

Sean B. Andersson

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Education and training:

2005 Postdoctoral researcher, Division of Engineering and Applied Sciences, Harvard University
2003 Ph.D., Electrical and Computer Engineering, University of Maryland, College Park
1995 M.S., Mechanical Engineering, Stanford University
1994 B.S., Applied and Engineering Physics, Cornell University

Positions:

2006- Assistant Professor, Dept. of Mechanical Engineering, Boston University
2003-2005 Lecturer in Applied Mathematics, Harvard University
1999-2003 Graduate Research Assistant, University of Maryland, College Park, Maryland
1998-1999 Graduate Teaching Assistant, University of Maryland, College Park, Maryland
1996-1998 Senior Controls Engineer, Aerovironment, Inc., Monrovia, California
1995-1996 Project Engineer, AlliedSignal Aerospace, Torrance, California

Honors:

2006 Best paper in session, American Controls Conference
2002-2003 Achievement Awards for College Scientists (ARCS) Fellowship
2001-2002 Graduate Committee Fellow, School of Engineering, University of Maryland
1994 Graduation with distinction, Cornell University
1992 Tau Beta Pi Engineering Honors Society

Teaching:

ME 704 *Adaptive Control* (Boston University) Spring 2009
AM764 *Optimal and Robust Control* (Boston University) Spring 2008
AM404 *Dynamics and Control of Mechanical Systems* (Boston University) Spring 2007
EK301 *Engineering Mechanics I* (Boston University) Fall 2006-2008, Spring 2008
AM400 *Engineering Mathematics* (Boston University) Spring 2006
ES102 *Introduction to Operations Research* (Harvard University) Spring 2004-2005
ES202 *Estimation and Control of Dynamic Systems* (Harvard University) Fall 2003-2004

Publications:

Journal papers under review:

1. D. Baronov and S.B. Andersson, "Controlling a magnetic force microscope to track a magnetized nanosize particle," submitted to IEEE Transactions on Nanotechnology, 2008.

Journal papers:

1. S. B. Andersson, D. Hristu-Varsakelis, and M. Lahijanian, "Observers in language-based control," Communications in Information Systems (Brockett Legacy Special Issue), vol. 8, no. 2, pp. 85-106, 2009.

2. S.B. Andersson and T. Sun, "Linear optimal control for tracking a single fluorescent particle in a confocal microscope," *Applied Physics B: Lasers and Optics*, vol. 94, no. 3, pp. 403-409, 2009.
3. S.B. Andersson, "Localization of a fluorescent source without numerical fitting," *Optics Express*, vol. 16, no. 23, pp. 18714-18724, 2008.
4. S.B. Andersson, "Discretization of a continuous curve," *IEEE Transactions on Robotics and Automation*, vol. 24, no. 4, pp. 456-461, 2008.
5. S.B. Andersson, "Curve tracking for rapid imaging in AFM," *IEEE Transactions on Nanobioscience*, vol. 6, no. 4, pp. 354-361, 2007.
6. S.B. Andersson and D. Hristu-Varsakelis, "Symbolic feedback control for navigation," *IEEE Transactions on Automatic Control*, vol. 51, no. 6, pp. 926-937, 2006.
7. S.B. Andersson, "Tracking a single fluorescent molecule with a confocal microscope," *Applied Physics B, Lasers and Optics*, vol. 80, no. 7, pp. 809-816, 2005.
8. S.B. Andersson, "Nonadiabatic corrections to the Hannay-Berry phase," *SIAM Journal on Applied Mathematics*, vol. 66, no. 1, pp. 98-121, 2005.

Refereed conference papers:

1. Z. Shen and S.B. Andersson, "LQG-based tracking of multiple fluorescent particles in two-dimensions in a confocal microscope," *American Control Conference*, 2009, to appear.
2. P.I. Chang and S.B. Andersson, "Theoretical bounds on a non-raster scan method for tracking string-like samples," *American Control Conference*, 2009, to appear.
3. M. Lahijanian, M. Kloetzer, S. Itani, C. Belta, and S.B. Andersson, "Automatic deployment of autonomous cars in a robotic urban-like environment (RULE)," *IEEE International Conference on Robotics and Automation*, 2009, to appear.
4. D. Baronov and S.B. Andersson, "Tracking a magnetic particle using a magnetic force microscope," in *Proceedings of the IEEE Conference on Decision and Control*, pp. 5170-5175, 2008.
5. P. Chang and S.B. Andersson, "Smooth trajectories for imaging string-like samples in AFM: A preliminary study," in *Proceedings of the American Control Conference*, pp. 3207-3212, 2008.
6. D. Baronov, S.B. Andersson, and J. Baillieul, "Tracking a nanosize magnetic particle using a magnetic force microscope," in *Proceedings of the IEEE Conference on Decision and Control*, pp. 2445-2450, 2007.
7. S.B. Andersson, "Position estimation of fluorescent probes in a confocal microscope," in *Proceedings of the IEEE Conference on Decision and Control*, pp. 4950-4955, 2007.
8. T. Sun and S.B. Andersson, "Precise 3-D localization of fluorescent probes without numerical fitting," in *Proceedings of the International Conference of the IEEE Engineering in Medicine and Biology Society*, pp. 4181-4184, 2007.
9. D.Y. Abramovitch, S.B. Andersson, L.Y. Pao, and G. Schitter, "A tutorial on the dynamics, control, and mechanisms of atomic force microscopes," in *Proceedings of the American Control Conference*, pp. 3488-3502, 2007.
10. S.B. Andersson and D.Y. Abramovitch, "A survey of non-raster-scan methods," in *Proceedings of the American Control Conference*, pp. 3516-3521, 2007.
11. S.B. Andersson, "Precise localization of fluorescent probes without numerical fitting," in *Proceedings of the International Symposium on Biomedical Imaging*, pp. 252-255, 2007.
12. S.B. Andersson, "An algorithm for boundary-tracking in AFM," *Proceedings of the American Control Conference*, pp. 508-513, 2006.
13. S.B. Andersson, "Discrete approximations to continuous curves," *Proceedings of the IEEE International Conference on Robotics and Automation*, pp. 2546-2551, 2006.
14. S.B. Andersson and J. Park, "Tip-steering for fast imaging in AFM," *Proceedings of the American Control Conference*, pp. 2469-2474, 2005.
15. S.B. Andersson and D. Hristu-Varsakelis, "Language-based feedback control using Monte Carlo sensing," *Proceedings of the IEEE International Conference on Robotics and Automation*, pp. 3058-3063, 2005.

16. S.B. Andersson, "Geometric phases in dissipative systems with symmetry," NOLCOS 2004.
17. S.B. Andersson, A.A. Handzel, V. Shah, and P.S. Krishnaprasad, "Robot Phonotaxis with Dynamic Sound-source Localization," in Proceedings of the IEEE International Conference on Robotics and Automation, pp. 4833-4838, 2004.
18. S.B. Andersson and D. Hristu-Varsakelis, "Stochastic Language-Based Motion Control," 42nd IEEE Conference on Decision and Control, pp. 5879-5884, 2003.
19. A.A. Handzel, S.B. Andersson, and P.S. Krishnaprasad, "A Biomimetic Apparatus for Sound-source Localization," 42nd IEEE Conference on Decision and Control, pp. 3313-3318.
20. S.B. Andersson and P.S. Krishnaprasad, "Degenerate Gradient Flows: A Comparison Study of Convergence Rate Estimates," in Proceedings of the 41st IEEE Conference on Decision and Control, pp. 4712-4717, 2002.
21. D. Hristu-Varsakelis and S.B. Andersson, "Directed Graphs and Motion Description Languages for Robot Navigation," in Proceedings of the IEEE International Conference on Robotics and Automation, pp. 2689-2694, 2002.
22. S.B. Andersson and P.S. Krishnaprasad, "The Berry-Hannay Phase of the Equal-Sided, Spring-Jointed Four-Bar Mechanism," in Proceedings of the 40th IEEE Conference on Decision and Control, pp. 3406-3407, 2001.

Extramural research funding:

Active

2007-2008 Agilent Foundation, PI, "Non-raster methods for high-speed AFM"

2007-2010 NSF-BIO, PI, "IDBR: Simultaneous tracking of multiple particles in confocal microscopy"

Invited Talks:

1. "Imaging for in-cell surgery: studying single molecules through tracking," The Johns Hopkins University LCSSR/CISST Seminar Series, February, 2009.
2. "Studying single molecules through tracking," University of Washington Mechatronics Seminar, October, 2008.
3. "Handling complexity in the real world through symbolic control," Meeting of the Central New England Chapter of the Robotics and Automation Society, April 8, 2008.
4. "Tracking fluorescent molecules in confocal and scanning probe microscopy," Michigan State University EE Seminar Series, February, 2007.
5. "Tracking fluorescent molecules in confocal and scanning probe microscopy," Harvard University DEAS EE Seminar Series, February, 2007.
6. "Non-raster-scanning for high-speed AFM," Georgia Tech Savannah Colloquium Series, November, 2007.
7. "Robotics at Boston University," The Future of Robotics: A Briefing on Robotics Research in New England, October, 2007.
8. "Estimation and Control in Confocal Microscopy," Institute for Systems Research, University of Maryland, College Park, April, 2007.
9. "Estimation and Control in Confocal Microscopy," Mechanical Engineering Seminar Series, Worcester Polytechnic Institute, March, 2007.
10. "Estimation and Control in Confocal Microscopy," Center for Information Science and Engineering, Boston, University, March, 2007.
11. "Novel rapid tracking methods in atomic force microscopy and confocal laser scanning microscopy," Boston University, Department of Aerospace and Mechanical Engineering, May, 2005.

12. "Novel rapid tracking methods in atomic force microscopy and confocal laser scanning microscopy," The Johns Hopkins University, Department of Electrical and Computer Engineering, February 2005.
 13. "Development of techniques for rapid tracking in AFM," Harvard University, Division of Engineering and Applied Sciences, Electrical and Computer Engineering seminar series, October, 2004.
 14. "Geometric phases in sensing and control," University of Pennsylvania, Department of Mechanical Engineering and Applied Mechanics, January, 2004.
 15. "Motion control and the mathematics of sensing," Harvard University, Division of Engineering and Applied Sciences, May, 2003.
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University service:

1. Departmental committees
 - Member, Responsible Conduct of Research Training Committee, Fall 2008 -
 - Department Seminars Committee, Fall 2006 - Spring 2008
 - Graduate Committee, Spring 2006-
 - Graduate Sub-committee (merger), Fall 2007
 - Systems Division Graduate Committee, Spring 2008-
 - Ph.D. Defense Committee Chair: August, 2006 (student: Yusuke Naka), January, 2007 (student: Jeffrey Stoll)
 - M.S. Defense Committee: December, 2006 (student: Pat Sears)
 - Ph.D. Prospectus Committee member, August, 2006 (student: Dimitar Baronov)
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Professional membership and service:

1. Associate Editor, Conference Editorial Board, IEEE Control Systems Society (July 2006-)
 2. Associate Editor, Conference Editorial Board, IEEE Robotics and Automation Society (July 2006-)
 3. Professional membership
 - IEEE
 - ASME
 4. Reviewer for archival journals
 - Systems and Control Letters, Physical Review E, IEEE Transactions on Image Processing, IEEE Transactions on Systems, Man, and Cybernetics, Instrumentation, Systems, and Automation (ISA) Transactions, IEEE Transactions on Automatic Control, IEEE Transactions on Robotics, SIAM Journal of Control and Optimization, Ultramicroscopy, Asian Journal of Control
 5. Reviewer for a variety of conferences
 6. Program committee member, IEEE International Conference on Electro/Information Technology (2006)
 7. Program committee member, Robotics: Science and Systems (2007)
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Outreach:

1. Poster judge, Junior Science and Humanities Symposium, Scientific Research, Engineering, and Mathematics Investigations, regional competition (2006,2007) and oral presentation judge (2008)

2. Developer and presenter, Learning Experiences for New Scientists (LENS), a Boston University K-12 outreach program (2006,2007)
3. Organizer and presenter, Nanocamp (through Boston University Upward Bound) (2008)

Last updated: April 7, 2009