annual European Stroke Conference* (ESC), Venice, Italy, April 13-15, 2016.
7. K. Tangen, N. Sriram Narasimhan, A. Linninger. Clearance of subarachnoid hemorrhage from the central nervous system via lumbar drain – a bench-top and computational study, 25th *Annual European Stroke Conference* (ESC), Venice, Italy, April 13-15, 2016.

8. B. Schneller, A. Linninger. Whole mouse brain neurovascular simulations for the examination of collateral blood flow, 25th *Annual European Stroke Conference* (ESC), Venice, Italy, April 13-15, 2016.

9. C.-Y. Hsu, A. Alaraj, A. Linninger. Volumetric flow rate estimation in digital subtraction angiography, Poster 249, *25th Annual European Stroke Conference (ESC),* Venice, Italy, April 13-15, 2016.

10. Lechowicz, J. M., Xu, J., Alford, S., Linninger, A. Microfluidic Platform for the Study of Water Transport in Astrocytes. Poster P-Th-378, 2015 *Biomedical Engineering Society Annual Meeting*, Tampa, FL, Oct 7-10, 2015.

11. I.G. Gould, P.S. Tsai, D. Kleinfeld, A. Linninger "Complex cerebral angioarchiture and neuronal Metabolism lead to wide variations of hematocrit, RBC saturation in the capillary bed", *XXVIIth International Symposium of Cerebral Blood Flow, Metabolism and Function. XIIth International Conference on Quantification of Brain Function with PET* , Vancouver, Canada, June 27-18, 2015.

12. C-Y. Hsu, M. Ghaffari, A. Alaraj, A. Linninger, "Computational Fluid Dynamics for Flow Assessment in Digital Subtraction Angiography" *XXVIIthInternational Symposium of Cerebral Blood Flow, Metabolism and Function. XIIth International Conference on Quantification of Brain Function with PET*, Vancouver, Canada, June 27-18, 2015.

13. 2. M. Ghaffari, C-Y Hsu, A. Alaraj, A. Linninger, "Hemodynamic simulation of the patient specific cerebral blood flow towards a personalized surgical planning for vascular disorders", *XXVIIth International Symposium of Cerebral Blood Flow, Metabolism and Function. XIIth International Conference on Quantification of Brain Function with PET* , Vancouver, Canada, June 27-18, 2015.

14. C. Hsu, A. Alaraj, A. A. Linninger. Cerebral blood flow assessment by digital subtraction angiography. 24th European Stroke Conference (ESC), Vienna, Austria, May 13-15, 2015.

15. M. Ghaffari, C. Hsu, B. Scheneller, X. Zhou, A. Alaraj, A. Linninger. Automatic and patient-specific reconstruction of the cerebral vasculature, CSF spaves and parenchyma for hemodynamic assessment of vascular pathologies. 24th European Stroke Conference (ESC), Vienna, Austria, May 13-15, 2015.

16. K. Tangen, A. Linninger. Cerebral tissue penetration of neuroprotective agents delivered by intrathecal injection following stroke. 24th European Stroke Conference (ESC), Vienna, Austria, May 13-15, 2015.

17. J. Buishas. I. Gould, A. Linninger. The impact of starling forces and metabolism on intracranial water shifts in the brain. 24th European Stroke Conference (ESC), Vienna, Austria, May 13-15, 2015.

18. I. Venugopal, S. Pernal, A. Linninger and H Engelhard, "Characterization and Cytotoxicity of Doxorubicin-loaded Magnetic Nanoparticles for Glioma Treatment", 2015 American Association of Neurological Surgeons (AANS) Meeting, Washington, May 2-6, 2015.

19. K. Yenke, U Diwekar, A Linninger, "Parameter Estimation in Cellular Systems Modeled as Stochastic Differential Equations", Aiche *Annual Meeting*, Atlanta, Paper 235g, Nov 16-21, 2014.

20. C.-Y. Hsu, B. Schneller, A. Linninger. "Organ-Wide Multi-scale Vessel filtering for Cerebral Vasculature Modeling", *BMES Annual Meeting*, San Antonio, TX, Oct 22-25, 2014.

21. I. Venugopal and A. Linninger, "Improved drug delivery to the central nervous systems using intrathecal drug targeting with superparamagnetic nanoparticles, oral presentation, *4th International Multidisciplinary Pain Congress*, Eindhoven, NL, Oct 1-4, 2014.

22. H. Engelhard, I. Venugopal and A. Linninger. Movement and Imaging of Quantum Dot-Conjugated Gold-Coated Magnetite Nanoparticles In Vitro and in the Spinal Intrathecal Space. *American Association of Neurological Surgeons*, San Francisco, CA, April 5-9, 2014.

23. I. Gould, C-Y. Hsu and A. Linninger. Parametric Cerebral Blood Flow Predictions, Paper 666, *AIChE Annual Meeting,* San Francisco, CA, Nov. 3-8, 2013.

24. I. Gould and A. Linninger. Systems Approach to Nonlinear Microvascualture Blood Flow, Paper 295, *AIChE Annual Meeting,* San Francisco, CA, Nov. 3-8, 2013.

25. K. M. Yenkie, U. Diwekar, A. Linninger and S. Kim. A New Method for Parameter Estimation in Stochastic Differential Equations, Paper 589, *AIChE Annual Meeting,* San Francisco, CA, Nov. 3-8, 2013.

26. T. Marrinan and A. Linninger. Whole-Brain Computational Fluid Dynamic Analysis, Paper 636, *AIChE Annual Meeting,* San Francisco, CA, Nov. 3-8, 2013.

27. A. Linninger, K. Tangen, I. Venugopal, and E. Lueshen. Simulations of CSF Flow Dynamics in a Global CNS Model With Magnetically Targeted Intrathecal Drug Delivery, Poster 98, *AIChE Annual Meeting,* San Francisco, CA, Nov. 3-8, 2013.

28. I. Venugopal and A. Linninger. Quantum Dot Conjugated Magnetic Nanoparticles for Targeted Drug Delivery and Imaging in the CNS. BMES Annual Meeting 2013. Seattle, WA, September 25-28, 2013

29. E. Lueshen, I. Venugopal, and A. Linninger. Intrathecal Magnetic Drug Targeting: A New Approach to Treating Diseases of the Central Nervous System. ASME 2013 2nd Global Congress on *Nanoengineering for Medicine & Biology*, NEMB2013. Boston, MA, February 4-6, 2013

30. Alaraj A., Hsu C.Y., Gould I., Marrinan T., Charbel F., Linninger A. The Use of Angiography to Quantify Relative Cortical Cerebral Blood Flow. The Congress of Neurological Surgeons 2012 Annual Meeting. Oct 6-10, 2012. Chicago, IL.

31. T. Marrinan, I. Gould, C-Y. Hsu, A. Linninger, Whole-Brain Vascular Reconstruction, Simulation, and Visualization, Best Poster Honorable Mention for Scientific Visualization, VisWeek 2012, Seattle, WA, Oct 13-18, 2012.

32. I. G. Gould, T. Marrinan, M. Chojecki, M. Qadar, B. Henry, M. Pervais, N. Vaicaitis, Y. Zhu, A. Rogers, and A. Linninger, Hemodynamics of cerebral micro vasculature, *Proc. 11th International Symposium on Process Systems Engineering, PSE'1*2, Singapore, July 15-19, 2012.

33. S. B. Kim and A. Linninger. Optimization of Complex Column Networks with Hybrid Genetic Algorithm, *Proc. 11th International Symposium on Process Systems Engineering, PSE'12*, Singapore, July 15-19, 2012

34. Y. Hsu, A. Karim, and A. Linninger. Medical Image-based Systematic Design of Human Gene Silencing Therapies, *Proc. 11th International Symposium on Process Systems Engineering, PSE'12*, Singapore, July 15-19, 2012

35. Y. Hsu, I. Venugopal, E. Lueshen, and A. Linninger. Improving Gene Silencing Efficiency in vivo with Organ-wide Quantitative Design of siRNA Infusions, RNAi Research and Therapeutics Conference, May 30-31, Boston, 2012.

36. Y. Hsu and A. Linninger. Interpatient Variability in Intrathecal Drug Distribution: Cerebrospinal Fluid Pulsatile Magnitude, Frequency, Solution Baricity, and Toxicity Risks, International Anesthesia Research Society, 2012 – Winner Kosaka Award, Best paper in category regional Anesthesia, Boston, May 18-21, 2012.

37. E. Lueshen, I. Venugopal, T. Soni, and A. Linninger. Magnetically guided nanoparticles: intrathecal drug targeting. UIC Student Research Forum, University of Illinois at Chicago, IL - April 17, 2012.

38. M. Chojecki, M. Qader, I. G Gould, and A. Linninger. Insights into cerebral hemodynamics of microvasculature. UIC Student Research Forum, University of Illinois at Chicago IL, April 17, 2012.

39. S. Chockalingam, M. Tran, N. Constantino, Y. Hsu, S. Basati, M. Cho, and A. Linninger. Gene regulation of aquaporin 4 causes dynamic changes in water channel expression levels during hydrocephalus. UIC Student Research Forum, University of Illinois at Chicago IL, April 17, 2012.

40. J. Stewart, V. Ngyuyen, Y. Hsu and A. Linninger. Pain Control and management through intrathecal morphine and gene silencing techniques. UIC Student Research Forum, University of Illinois at Chicago, IL - April 17, 2012.

41. Y. Hsu, A. Karim, M. Hettiarachchi and A. Linninger. A mechanistic model of short interfering RNA transport, uptake and cellular reactions in the human spinal cord for gene silencing therapy. Chicago Biomedical Symposium, Chicago, IL. Oct 21, 2011.

42. S. Kim, and A. Linninger. Design and Synthesis of Complex Distillation Networks with Hybrid Genetic Algorithm, Paper 408c, *AIChE Annual Meeting*, Minneapolis, MN, Oct. 16-21, 2011.

43. C. Hall, M. Heitzig, G. Sin, R. Gani, and A. Linninger. Systematic Engineering Approach to Development and Identification of Physiologically-Based Pharmacokinetic Models, Paper 595e, *AIChE Annual Meeting*, Minneapolis, MN, Oct. 16-21, 2011.

44. Linninger, and M. Hettiarachchi. Model Generation: Massive Parallel Computations for the Next Generation of Biomedical Engineering Applications, Paper 700c, *AIChE Annual Meeting*, Minneapolis, MN, Oct. 16-21, 2011.

45. Y. Hsu, M. Hettiarachchi, D. Zhu, B. Henry and A Linninger, "Patient-specific Intrathecal Infusion Therapy Design Using Medical Imaging-based Computational Modeling" , 48th Annual Technical Conference of Society of Engineering Sciences, Evanston, IL, Oct 13, 2011.

46. Y. Hsu, T. Harris, H.D.M. Hettiarachchi, R. Penn, and A. Linninger. Three Dimensional Simulation and Experimental Investigation of Intrathecal Drug Delivery in the Spinal Canal and the Brain. Oral Presentation. 21st European Symposium on Computer Aided Process Engineering, ESCAPE21, Chalkidiki, Greece, May 29 – June 1, 2011.

47. N. Vaičaitis, B. Sweetman, and A. Linninger. A Computational Model of Cerebral Vasculature, Brain Tissue, and Cerebrospinal Fluid. Oral Presentation. 21st European Symposium on Computer Aided Process Engineering, ESCAPE21, Chalkidiki, Greece, May 29 – June 1, 2011.

48. E. Lueshen, C. Hall, A. Mošat', and A. Linninger. Physiologically-Based Pharmacokinetic Modeling: Parameter Estimation for Cyclosporin A. Oral Presentation. 21st European Symposium on Computer Aided Process Engineering, ESCAPE21, Chalkidiki, Greece, May 29 – June 1, 2011.

49. N. Vaicaitis, B. Sweetman, and A. Linninger. Computation Analysis of Cerebral Blood Flow. Poster Presentation. XXVth International Symposium on Cerebral Blood Flow, Metabolism, and Function. Barcelona, Spain, May 25-28, 2011.

50. Y. Hsu, T. Harris, M. Hettiarachchi, and A. Linninger. Intrathecal Drug Delivery to the Human Central Nervous System. Poster Presentation. XXVth International Symposium on Cerebral Blood Flow, Metabolism, and Function. Barcelona, Spain, May 25-28, 2011.

51. S. Basati and A. Linninger. Development of improved treatment options for hydrocephalic patients. Oral Presentation. UIC Neurosurgery Breakfast Meeting, May 11th, 2011.

52. B. Sweetman, I. Gould, and A. Linninger. "Vasculature-brain tissue interaction and cerebrospinal fluid flow in the brain (Multi-scale modeling of biomechanical interactions in the brain)." Poster 209. UIC Student Research Forum, University of Illinois at Chicago, Chicago, IL, April 19, 2011.

53. U. Kaewken, V. Nguyen, Y. Hsu, M. Hettiarachchi, and A. Linninger. Anatomical Fine Structures inside the Spinal Canal Drastically Enhance Micromixing in Intrathecal Drug Delivery. Poster Presentation. Student Research Forum, UIC, Tuesday, April 19, 2011.

54. S. Basati, M. LaRiviere, R. Penn, and A. Linninger. Cerebrospinal Fluid Volume Monitoring for Hydrocephalus Therapy. Poster Presentation. Design of Medical Devices (DMD), University of Minnesota, Wednesday, April 13, 2011.

55. S. Basati, B. Sweetman, J. Lancaster, and A. Linninger. Intracranial Dynamics and its Role in Hydrocephalus Treatment. Poster Presentation. Midwest Biomedical Engineering Career Conference (MBECC), Evanston, IL, 2011.

56. C. Hall, E. Lueshen, M. Heitzig, and A. Linninger. Pharmacokinetic Scaling and Discovery of In Vivo Drug Distribution Mechanisms with A Novel Whole-Body Physiologically-Based Modeling Framework. Poster Presentation. Midwest Biomedical Engineering Career Conference (MBECC), Evanston, IL, 2011.

57. U. Kaewken, V. Nguyen, Y. Hsu, M. Hettiarachchi, and A. Linninger. Anatomical Fine Structures inside the Spinal Canal Drastically Enhance Micromixing in Intrathecal Drug Delivery Authors. Poster Presentation. Midwest Biomedical Engineering Career Conference (MBECC), Evanston, IL, 2011.

58. N. Bogdanovich, S. Kim, and A. A. Linninger. RET – Chicago Science Teacher Research Program. Poster Presentation. NSF Engineering Education Awardee Conference, Reston, VA, March 13-15, 2011.

59. S. Kim and A. Linninger. Automatic and Rigorous Flowsheet Design of Energy Efficient Separation Process. Poster Presentation. AIChE 2011 Spring Meeting, Chicago, IL, 2011.

60. S.B. Kim and A. Linninger. Fully Automatic Computer-Aided Design and Synthesis of Complex Separation Networks, Paper 337d, *AIChE Annual Meeting*, Salt Lake City, UT, Nov. 7-12, 2010.

61. A. Mošať, E. Lueshen, C. Hall, and A. Linninger. Parameter Estimation in Global Pharmacokinetic Models for Drug Delivery, Poster 370d, *AIChE Annual Meeting*, Salt Lake City, UT, Nov. 7-12, 2010.

62. E. Lueshen, C. Hall, A. Mošať, and A. Linninger. Pharmacokinetic Parameter Estimation of Drug Distribution in an Entire Organism, Paper 693a, *AIChE Annual Meeting*, Salt Lake City, UT, Nov. 7-12, 2010.

63. E. Lueshen, C. Hall, A. Mošať, and A. Linninger. Quality by Design Approach to Pharmacokinetic Modeling. A Case Study on Cyclosporin A., Paper 697g, *AIChE Annual Meeting*, Salt Lake City, UT, Nov. 7-12, 2010.

64. S.B. Kim and A. Linninger. Energy Efficient Distillation Process Design, Paper 377c, *AIChE Annual Meeting*, Salt Lake City, UT, Nov. 7-12, 2010.

65. A. Linninger. Model Generation for Distributed Systems in Life-Sciences and Biology, Paper 588f, *AIChE Annual Meeting*, Salt Lake City, UT, Nov. 7-12, 2010.

66. Y. Hsu, T. Harris, M. Hettiarachchi, R. Penn, and A. Linninger. Intrathecal Drug Delivery to the Human Central Nervous System. Poster Presentation. University of Illinois College of

Medicine 2010 Research Forum, November 12th, 2010; Student Center West, University of Illinois College of Medicine at Chicago, IL, 2010.

67. B. Sweetman, A. Linninger, and R. Penn. Measurements and Computational Modeling of Cerebrospinal Fluid Flow in Humans. Oral Presentation. Track: Systems Biology, Bioinformatics and Computational Biology. BMES 2010, Annual Fall Meeting, Oct 6–9, 2010; Austin Convention Center, Austin, TX, 2010.

68. S. Basati, M. LaRiviere, R. Penn, and A. Linninger. An Intracranial Sensor to Monitor Ventricular Enlargement. Poster Presentation. Track: Devices: Nano to Micro. BMES 2010 Annual Fall Meeting, Oct 6–9, 2010, Austin Convention Center, Austin, TX, 2010.

69. Y. Rawash, O. Ivanchenko, N. Sindhwani, and A. Linninger, Computational Model for Predicting Drug Distribution in the Human Brain Using DTI. Poster Presentation. Track: Biomedical Imaging and Optics. BMES 2010 Annual Fall Meeting, October 6–9, 2010, Austin Convention Center, Austin, TX, 2010.

70. O. Ivanchenko, E. Lueshen, N. Sindhwani, Y. Rawash and A. Linninger. Design of Backflow-Free Catheters Based on Micro-fluid Dynamics. Poster Presentation. Track: Systems Biology, Bioinformatics and Computational Biology. BMES 2010 Annual Fall Meeting, Oct 6–9, 2010, Austin Convention Center, Austin, TX, 2010.

71. T. Harris Jr., Y. Hsu, B. Sweetman, M. Hettiarachchi, R. Penn, and A. Linninger. Quantifying the Effect of Pulsatile Fluid Flow on Drug Distribution in the Spinal Canal. Poster Presentation. Track: Systems Biology, Bioinformatics and Computational Biology. BMES 2010, Annual Fall Meeting, Oct 6–9, 2010, Austin Convention Center, Austin, TX, 2010.

72. Y. Hsu, T. Harris Jr., S. Basati, and A. A. Linninger. "Quantifying the Effect of Pulsatile Fluid Flow on Drug Distribution in the Spinal Canal". Oral Presentation. Track: Student Paper Competition. 47th Annual Technical Meeting of Society of Engineering Science, Oct 3-6, 2010; Iowa State University, Ames, IA, 2010.

73. S. Kim and A. Linninger. Automatic and Rigorous Flowsheet Design of Energy Efficient Separation Process. Poster Presentation. AIChE Midwest Regional Meeting, Sep. 30-Oct. 1, 2010, Illinois Institute of Technology, Chicago, IL, 2010

74. C. Hall, E. Lueshen, A. Mošat' and A. Linninger. Parameter Estimation of Drug Distribution in Physiologically-Based Pharmacokinetic Modeling: A Case Study on Cyclosporin-A. Poster Presentation. 2010 AIChE Midwest Regional Conference, Sep 30, 2010; Illinois Institute of Technology, Chicago, IL, 2010.

75. T. Harris, Y. Hsu, M. Hettiarachchi, R. Penn, and A. Linninger. Quantifying the Effect of Pulsatile Fluid Flow on Drug Distribution in the Spinal Canal. Poster Presentation. 2010 AIChE Midwest Regional Conference, Sep 30, 2010; Illinois Institute of Technology, Chicago, IL, 2010.

76. A. Linninger, Integrated Design and Control under Uncertainty – application to plant-wide scale process, Oral Presentation. 2010 AIChE Midwest Regional Conference, Oct 1, 2010; Illinois Institute of Technology, Chicago, IL, 2010.

77. G. Ruiz, S. Kim, D. Beneke, and A. Linninger. Robust Thermodynamically-guided Algorithms for Synthesis of Energy Efficient Separation Networks, 20th European Symposium on Computer Aided Process Engineering, ESCAPE20, June 6-9, 2010, Naples, Italy, 2010.

78. D. Li, O. Ivanchenko, N. Sindhwani, E. Lueshen, and A. Linninger. Optimal Catheter Placement for Chemotherapy, 20th European Symposium on Computer Aided Process Engineering, ESCAPE20, June 6-9, 2010, Naples, Italy, 2010.

79. S. B. Kim and A. Linninger. Integration of Design and Control for a large scale flowsheet, 20th European Symposium on Computer Aided Process Engineering, ESCAPE20, June 6-9, 2010, Naples, Italy, 2010.

80. S. Basati, M. LaRiviere, T. Harris, and A. Linninger. Development of Treatment Options for Hydrocephalic Patients. Poster 14. *UIC Student Research Forum*, April 20, 2010, University of Illinois at Chicago, Chicago, IL, 2010

81. B. Sweetman and A. Linninger. Experimental measurements and computational prediction of cerebrospinal fluid flow in the human brain. Poster 185. *UIC Student Research Forum*, April 20, 2010, University of Illinois at Chicago, Chicago, 2010.

82. S. Kim and A. Linninger. Design and Synthesis of Complex Distillation Network. Poster 92, *UIC Student Research Forum*, April 20, 2010, University of Illinois at Chicago, Chicago, 2010.

83. A. Linninger, G. Ruiz, and T. Mahalingam, Research Experience for Undergraduates: Novel Processes and Materials in Bioengineering and Biomedical Engineering, *NSF Engineering Education Awardees Conference*, Poster 244, Jan 31 – Feb 2, 2010, Reston, Virginia, 2010.

84. A. Linninger, G. Ruiz, and T. Mahalingam. Chicago Science Teacher Research Program: Synergy between Teachers, Gifted High School Students and REU, *NSF Engineering Education Awardees Conference*, Poster 246, Jan 31 – Feb 2, 2010, Reston, Virginia, 2010.

85. A. Lucia, G. Passa, C. Hassan, G. Ruiz and A. Linninger. A Global Terrain Approach to Distillation Design Feasibility, Paper 380a, *AIChE Annual Meeting*, Nashville, TN, Nov. 8-13, 2009.

86. S. Kim, G. Ruiz and A. Linninger. Global Feasibility Test for Complex Column Design, Paper 335o, *AIChE Annual Meeting*, Nashville, TN, Nov. 8-13, 2009.

87. J. Moon, S. Kim, G. Ruiz and A. Linninger. Advanced Hybrid Sequential Niche Algorithm for Finding Multiple Solutions in Global Optimization, Paper 486k, *AIChE Annual Meeting*, Nashville, TN, Nov. 8-13, 2009.

88. A. Linninger. Multiscale Modeling and Solution Multiplicity in Catalytic Reactions, 5th Sino-US Conference of Chemical Engineering, Beijing, China, October 11-18, 2009.

89. N. Sindhwani, O. Ivanchenko, and A. Linninger. Displacement and Stress Visualization in Porous Media during Convection Enhanced Drug Delivery, BMES 2009 Annual Fall Meeting, Pittsburgh, PA, October 8-10, 2009.

90. S. Basati, B. Sweetman, T. Harris, and A. Linninger. Optimal Sensor Design with Patient Specific Modeling, BMES 2009 Annual Fall Meeting, Pittsburgh, PA, October 8-10, 2009.

91. A. Linninger, S. Kim, A. Lucia and G. Ruiz. A Global Optimization Approach to Distillation Design Feasibility, *20th International Symposium of Mathematical Programming (ISMP),* Chicago, Illinois, USA August 23–28, 2009.

92. J. Moon and A. Linninger. A Hybrid Sequential Niche Algorithm for Multimodal Optimization Problems, *20th International Symposium of Mathematical Programming (ISMP),* Chicago, Illinois, USA, August 23–28, 2009.

93. J. Moon, S. Kim, G. Ruiz and A. Linninger. Embedded Control for Optimizing Flexible Dynamic Process Performance, *Proc. 10th International Symposium on Process Systems Engineering, PSE'09,* Salvador-Bahia-Brazil, August 16–20, 2009.

94. G. Ruiz, S. Kim, J. Moon and A. Linninger. Hybrid Algorithm for Design and Optimization of Complex Separation Networks, *Proc. 10th International Symposium on Process Systems Engineering, PSE'09,* Salvador-Bahia-Brazil, August 16–20, 2009.

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227. A. Linninger. A Corporate-wide Initiative for Integrated Computer-aided Process Engineering, *FOCAPO '98 Conference,* Snowbird, Utah, July 5-10, 1998.

228. A. Linninger and G. Stephanopoulos. Computer-Aided Pharmaceutical Process Development Using a Natural Design Language, *Proc. Of the Fourteenth Meeting of Cybernetics and Systems Research (EMCSR 98),* Vienna, Austria, April 14-17, 1998.

229. A. Linninger, E. Stephanopoulos, S. Ali, E. Salomone, J. Aumond and G. Stephanopoulos. Batch Design-Kit - A Comprehensive Computer-aided Design Framework for Batch Process Development with Ecological Considerations, Paper 146h, *1996 AIChE Annual Meeting,* Chicago, IL, Nov., 1996.

230. A. Linninger, S. A. Ali and G. Stephanopoulos. Knowledge-based validation and waste management of batch pharmaceutical process designs, *Symposium on Computer Aided Process Engineering-6 (ESCAPE),* Rhodes, Greece, May 26-29, 1996.

231. A. Linninger, M. Hofer, H. Krendl, H. Druckenthaner and H. P. Jörgl. M-PROJECT - Organizing problem representation and modeling of steady state and dynamic processes, *Symposium on Computer Aided Process Engineering-6 (ESCAPE),* Rhodes, Greece, May 26-29, 1996.

232. A. Linninger, E. Salomone, S. A. Ali, E. Stephanopoulos and G. Stephanopoulos. Pollution Prevention for Production Systems of Energetic Materials, *Conference for Life-Cycles of Energetic Materials,* Williamsburg, VI, Oct. 6-9, 1999.

233. A. Linninger and G. Stephanopoulos. Computer-Aided Waste Management of Pharmaceutical Wastes, Paper 23a, *AIChE Meeting,* New Orleans, LA, February 25-29, 1996.

234. A. Linninger and G. Stephanopoulos. Modern Waste Management Using a Technology Assessment Expert System, Paper 26a, *AIChE Meeting,* Boston, June 30 - August 2, 1995.

235. A. Linninger. Technology Assessment of Metallurgical Processes, *VAI Symposium on Technology Assessment,* Linz, Austria, Oct. 9-10, 1995.

236. A. Linninger, S. A. Ali and G. Stephanopoulos. Assessment of Pharmaceutical Processes, *ERRC Meeting,* MIT, MA, Nov. 3, 1995.

237. A. Linninger and G. Stephanopoulos. Life-Cycle Design (LCD) - Reengineering the Process Design Procedure, *88th Annual Meeting Air & Waste Management Association,* San Antonio, TX, June 18-23, 1995.

238. A. Linninger, S. A. Ali, E. Stephanopoulos, C. Han and G. Stephanopoulos. Generation and Assessment of Batch Processes with Ecological Considerations, *Symposium on Computer Aided Process Engineering-5 (ESCAPE),* Bled, Slovenia, June 11-14, 1995.

239. A. Linninger. Gas Reactions in the EAF Process, *3rd DynEAF User Workshop,* Linz, Austria, Jan. 16, 1995.

240. A. Linninger, C. Han, S. A. Ali, E. Stephanopoulos and G. Stephanopoulos. Concept of Minimum Avoidable Pollution (MAP) in the Synthesis and Evaluation of Batch Pharmaceutical Processes, Paper 40a, *1994 Annual AIChE Meeting*, San Francisco, CA, Nov. 13-18, 1994.

241. G. Stephanopoulos and A. Linninger. Batch Design-Kit - The Simulator_Evaluator, *ERRC Meeting, Penn State University,* State College, PA, 1994.

242. A. Linninger. Modeling the Corex Process, *Presented at the 1st Corex Seminar,* Linz, Austria, August, 1994.

243. A. Linninger. Reaction Kinetics in Liquid Metals, *2nd DynEAF User Workshop,* Linz, Austria, April 12-15, 1994.

244. A. Linninger, M. Hofer, A. Patuzzi. DynEAF - A dynamic modeling tool for integrated electric steelmaking, *AISE Spring Convention,* Memphis, TN, April 26-27, 1994.

245. G. Stephanopoulos and A. Linninger. Batch Design Kit - An update, *ERRC Steering Group Meeting,* Massachusetts Institute of Technology, July 19, 1994.

246. G. Stephanopoulos and A. Linninger. The Batch Design-Kit, *Seminar at the Emission Reduction Research Center (ERRC),* New Jersey Institute of Technology, Newark, NY, 1994.

247. A. Linninger and G. Stephanopoulos. Process Synthesis, *Presented at Workshop for User Requirements for Life-Cycle Assessment (LCA) Models,* Washington, DC, Oct. 6, 1994.

248. A. Linninger. M-Project - A material-based approach for the solution of industrial design processes, *Conference for Mathematical Modeling and Computer Simulation of Industrial Processes,* FAZAT-Steyr, Steyr, Austria, December 16-17, 1993.

249. A. Linninger. Coal Gasification using the COREX Process, *Poster at the ACHEMA 1991,* Frankfurt am Main, Germany, 1991.

250. A. Linninger. Economics of Environmental Technology at the example of Gas Cleaning Systems, *Poster at the Envirotech,* Vienna, Austria, 1991.

II. TEACHING EXPERIENCE

A. Supervision of Graduate Students:

PhD students
1. Grant Hartung, PhD C., "Receptor kinetics in the synaptic cleft", 2015-date.
2. Mahsa Ghaffari, PhD C., "Traumatic Brain Injury", 2013-date.
3. Kevin Tangen, PhD C., "Neurohydrodynamics and Cerebral Hemodynamics", 2012-date.
4. Indu Venugopal, PhD C., "Synthesis and electromagnetic-guidance of nano-particles for the treatment of the central nervous systems", 2012-date.
5. Chih-Yang Hsu, PhD C., "Imaging of Cerebral Blood Flow in the microvasculature", 2011-date.
6. Ian Gould, PhD C., "Transport Processes in Hydrocephalus", 2010-date.
7. Eric Lueshen, PhD C., "Drug Delivery to the Central Nervous System", 2009-2015.
8. Seonbyeong Kim, PhD C., "Separation Synthesis", Korean National Laboratory, 2008-2013.

9. Sukhi Basati, PhD, "Modeling, Monitoring and Control of Hydrocephalus", 2007-2011, Chief Technical Officer, System Science Incorporation, Chicago, IL.
10. Brian Sweetman, PhD, "Intracranial Dynamics", 2007-2011. Research Scientist, CD-Adapco, Houston, TX.
11. Jeonghwa Moon, PhD C, "Global optimization with grid computing techniques", 2011, Research Scientist, Samsung.
12. Bharath Somayaji, PhD 2008, "Drug Transport Mechanism in the Human Brain", Research Scientist, CFD Research Corporation.
13. Kedar Kulkarni, PhD 2007, "Mathematical Modeling, Problem Inversion and Design of Distributed Chemical and Biological Systems", Research Engineer, Air Liquide.
14. Andres Malcolm, PhD 2006, "Clean Manufacturing of Batch Processes under Uncertainty", Research Scientist, Cargill.
15. Weiyong Tang, PhD, 2005. Co-advised with K. Brezinsky (principal advisor) on Kinetic Inversion Problems in High-Pressure Kinetics, 2005.
16. Aninda Chakraborty, PhD 2002 "Plant-wide Synthesis of Optimal Waste Treatment Policies Under Uncertainty", Senior Lecturer, University of Cape Town.

Master students
1. Narsi Narasimhan, MS C, "Spinal tumor treatment design", 2015-date.
2. Jacek Lechowicz, MS C, "Aquaporin channels in the human brain", 2014-date.
3. Abhey Sane, MS C, "An anti-clogging catheter for hydrocephalus", 2014-date.
4. Ying Hsu, MS, "Intrathecal Delivery of Gene Silencing Treatments", Genetics Ohio State University, 2010-2012.
5. Nikhil Sindhwani, MS, "Optimal Delivery of Macromolecules to the Brain", 2008-2010, Materialize Corp, Belgium.
6. Madhu Harihara Iyer, MS 2009, "Image-guided Invasive Drug Delivery to the Brain", Indus Biotech, India.
7. Bhaumik K. Parikh, MS 2007, "Emission Trading", Aero Thermal Engineer, Pratt & Whitney.
8. Brian Sweetman, MS 2007 "Quantification of Intracranial Dynamics under Normal and Hydrocephalic Conditions".
9. Monil Shah, MS 2006, "Image-driven Reconstruction and Transport in the Human Brain", MEVIS Medical Solutions, Pewaukee, WI.
10. Samarjit Singh, MS 2006, "Control of Biological Processes", Air Liquide.
11. Romeo Ibrahim, MS 2005, "Computational Approaches to Multiphase Flow", Abbott Laboratories.
12. Chandra Singavarapu, MS 2002, "Computer-Aided Synthesis of Non-ideal Separation Processes".
13. Shantanu Chowdhry, MS 2002, "Symbolic Numerical Analysis and Solution of Differential Algebraic Systems in Chemical Process Models", AspenTech.
14. Vishal Bahl, MS 2002. "Modeling of Continuous Discrete Systems", AspenTech.
15. Michael Hofer, MS 1993. "Object-oriented dynamic simulation of the EAF process". (with H.P. Joergl, TU-Vienna).
16. Rudolf Lutz, MS 1990. "Systematic mathematical modeling of reaction kinetics using polynomial collocation". (with A. Schmidt, TU-Vienna).

B. Postdocs and Visiting Scientists:

1. Guren Xu, UIC, Software Engineer, 2016-present.
2. Narsia Habib, UIC, Lab Chemist, 2016-present.
3. Ben Schneller, UIC, Computer and Imaging Engineer, 2015-2016.
4. Sebastian Pernal, UIC, Lab Chemist, 2014-2015.
5. Nicolas Gascuel, Visiting Scientist, 2016
6. Thomas Preden, Visiting Scientist, 2016
7. Alexandra Duproz, Visiting Scientist, 2015-2016
8. Roxane Leval, Visiting Scientist, 2015
9. Yves-Marie Salaun, Visiting Scientist, 2015
10. Madhawa Hettiarachchi, UIC, Postdoc, 2010-2011.
11. Andrej Mosat, ETH Zuerich, Postdoc, 2010-2011.
12. Olexsandr Ivanchenko, University of Alabama, Postdoc, 2008-2010.
13. Daniel Beneke, University of the Witwatersrand, Johannesburg, South Africa, Visiting scientist 2009-2010.
14. Gerardo Ruiz, University of Puerto Rico, Postdoc, 2008-2010.
15. Dongning Li, University of Illinois at Urbana-Champaign, Postdoc, 2009.
16. Libin Zhang, Tsinghua University, PRC, Postdoc, 2002-2006. Research Assistant Professor, AspenTech, 2006-2008.
17. Benyamin Grosman, Technion, Israel, Postdoc, 2008.
18. Argyris Politis, Athens National University, Greece, Postdoc, 2007-2008.
19. Michalis Xenos, University of Patras, Postdoc, 2003-2007, Assistant Professor of Mathematics, Ioannina University, Greece..
20. Mark Peters, University of the Witwatersrand, Johannesburg, South Africa, Visiting scientist 2006-2007.
21. Xuedong Zhou, Write State University, Postdoc, 2005.
22. Aninda Chakraborty, Postdoc, Senior Lecturer University of Cape Town, 2003-2004.
23. Gan Yongseng, Shanghai Institute of Petroleum, Visiting scientist, 2003-2004.
24. Cristian Tsakiris, University of Bukarest, Postdoc, 2002-2004.
25. Hanns Gregor, University of Hannover, Visiting scientist 1998-2000, 2003, Spring 2004.
26. Erik Bek-Peterson, University of Denmark, Visiting scientist, June-August 2000.
27. Robert Stockenreitner, Visiting scientist, TU-Vienna, 1992.

C. Undergraduate Research and Students supported[*]:

1. Jon Hohol, "Visualization of the Cerebral Vasculature of the Rat Cortex Using Confocal Microscopy", 2013
2. Natasha Relwani, "The Hierarchal Vascular Architecture: A Study of the Rat Cerebral Cortex to Validate Human Cerebral Simulations", 2013
3. Sebastian Pernal, "Synthesis and Characterization of Gold Coated Magnetite Nanoparticles and Quantum Dots: Research into Spasticity and Probable Treatments", 2012
4. Sebastian Pernal, "Characterization Gold Coated Magnetite Nanoparticles and Quantum Dots, and Doxorubicin-Gellan Gum Coated Nanoparticles", 2013
5. Sebastian Pernal, "Gold-Coated Magnetite Nanoparticles and Quantum Dots as a Multifunctional Drug Vehicle", 2013
6. Vineetha Kaitharath, "Different Techniques to Treat Spasticity", 2013

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[*] NSF REU Site Support and NSF REU Supplements with A. Linninger as advisor

7. Soni, T., "Implanted-Assisted Magnetic Targeting for Intrathecal Drug Delivery", UIC-LPPD, August 2012.
8. Chojecki, M.," Signal Analysis of Impulse Response Function", UIC-LPPD, August 2012
9. Tran, M., "Aquaporin 4 Signaling Pathway", UIC-LPPD, August 2012.
10. Constantino, N., "Visualization and Quantification of Aquaporin 4", UIC-LPPD, August 2012.
11. Nguyen, V., The Effect of spinal nerves on the distribution of drug and pressure drop in the spinal canal, 2011.
12. Stewart, J., Species transport and reaction kinetics of morphine in the spinal cord and canal with two dimensional and three dimensional computational models, 2011.
13. Jacoby, F. "Function Analysis of an Impedance Based Volume Sensor in Hydrocephalic Rat Comparison of Sensor Design Sensitivity Drift", UIC-LPPD-060811, June 2011.
14. Bhargav Desai, B. Bench-top Testing of Intracranial Ventricular Volume Sensors, May 2011.
15. Nguyen, V., Study on the effect of nerves to the pressure drop, Jan. 2011.
16. Kaewken, M., Effect of trabeculae on cerebral spinal fluid flow and drug mixing, Jan. 2011.
17. Stewart, J., Intrathecal species transport of hydrochloride morphine in the spinal canal with a 2D spinal cord model, 2010.
18. Henry, B., Digitally registering and segmenting the central nervous system for CFD simulations, Dec. 2010.
19. Hall, C., "Quantification of Animal Experiments Using Rigorous Pharmacokinetic Models", UIC-LPPD-080310g, Aug. 2010.
20. Gardner, L., "Autoregulation of Cerebral Blood Flow", UIC-LPPD-080310h, Aug. 2010.
21. Hall, C., Quantification of Animal Experiments Using Rigorous Pharmacokinetic Models, 2010.
22. Gardner, L., Autoregulation of Cerebral Blood Flow, 2010.
23. Sullivan, M., Design of Biofuel Distillation using Complex Column Networks", 2010.
24. Vaicaitis, N., Computational Modeling of Cerebral Vasculature, 2010.
25. Esko, E., Animal Validation of a Volume Based Sensor to Monitor Hydrocephalus, 2010.
26. Gangopadhyay, P., "Computer Assisted Modeling of Convection Enhanced Drug Delivery to the Brain, 2010.
27. Hsu, Y., Investigating the Accelerated Species Transport by the Pulsatile Fluid Flow in the Spinal Canal with a Two Dimensional Computational Model, 2010.
28. Harris, T., Development of an Experimental Model for Intrathecal Drug Delivery to Quantify Cerebral Spinal Fluid's Pulsatile Influence, 2010.
29. Tsiagalis, G., Elastic Properties and Hydraulic Permeability of Agarose Gel, 2010.
30. Hall, C., Physiologically-Based Pharmacokinetic Models of the Rat", 2010.
31. Shinita Thomas, Vasculature generation; website proposal for Brain Physics, 2009.
32. Lucas Alvey, Characterization of Volume Sensor for Treatment of Hydrocephalus, 2009
33. Komal Prem, Gene Therapy For The Treatment Of Gliomas, 2009
34. Shivang Adhyaru, Adaptive placement of finite elements in orthogonal collocation, 2009
35. Laura Moes, Modeling of complex column, 2009.
36. William Yantz, Global Optimization: Technique and Implementation, 2009.
37. Deepika Govind, Dynamics of column networks under uncertainty, 2009.
38. Laura Zitella, 3D fluid-structure interaction model of the human brain, 2009.
39. Timothy Harris, Fabricating a Volume and Pressure Sensor, 2009.
40. Shinita Thomas, Creation of a Three Dimensional Human Cerebral Vasculature, 2009.

41. Smit Naik, Cerebral Vasculature and Fractals, 2009.
42. George Tsiagalis, Detection of microdeformation in agarose gel model of convection enhanced delivery, 2009.
43. Tim Harris and Jacqueline Thomas, A Ventricular Volume Sensor for Monitoring and Control of Hydrocephalus, 2009.
44. Laura Zitella, 3D Model of the Human Central Nervous System, 2008-2009.
45. Rohit Yengisetty, Cerebral Vasculature Modeling, 2008.
46. Qusai Shikari, Understanding Effects of Transmural Pressures on Human Blood Vessel by Constructing Fluid Flow Models of Collapsible Tubes, 2008.
47. Komal Prem, Convection Enhanced Delivery in Agarose Gel Brain Phantoms, 2008.
48. Laura Moes, The Synthesis of Separation Networks with Complex Columns, 2008.
49. Matt Hinshelwood, Separation Systems Design Under Uncertainty, 2008.
50. Mary Yu and Megan M. Mekarski, Design an Impedance Sensor to Measure Volume Under Uncertainty, 2007.
51. Leah Dougherty, Dynamic Separation Model Under Uncertainty, 2007.
52. Robert Wojahn, The Synthesis of Separation Networks with Complex Columns, 2007.
53. Liping Yang, Prediction and Control of Blood Flow in the Human Brain Vascular Network, 2007.
54. Erum Ahmed and Rashi Bamzai, Convection-enhanced delivery into agarose gel brain phantoms, 2007.
55. Kirstin Tawse, Cerebrospinal Fluid-Tissue Interactions in the Human Brain, 2006.
56. Sukruti Ponkshe, Intracranial Blood Pressure and Brain Vasculature, 2006.
57. Robert Dawe and Terri Erickson, Convection-enchanced delivery into agarose gel brain tissue phantoms, 2006.
58. Jamie Polan, Separation Systems Design Under Uncertainty, 2006.
59. Megan M. Mekarski, Bio-Transfer and Metabolism in the Distributed System Under Uncertainty, 2006.
60. Celia Xue, Catalytic Pellet Reactor Design under Uncertainty, 2005.
61. Michael Shade, Polymerization Reactor Control under Uncertainty, 2005.
62. Robert Dawe and
63. Christopher Drake, Monitoring and control of brain ventricular volume, 2005.
64. Melanie Rondot, VOC Reduction by Dynamic Condenser Design, 2004.
65. Jacob Hunter, Design of Solvent Recovery Systems Under Uncertainty, 2004.
66. Sarah Inwood, Computational Fluid Dynamics for Transport Processes in the Human Body, 2004.
67. Sean Anderson, Modeling Changes in Brain Pressures, Volumes, and Cerebral Capillary Fluid Exchange: Hydrocephalus, 2004.
68. Joel Stanfield, Developing a Volume Sensor for Use in the Ventricular System of the Brain, 2004.
69. Walter Roeder, Patricia Ilia, Melissa Leaf, Daniel Emerson, Designing a Smart Condenser for VOC Control, Engineering EXPO - College of Engineering Senior Design Student Competition, Advisor: Dr. Linninger, (unsupported), 2004.
70. Peter Roycewicz, A Volume Sensor for treatment of Hydrocephalus, 2004.
71. Zachary Danziger, Modeling Cerebral Blood Flow and Pressure in Elastic Tubes Using A Finite Element Approach: Its Relation to Symptoms in Hydrocephalus, 2003.
72. Peter Roycewicz, Modeling of Hydrocephalus in the Human Brain, 2003.

73. Virag Dandekar, Modeling of Fermentation Processes in Biological Reactors, 2003
74. Nathaniel Mark, Robust and Reliable Design Method of a Distillation Column, 2003.
75. Alexander Munoz, Hydrodynamics of Cerebrospinal Fluid Flow in the Human Brain, 2002.
76. William Waechter, Reaction Network Synthesis for Fuel Cells Using Gibbs Free Energy Minimization, 2002.
77. Orlando Rodriguez, Fuel Cells – A thermodynamic feasibility Study, 2002.
78. Arthur Wojcicki, Pollution Prevention in Pharmaceutical Batch Manufacturing, 2002.
79. Alexander Munoz, Quantitative Models of Cerebrospinal Fluid Flow, 2002.
80. Jesse Trucko, Column modeling and simulation via symbolic mathematical methods, 1999.
81. Mathias Anderson, Dynamic Optimization - A Case Study, SPREE Student exchange program with Royal Institute of Sweden, July, 1999.
82. Mathias Berg, Joint Confidence Regions and Confidence Intervals, SPREE Student exchange program with Royal Institute of Sweden, July, 1999.
83. David Lubertozzi, Solutions Thermodynamics, Summer Internship, June – July, 1999.
84. Harsh Walia, Visualization of Thermodynamic Properties, 1999.
85. Richardson, Christina, Soper, Susan, and Petak, Robert, Conceptual Process Design using Symbolic and Numerical Computing Techniques unsupported, UIC, Spring 1998.
86. Chinue Bailey, Property-driven Waste Treatment Selection, sponsored by the Alliance for Minority Participants in Sciences; UIC, Spring 1998.
87. Andreas Werner, Fluid dynamics of free jets, TU-Vienna, 1992.
88. Robert Kallinger, Stationary elutriation and attrition in the Corex cold model, TU-Vienna 1990.
89. Johann Glodovatz, Planning and construction of a cold model for the investigation of elutriation and attrition of the Corex process, TU-Vienna, 1990.
90. Roman Sieberer, Investigation of the influence of feed facilities on bed surface and elutriation, TU-Vienna, 1990.
91. Rudolf Lutz, A cold experimental reactor for analyzing fluidized-bed elutriation, TU-Vienna, 1990.

D. Highschool Research Students Supervised
J. Kwak. Web-based Exploration of Critical Properties-An Interactive Tutorial, Illinois Mathematics and Science Academy (IMSA) Mentorship Program, 2000. T. Wu and V. Abraham, Two-dimensional computer modeling of drug delivery in the rat brain, IMSA Mentorship Program 2005. M. Abraham and Y. Gao, Computational Model of Hydrocephalic Brain, IMSA Mentorship Program 2005. Y. Gao. Finite Volumes in One and Two Dimensions, IMSA Mentorship Program 2006. S. Song and J. Ou. The Practicality of Dry-Laboratory Methodology and Geometric Modeling with a Mouse Brain in the Development of Drug Treatments for Neurodegenerative Diseases, 2008. Hu, J., 3-dimensional brain animation, 2009. Hu, J. Animation editing and documentation, 2009. Yi, C., Virtual Representation of the Human Central Nervous System, 2010.

E. Research by K-12 Math and Science Teachers Supervised (NSF RET Support)
C. Riff. Computational Fluid Dynamic Modeling, 2004. J. Mason. Design of a CSF Volume Sensor, 2005. S. Baker. Brain Vasculature and Fractal Structures, 2006. A. Theen. The Role of Nitric Oxide in Autoregulation, 2006. T. Jones . Image reconstruction and drug delivery to the brain, 2007. S. Ford. Studies of flow physics in the human brain, 2007. T. Nisbet, Peak Oil, 2008. M. Ranft. Image Reconstruction of Brain Structures, 2008. S. Baker. Convection-Enhanced Drug

Delivery in Agarose Gel and Brain Tissue, 2008. V. Durrah. Biofuels, 2009. K. Quark, System Blood-flow in rhesus monkey, 2010.

F. Courses Taught

Bioengineering:

Biological Systems Analysis, BioE310, Fall 2007-present. (required undergraduate mathematics core course)

Advanced Biological Systems Analysis, BioE 532, Spring 2015, 2016. (required graduate mathematics core course)

Metabolic Engineering, BioE465, Fall 2005, Spring 2008, Spring 2009.

Advanced Biotransport: Drug Delivery to the Central Nervous System: BioE 594, Spring 2011, Spring 2013.

Graduate research and laboratory course option for teachers participating in the Chicago Science Teacher Research (CSTR) Program, BioE594, Summer 2006-2015.

Graduate Seminar in Bioengineering: BioE 595 Spring 2006. Course in scientific writing

Research Seminar in Bioengineering, 2005 - present.

Chemical Engineering:

Transport III (Separation Processes), Che313, Spring 2004.

Process Control, Che341: Spring 1999, Spring 2000, Spring 2001, Spring 2002.

Undergraduate Research in Chemical Engineering, Che 392: AY 1999 - 2010.

Senior Design I, Che396: Fall 1998, Fall 1999, Fall 2000.

Senior Design II, Che397: Spring 1998.

Numerical Methods in Chemical Engineering, Che431, Spring 2004, Fall 2002.

Computational Methods in Chemical Engineering: Che441, Spring 1999, Fall 2000.

Green Chemistry, Chem494: Spring 2000 - web-based course, taught one segment together with Prof. Pat Shapley, UIUC and 8 other faculty from UIC, UIUC, and UIS.

Separation Processes, Che510: Spring 2000, Spring 2002.

Seminar in Chemical Engineering, Che595, 1999 - 2010.

IV. SERVICE (PUBLIC, PROFESSIONAL/DISCIPLINARY, AND UNIVERSITY)

A. Organization of Conferences and Workshops:

Elected Director of the AICHE CAST Division, 2013-present

Elected Director of the AICHE Environmental Division, 2008-2012

Organizer Foundation Conference of Computer-Aided Process Design, FOCAPD, 2007-2009

Elected Program Coordinator Area 10a Computers and Systems Division, American Institute of Chemical Engineers, 2005-2006.

Service to AICHE as Session Chair or Co-Chair in AICHE Annual National Meetings:

Salt Lake City, UT, Nov 7-12, 2010. Session 397: Design of Sustainable Processes, Session 588: Computer-Aided Process Modeling for Design I, Session 536: Computer-Aided Process Modeling for Design II.

Nashville, TN, Nov. 8-13, 2009. Session 23: Fundamentals of Environmental Sustainability

Philadelphia, PA, Nov 16-21, 2008. Session 458: Bio and Pharmaceutical Process Design, Session 728: Design of Sustainable Processes.

Salt Lake City, UT, Nov 4-9, 2007. Session 140: Advances in Systems and Process Design Poster Session, Session 289: Design of Biological and Pharmaceutical Systems.

San Francisco, CA, Nov 12-17, 2006. Session 689: Design of Biological Pharmaceutical and Alternative Energy Systems, Session 371: Advanced Computations for Environmental Applications I, Session 423: Advanced Computations for Environmental Applications II. Session 575: Algorithms, Applications and Best Practices in Parallel and Grid Computing. Session 303: Recent Developments in Systems and Process Design.

Chicago, IL, Oct 30-Nov 4, 2005. Session 134: Retrofit Design for Better Economic and Environmental Performance, Environmental Division.

Chicago, IL, April 19-20 2005. Session: Process Design for the Environment, Illinois Institute of Technology (IIT).

Austin, TX, Nov 7-12, 2004. Session 464: Pharmaceutical & Biopharmaceutical Separations, Food, Pharmaceutical & Bioengineering Division. Session 407: Design and Operations Under Uncertainty. Computing and Systems Division. Session 387: Advanced Computations for Environmental Applications I, Environmental Division. Session 389: Advanced Computations for Environmental Applications II, Environmental Division. Austin, TX, Nov 7-12, 2004.

San Francisco, CA, Nov 16-21, 2003. Session 431: Process Synthesis I. Session 432: Process Synthesis II. San Francisco, CA, Nov 16-21, 2003.

New Orleans, LA, March 30–April 3, 2003. Session 141: Advances in Design Software I. Session 142: Advances in Design Software II. Session 143: Advances in Design Software III–Panel Session.

Indianapolis, IN, Nov. 4-8, 2002. Session 238: Session Design for Energy and Environment.

Los Angeles, Nov 12-17, 2000. Session Process Synthesis, Los Angeles.

Dallas TX, Oct 31–Nov 5, 1999. Session: Process Synthesis.

Houston, March 14-18, 1999. Session 24: Practical Process Synthesis I, Session 18: Practical Process Synthesis II, Session 98: Process Design and Development Technologies for Liquid Wastes.

Service to Professional Organizations or Academic Conference Organization:

Member International Program Committee, 11th International Symposium on Process Systems Engineering, PSE2012, Singapore July 15-19, 2012.

Session Chair – Biomedical Applications, 11th International Symposium on Process Systems Engineering, PSE2012, Singapore July 15-19, 2012.

Member International Program Committee, European Symposium on Computer Aided Process Engineering, London, June 17-20, 2012.

Session Chair, Energy Systems Engineering V, ESCAPE-21, Chalkidiki, Greece, 2011.

Session Chair, Process Design, ESCAPE-20, Ischia, Italy, June 6-9, 2010.

Session Chair, Multi-scale Chemical Processes, 5th Sino-US Conference of Chemical Engineering, Beijing, China, October 11-18, 2009.

Session Chair, Process Design I, Intl. Symposium on Process Systems Engineering Conference, PSE 2009, August 16–20, 2009, Salvador, Brazil, 2009.

Invited workgroup member NIH Workshop on Hydrocephalus: Myths, Facts and Clear Directions, Sept. 30-Oct.1, 2005, Bethesda, MD, 2005.

Organizer, 2005-2007. Chicago Science Teacher Research Fall Conference, Dec 3, 2005, Dec. 3, 2006, Dec. 15, 2007. Workshop on Teaching Modules Teaching Modules with the RET Cohort.

Organizing Committee, Conference on Managing Risk in an Uncertain World, McCormick School of Engineering and Applied Sciences, Northwestern University, IL 60208, May 31, 2003.

Process Systems Engineering Conference – Chair Session: Product Development, Keystone, CO, July 16-21, 2000.

Organizer, Fourth Industrial Outreach Program in Chemical Engineering, Department of Chemical Engineering, University of Illinois at Chicago, Fall 2000.

Organizer, Third Industrial Outreach Program in Chemical Engineering, Department of Chemical Engineering, University of Illinois at Chicago, Fall 1999.

International Conference on Engineering Education, Recorder for Faculty and Student Exchange Programs Prague, Czech Republic, Aug. 1999.

MIC'99 Conference Session Chair – Session Modeling, Modeling, Identification and Control Conference IASTED 99, Innsbruck, Austria, Feb. 15-18, 1999.

Organizer, Second Industrial Outreach Program in Chemical Engineering, Department of Chemical Engineering, University of Illinois at Chicago, Fall 1998.

Organizer, First Industrial Outreach Program in Chemical Engineering, Department of Chemical Engineering, University of Illinois at Chicago, Spring 1998.

B. Journal Review

Subject Editor, Chemical Engineering Research and Design, Official Journal of the European Federation of Chemical Engineering: Part A

Editorial Advisory Board, Recent Patents on Drug Delivery and Formulation, Online Journal by Bentham Science Publishers

AICHE Journal, Annals of Biomedical Engineering, Applied Mathematics Letters, Applied Mathematics and Computation, Applied Sciences, Biomechanics and Modeling in Mechanobiology, BioMed Research International, BMC Medical Informatics and Decision Making, Brazilian Journal of Chemical Engineering, Cerebrospinal Fluid Research, Chemical Engineering Education, Chemical Engineering Research and Design, Chemical Engineering Science, Computers and Chemical Engineering, Computer Methods in Biomechanics and Biomedical Engineering, Computers in Biology and Medicine, Ecological Economics Journal, Ecological Modeling, eLife Sciences Publications, Engineering Optimization, Engineering Applications in Artificial Intelligence, IEEE Transaction of Biomedical Engineering, Industrial and Engineering Chemistry Research, International Journal of Chemical Kinetics, International Journal of Numerical Methods in Biomedical Engineering, International Journal of Refrigeration, International Society of Automation (ISA) Transactions, Journal of Biological Engineering, Journal of Biomechanical Engineering, Journal of Biological Physics, Journal of Computational and Nonlinear Dynamics, Journal of Biomedical Microdevices, Journal of Fluid Mechanics, Journal of Global Optimization, Journal of Physical Chemistry, Journal of Theoretical Biology, Journal of the Neurological Sciences, Journal of Physiology, Journal of the Royal Society Interface (UK), Journal of the Air & Waste Management Association, Journal of Visualized Experiments, Macromolecular Reaction Engineering, MapleTech Journal, Mathematical Biosciences, Mathematical and Computer Modelling, Medical and Biological Engineering and Computing, Medical Engineering and Physics, Metallurgical and Materials Transactions B, Molecular Diversity Preservation International, Neurobiology of Aging, Neurological Research, Physiological Measurement, Public Library of Science (PLoS ONE), Transactions of the Institute of Chemical Engineers.

Book and Conference Reviews: Book Reviewer for "Process Design Tools for the Environment" edited by Subhas K. Sikdar, USEPA and Mahmoud El-Halwagi, Auburn University. Invited Book Reviewer: Oxford University Press, of the Book "Process Modeling, Dynamics, Modeling and Control" by T. Oguannaike and H. Ray, 2008. Invited Technical Reviewer: Enpromer 2001, 3rd MERCOSUR Congress on Process Systems Engineering, 1st MERCOSUR Congress on Chemical Engineering, September 16-20, 2001, 3000 Santa Fe, Argentina. Aiche – Reviewer for the National Heat Transfer Conference, Albuquerque, NM, (Aiche J. and Chem. Eng. Progr.), 18th IMACS World Congress MODSIM 09.

C. University and Departmental Service:

Departmental Committees: Director of Graduate Studies, Bioengineering, 2010-2012. Associate Director of Graduate Studies, Bioengineering, 2008-2010. Associate Director of Graduate Studies, Chemical Engineering, 2001-2002. Faculty Group Chair, Biomolecular Engineering, 2007-present. Member of the Graduate Committee, 2000-2005. Chair of the Computer Committee, 2000-2001, 2001-2004. Member of the Industrial Relations Committee, 2000-2001. Member of the Undergraduate Committee, 1999-2000. Member of the Computer Committee, 1997-2004. Elected Member of the Advisory Committee, 2004-2005.

College Committees: Judge, Engineering Senior Design Student Competition, EXPO '99, EXPO'98. Faculty Coordinator, Engineering Senior Design Student Competition, EXPO '98.

University Committees: Honors College Fellow, 2010-present, Campus Research Board Review for NER, NIRT programs. University Disciplinary Committee, 1999-2002. Member of the Faculty of the IESP Steering Committee, 2003-present.

D. Public Service:

Member of the Global Village Initiative – Bringing Scientists to Middle and High School Education. Volunteer-Oak Leyden Developmental Services-Center for disabilities serving adults and children. Founding Member Young Austrians in Chicago. Board Member – Austrian-American Council.

E. Society Membership:

American Institute of Chemical Engineers (AIChE), Computer and Systems Technology Division of AIChE (CAST), Member Biomedical and Bioengineering Society (BMES), Berkeley Alumni Association, Alumnus – Technical University of Vienna