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Nonlinear Control for Real-time, Feedback-driven Single Particle Tracking



**Sean
Andersson**

*Professor
Interim MechE
Department Chair
Boston University*

ABSTRACT:

Abstract: Real-Time, Feedback-Driven Single Particle Tracking (RT-FD-SPT) is a class of techniques for following individual particles as they move inside living cells, revealing details about the biological processes occurring inside this complex and dynamic environment. In this talk we describe our recent advances in the use of nonlinear control for RT-FD-SPT and the use of Fisher information to guide the design of these controllers to ensure the most informative measurements are made during the tracking process. We will also discuss the tradeoffs that must be made between designing for good estimation (through informative measurements) and designing for tracking (to ensure long trajectories are probed).

BIOGRAPHY:

Prof. Sean B. Andersson received his B.S. in Applied and Engineering Physics from Cornell University (1994), his M.S. in Mechanical Engineering from Stanford University (1995) and his Ph.D. in Electrical and Computer Engineering from the University of Maryland, College Park (2003). He worked at AlliedSignal Aerospace and then Aerovironment before pursuing his Ph.D. After completing that degree, he was a Lecturer in Applied Mathematics before joining Boston University in 2003 where he is currently Professor and Interim Chair of Mechanical Engineering and Professor of Systems Engineering. His research interests are in systems and control theory with applications in biophysics and robotics.