

Andrew Fiordalis, Ph.D.

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Summary

Versatile, interdisciplinary engineer with extensive mathematical modeling, simulation, and data analysis experience. Interested in applying my computational expertise in a fast-paced, solution-oriented environment that values creative thinking for complex problems. Excel in environments that require a synthesis of independent and collaborative work. Accomplished history as a process/production engineer with nearly a decade of industrial experience interacting with stakeholders at all levels from research to scale-up to production.

Education

Tufts University

Medford, Massachusetts

Ph.D., in Chemical Engineering

08/2008–02/2017

DISSERTATION: *Development of Accurate and Computation-Efficient Linearization Techniques for Modeling Absorption with Complex Chemical Reaction*

Tri-State University (currently Trine University)

Angola, Indiana

B.S., in Chemical Engineering with High Honors

08/1997–05/2001

Research

Tufts University

Medford, Massachusetts

Research Assistant

08/2008–02/2017

- Developed accurate computation-efficient linearization techniques for solving boundary-value problems simulating carbon dioxide (CO₂) capture in blended amine solutions
- Implemented algorithms based on linearization techniques to calculate CO₂ absorption/desorption rates (enhancement factors) in blended amine solutions
- Calculated CO₂ absorption/desorption rates numerically to compare and validate the accuracy of our linearization schemes
- Co-developed Design of Dynamic Experiments (DoDE) methodology for identifying near-optimal control trajectories for batch processes
- Designed DoDE experiments, simulated experimental data based on first-principles models, and generated response surface models (RSMs) for batch crystallizers, reactors, and fermenters
- Calculated near-optimal control trajectories from RSMs and compared them to optimal control profiles calculated directly from first-principles models in order to assess validity of DoDE methodology

Sunovion Pharmaceuticals

Marlborough, Massachusetts

R&D Engineering Associate

06/2010–04/2013

- Performed lab-scale batch crystallization experiments to validate DoDE-based near-optimal temperature and solvent feed trajectories

Tufts University

Medford, Massachusetts

Teaching Assistant

08/2008–05/2010

- Process Dynamics and Control
- Advanced Transport Phenomena

Professional Experience

Genzyme

Framingham, Massachusetts

Process Engineer

10/2004–07/2008

- Provided technical support for cell culture and protein purification operations
- Developed statistical analyses of historical datasets to identify production trends and specify materials
- Led protein purification process control review meetings with production, R&D, QA, and regulatory personnel
- Managed technology transfer of enzyme production process (cell culture and purification) between production sites and its subsequent validation
- Designed and executed experiments to elucidate mixing dynamics and material compatibility in purification operations
- Designed process equipment and implemented standard operating procedures for aseptic sampling
- Co-developed detailed cycle-time model for purification operations to expedite implementation of second shift production team

Aker Kvaerner Pharmaceuticals

Boston, Massachusetts

Validation Specialist

10/2003–10/2004

- Commissioned heating, ventilating, and air conditioning (HVAC) systems; Siemens building automation, security, and fire systems; and other laboratory systems during construction of Merck research facility

Pfizer

Kalamazoo, Michigan

Production Engineer

06/2001–07/2003

- Managed extraction, isolation, and purification facilities for production of bulk antibiotics in 24-hour facility
- Collaborated with R&D to minimize production cycle times, increase product yields, and maintain product quality
- Worked with R&D team to design and execute bench-scale experiments to improve crystal quality and drying characteristics
- Designed and managed installation of major capital projects
- Managed technology transfer of antibiotic process between production locations
- Implemented site-wide quality standards for aseptic material processing
- Trained site personnel on new equipment and standard operating procedures

Publications

- A. Fiordalis, J. Meldon, Concentration profile curvature for diffusion processes with simultaneous irreversible reaction, *Journal of Mathematical Chemistry* 53 (2015) 1193-1194.
- A. Fiordalis, C. Georgakis, Data-driven, using design of dynamic experiments, versus model-driven optimization of batch crystallization processes, *Journal of Process Control* 23 (2013) 179-188.
- A. Fiordalis, C. Georgakis, Design of dynamic experiments versus model-based optimization of batch crystallization processes, in: *Proceedings of the 18th World Conference of the International Federation of Automatic Control (IFAC)*, Milano, Italy (2011) 14019-14024.
- A. Fiordalis, C. Georgakis, Optimizing batch crystallization cooling profiles: The design of dynamic experiments approach, in: *Proceedings of the 9th International Symposium on Dynamics and Control of Process Systems (DYCOPS)*, Leuven, Belgium (2010) 31-36.

Special Skills/Experience

- Expertise in process modeling, simulation, and design of experiments
- Fluent in MATLAB, proficient in GAMS, and familiar with Fortran, C++, C#, Python, Javascript

Awards

- Best Presentation Award for *How can Canada set up a series of regionally integrated CO₂ capture, transport, and storage clusters and hubs*, International Energy Agency Greenhouse Gas Program Summer School, University of Regina, Saskatchewan, Canada, 2016
- AIChE Donald F. Othmer Sophomore Academic Excellence Award, Tri-State University, 1999

References available upon request