

- 1998-1999 **Pennsylvania State University** **State College, PA**
 RESEARCH ASSOCIATE
 Conducted research in the automation of underwater vehicles. Developed new sensor data fusion techniques which dramatically improve the tracking of weaving underwater targets. Participated in the development of software engineering techniques for the design of intelligent control systems.
- 1998 **Massachusetts Institute of Technology** **Cambridge, MA**
 TRACK COACH
 Coached the middle and long distance runners of the MIT women's outdoor and indoor track and field team. Six runners set personal records and broke school records in four events.
- 1994 - 1997 **Northeastern University** **Boston, MA**
 RESEARCH AND TEACHING ASSISTANT
 Research Assistant working on the detection and identification of buried waste using fuzzy logic to fuse data from radar and low frequency electromagnetic sensors. Taught Software Engineering Project at the graduate level; emphasized technical communication and the productivity increase resulting from the use of well written specification and design documents. Also a teaching assistant for graduate courses in Software Engineering, Machine Intelligence and Machine Learning.
- 1990 - 1994 **Advanced Mechanical Technology, Inc.** **Newton, MA**
 CHIEF ELECTRICAL ENGINEER
 Designed and implemented mechatronic systems for the intelligent testing of friction, material wear and forces. Designed analog and digital hardware and wrote embedded software for 8 and 16-bit microcontrollers. This technology was used to automate pin-on-disk tribometers, portable impact tester for playground surfaces, a multi-axis force, torque sensor for automobile wheels, and multi axis force and biomedical force and pressure platforms. Solicited and received several SBIR grants to fund research.
- 1985 – 1989 **Acorn Technology System, Inc.** **Sudbury, MA**
 PROJECT ENGINEER
 Designed and implemented intelligent control systems for Scanning Electron Microscopes (SEMs). Projects include automating focusing and stigmatism correction of SEM image; digital control of electron optics; real time digital image capture, storage and enhancement; and microprocessor control of high voltage electron gun supplies. Managed system integration of a new SEM model, incorporating the functions of a SEM and energy disperse system.

RESEARCH ACTIVITY

- Refereed Papers and Conferences**
- Linder, S. and Shafai B. (1997) *A Systematic Approach to Fuzzy Control Design for the 1992 ACC Robust Control Benchmark*. Proceeding of the 1997 American Control Conference, Albuquerque, NM, USA, IEEE, pp. 1258-1263.
- Linder, S. and Shafai B. (1997) *Robust PI Adaptive Observer*. Proceeding of the IASTED Control '97, Cancun, Mexico, pp. 151-154.
- Linder, S. and Shafai B. (1997) *Rejecting Disturbances to Flexible Structures using PI Kalman Filters*. Proceeding of the 1997 Conference on Control Application, Hartford, CT, USA, pp. 475-477.
- Linder, S. and Shafai B. (1998) *Robust PFI Kalman Filters*. Proceeding of the 1998

American Control Conference, Philadelphia, USA, pp. 3163-3164.

Linder, S., Shafai B. and Saif, M. (1998) *Estimating and Accommodating Unknown Actuator Faults with PI Observers*. Proceeding of the 1998 Conference on Control Application, Trieste, Italy, pp. 461 - 465.

Linder, S. and Shafai B. (1998) *Behavior-Based Robust Fuzzy Control*. Proceeding of the 1998 International Symposium on Intelligent Control, pp. 233-238.

Linder, S., Kokar, M., and Korona Z. (1996). *Q² Symbolic Reasoning about Noisy Dynamic Systems*. Journal of Intelligent & Robotic Systems, **24**:295-311.

Linder, S. and Shafai B. (1999) *Qualitative Robust Fuzzy Control with Applications to 1992 ACC Benchmark*. IEEE Transactions on Fuzzy Systems, **07**:04, pp. 409-421.

Bas, O. Y., Ho, M., Shafai, B. and Linder, S. P (1999) *Improving Stability of EKF Filter used by the Symmetrical Measurement Equations*. Proceeding of the SPIE's International Symposium on Optical Science, Engineering, and Instrumentation, Denver, Colorado, pp. 3809-3826.

Linder, S. Shafai B. and O. Y. Bas (1999) *Improving Track Maintenance of Crossing and Maneuvering Targets*. Proceeding of the AIAA Guidance and Control Conference, Portland, OR, USA, pp. 1752-60.

Roeckel, Michael W., Robert H. Rivoir, Ronald E. Gibson and Stephen P. Linder (1999) *Simulation environments for the design and test of an intelligent controller for autonomous underwater vehicles*. Proceeding of the Winter Simulation Conference, Phoenix, AZ, pp. 1088 -1093 vol.2.

Bas, O. Y., B. Shafai and S. P. Linder (1999) *Design of Optimal Gains for the Proportional Integral Kalman Filter with application to Single Particle Tracking*. Proceeding of the Conference on Decision and Control, San Diego, CA, pp. 4567-4571.

O.Y. Bas, B. Shafai, and S.P. Linder, *Improving Stability of EKF Used by the Symmetrical Measurement Equations*. Proceeding of the 44th International Symposium on Optical Science, Engineering, and Instrumentation (SPIE), Denver, Colorado, 1999, pp. 3809-3826

Linder, S.P., Nestruck, B.E., Mulders, S. and Lavelle, C.L. (2001) *Facilitating Active Learning with inexpensive Mobile Robots*. The Journal of Computing in Small Colleges, Consortium for Computing in Small Colleges, 16:4, pp. 21 - 33.

Linder, S. P., Helferty, J. P., Lewis, A. S., Dennison, G. L., and Erdley, J.D., (2001), *A Pseudo-Measurements Kalman Filter for Tracking a Weaving Target with Passive and Active Sonar*. Journal of Underwater Acoustics.

Shafai B., C-T. Pi, O. Bas, S. Nork, and S. Linder (2001) *A general purpose observer architecture with application to failure detection and isolation*. Proceedings of American Proceeding of the Control Conference, Arlington, VA, pp. 1133-1139.

Linder, S.P. , Ryan, M.D., and Quintin, R.J. (2001) *Concise Track Characterization of Maneuvering Targets*. Proceeding of the AIAA Conference on Guidance, Navigation, and Control. Montreal, CA.

Schell, Chad, Stephen Paul Linder and James R. Zeidler (2004) *Tracking Highly Maneuverable Targets with Unknown Behavior*. Proceedings of the IEEE, Special Issue on Sequential State Estimation, **92**:3, pp. 558 - 574.

Linder, Stephen Paul, Edward Wei and Alexander Clay (2005) *Robotic Rock Climbing using Computer Vision and Force Feedback*. ICRA, IEEE International Conference on Robotics and Automation, Barcelona, Spain.

Wendelken Suzanne, Stephen Linder, Susan McGrath, George Blike (2005) *Monitoring respiration rate in PACU patients using the plethysmogram from a pulse oximeter*. Annual Meeting of the Society for Technology in Anesthesia for publication in *Journal of Anesthesia & Analgesia*.

Schell, Chad and Stephen Paul Linder (2005) *Experimental Evaluation of Tracking Algorithms for the Determination of Fish Behavioral Statistics*. IEEE Journal of Oceanic Engineering **30**:4.

Linder, Stephen Paul and Chad Schell (2005) *A non-Bayesian Segmenting Tracker for Highly Maneuvering Targets*. IEEE Transactions on Aerospace and Electronic Systems **41**:4, pp.1168 - 1177.

Linder, Stephen Paul, Suzanne M. Wendelken, Susan P. McGrath (2005) *Using PPG Morphology to Detect Blood Sequestration*. Annual Meeting of the Society for Technology in Anesthesia. Winner of the 2006 "New Technology Award"

Linder, Stephen Paul and David Abbott (2005) *An Instructional Scaffolding Approach to Teaching Software Design*. Accepted by the Journal of Computing in Small Colleges, Consortium for Computing in Small Colleges.

**Submitted
for
Publication**

Linder, Stephen Paul, Suzanne M. Wendelken, Edward Wei, Susan P. McGrath (2005) *Using the Morphology of Photoplethysmogram Peaks to Detect Changes in Posture*. Submitted to Journal of Clinical Monitoring

Papers in electronic form can be found at
<http://alum.mit.edu/www/spl>.