

Ryan Feeley, Ph.D., P.E.
Senior Engineer

Professional Profile

Dr. Ryan Feeley is a Senior Engineer in Exponent's Mechanical Engineering practice. His areas of expertise include automatic control systems, machine design, optimization, and computer modeling and simulation. He is experienced in the integration of sensors and controls with mechanical systems, and is skilled in the design of control systems and the study of their safety and performance. His background also includes research in computational science and the development of simulation models for systems biology.

Dr. Feeley has applied his expertise to numerous design and failure analysis problems while at Exponent. He has reviewed and interrogated programmable logic controller (PLC) logic and data in applications ranging from construction cranes, food and beverage processing equipment, and mining and metals. Dr. Feeley has used his knowledge of modern instrumentation, data acquisition hardware, and control strategies to design various test apparatuses to assist in the development and/or failure analysis of both consumer products and medical devices. He has developed data processing and automatic target recognition algorithms for a ground penetrating radar system and spent 9 months deployed to Afghanistan with the US Army Rapid Equipping Force, where he provided engineering support and training to assist counter IED efforts. Dr. Feeley is also a member of Exponent's Software Taskforce, where he focuses on algorithm development and software reliability. He has experience in the verification and validation of software as required by the FDA's Quality System Regulation.

Prior to joining Exponent, Dr. Feeley attended the University of California, Berkeley, where he conducted research on computational science and simulation. Dr. Feeley's research focused on the validation of complex simulation models and the use of such models to make reliable scientific predictions. This work involved a combination of parameter estimation, uncertainty quantification, optimization, and statistics, and was applied to diverse areas including combustion kinetics, atmospheric chemistry, and systems biology.

During his undergraduate studies, Dr. Feeley developed a control system for a rotating TIG welding machine and evaluated sensors for obtaining feedback information on the weld bead. He participated in the tuning and preproduction testing of a digital valve controller, and designed the hardware and baseline control system for an unmanned unicycle that was constructed to test and evaluate nonlinear control algorithms.

Dr. Feeley also has experience using machine tools and other shop equipment. He participated in the design and fabrication of a solar car at Kansas State University that placed 5th in the 2001 American Solar Challenge. He has rebuilt motorcycle and automotive engines and transmissions and has designed and fabricated numerous mechanical devices. Additionally he has operated heavy construction equipment.

Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, University of California, Berkeley, 2008
B.S., Mechanical Engineering, Kansas State University, 2002

Licenses and Certifications

Registered Professional Engineer, California, #35402

Publications

Feeley R. Fighting the curse of dimensionality: A method for uncertainty propagation and validation of complex simulation models. Ph.D. Dissertation, University of California, Berkeley, 2008.

Feeley R, Frenklach M, Onsum M, Russi T, Arkin A, Packard A. Model discrimination using Data Collaboration. *The Journal of Physical Chemistry A* 2006; 110:6803–6813.

Feeley R, Seiler P, Packard A, Frenklach M. Consistency of a reaction dataset. *Journal of Physical Chemistry A* 2004; 108:9573–9583.

Russi T, Packard A, Feeley R, Frenklach M. Sensitivity analysis of uncertainty in model prediction. *Journal of Physical Chemistry* 2008; 112:2579–2588.

Smith GP, Frenklach M, Feeley R, Packard A, Seiler P. A system analysis approach for atmospheric observations and models: the mesospheric HO_x dilemma. *Journal of Geophysical Research* 2006; 111:D23301.1–D23301.8.

Seiler P, Frenklach M, Packard A, Feeley R. Numerical approaches for collaborative data processing. *Optimization and Engineering* 2006; 7:459–478.

Jarvis-Wloszek Z, Feeley R, Tan W, Sun K, Packard A. Some controls applications of sum of squares programming. *Proceedings, 42nd IEEE Conf Dec and Contl* 2003; 5:4676–4681.

Frenklach M, Packard A, Seiler P, Feeley R. Collaborative data processing in developing predictive models of complex reaction systems. *International Journal of Chemical Kinetics* 2004; 36:57–66.

Book Chapters

Frenklach M, Packard A, Feeley R. Optimization of reaction models with solution mapping. In: *Comprehensive Chemical Kinetics*. Elsevier, Volume 42, 2007.

Jarvis-Wloszek Z, Feeley R, Tan W, Sun K, Packard A. Control applications of sum of squares programming. In: *Positive Polynomials in Control*. Springer-Verlag, 2005.

Selected Presentations

Feeley R, Russi T. Small models and short proofs (the wrong way). Presented at Connections II: Fundamentals of Network Science, Pasadena, CA, August 18, 2006.

Professional Affiliations

- American Society of Mechanical Engineers
- Tau Beta Pi, Engineering Honor Society