

CURRICULUM VITAE

Jason Rife, Ph.D.

Assistant Professor
Department of Mechanical Engineering
Tufts University
Medford, MA 02155

office: 617-627-4732

home: 617-489-1016

email: jason.rife@tufts.edu

EDUCATION

- 2003 **Stanford University, Stanford, CA**
Ph.D. in Mechanical Engineering
- 1999 **Stanford University, Stanford, CA**
M.S. in Mechanical Engineering
- 1996 **Cornell University, Ithaca, NY**
B.S. in Mechanical and Aerospace Engineering

RESEARCH EXPERIENCE

- 2007- **Tufts University, Medford, MA**
Assistant Professor, Department of Mechanical Engineering
- Developing solutions to enhance the safety of GPS-aided aircraft landing given rare but severe hazards such as those introduced by intense storms in the upper atmosphere
 - Pursuing methods for design of robotic control systems for soft-bodied biomimetic robots
- 2003-07 **Hansen Experimental Physics Laboratories, Stanford University, Stanford, CA**
Research Engineer, Stanford Global Positioning System (GPS) Lab
- Researched conservative error bounding approaches, with application to the Federal Aviation Administration's (FAA) Local Area Augmentation System (LAAS) and served as a member of the LAAS integrity panel, a team of FAA, academic and industry representatives who evaluate the safety of the LAAS architecture
 - Developed, with FAA team, an alternative Local Airport Monitoring architecture based on WAAS
 - Mentored team of graduate student researchers investigating the integrity of the Joint Precision Approach and Landing System (JPALS), a technology for safely landing U.S. military aircraft
- 1999-03 **Department of Mechanical Engineering, Stanford University, Stanford, CA**
Research Assistant, Stanford Aerospace Robotics Lab and Monterey Bay Aquarium Research Institute (MBARI)
- Researched and implemented visual sensing and control algorithms to enable robot-based animal tracking in the deep-ocean
 - Coordinated technology transfer of research software for field use by MBARI
- 1997-99 **Department of Mechanical Engineering, Stanford University, Stanford, CA**
Research Assistant, Center for Turbulence Research
- Studied reacting flows and numerical methods for fluid dynamics computation
 - Researched numerical methods (1) to minimize dump combustor NO_x emissions and (2) to capture acoustic-chemistry interactions for low mach number combustor flows

- 1995-96 **Department of Mechanical and Aerospace Engineering, Cornell, Ithaca, NY**
Undergraduate Researcher, Experimental Fluid Mechanics
- Led project team to design and implement a portable water channel for classroom instruction
 - Performed wind tunnel experiments studying scalar field transport in the presence of intense turbulence created by an active grid
- 1995 **Thayer School of Engineering, Dartmouth College, Hanover, NH**
Research Assistant, Mechanical Engineering Department
- Designed and performed wind tunnel experiments to test Professor Graham Wallis' theories regarding the lateral "drift" force on bluff bodies placed in weak shear flows

TEACHING EXPERIENCE

- 2007- **Tufts University, Medford, MA**
Assistant Professor, Department of Mechanical Engineering
- Taught ME-37: Dynamics and Vibrations
 - Taught ME-80: System Dynamics and Control
 - Taught ME-180: Digital Control of Dynamic Systems
 - Taught ME-184: Robotics
- 2005 **School of Engineering, Santa Clara University, Santa Clara, CA**
Lecturer in Mechanical Engineering
- Developed and taught a master's level course entitled Vision Systems for Robotic Applications (Course Web Site: <http://www.engr.scu.edu/~jrife/>)
 - Assisted as a guest lecturer for Dynamics and Controls for Ocean Engineering
- Department of Aeronautics and Astronautics, Stanford University, Stanford, CA**
- 2003-07 Research Associate, Stanford GPS Lab
- Supervised the research of six Ph.D. students in the GPS lab
- 2000-02 Student Director of Young Astronauts Program, Sponsored by AIAA
- Coordinated and taught hands-on science classes for local 3rd and 4th grade students
- 1995-96 **Cornell Outdoor Education Program, Cornell University, Ithaca, NY**
Instructor, Cornell Outdoor Education
- Taught undergraduate course, Basic Cross-Country Skiing

PROFESSIONAL EXPERIENCE

- 1997 **Pratt & Whitney, East Hartford, CT**
Development Engineer, Turbine Aerodynamics Group
- Analyzed test stand data for PW4098 engine development program
 - Coordinated design and implementation of a software tool to automate information transfer between two existing simulation codes (turbine cooling air and turbine aerodynamics)
- 1994-95 **Solomon Software, Findlay, OH**
Programmer
- Wrote commercial code to support foreign currency management for Solomon's next generation accounting package
- 1993-94 **GENEVA Group, Belmont, MA**
Intern
- Translated technical and financial documents from French clients of GENEVA, a small business specializing in accounting systems

- Wrote scheduling routine for manufacturing client
- Lead telemarketing campaign, locating clients for second phase sales negotiations

HONORS AND AWARDS

- 2008 Best of Session Award, Session B1: Integrity of Multi-Constellation RAIM, at ION Global Navigation Satellite Systems (GNSS 2008), Savannah, GA.
- 1997-99 Stanford Graduate Fellow, Stanford School of Engineering
- 1997-99 Graduate Research Fellow, National Science Foundation
- 1997 Second in class, Cornell School of Engineering
- 1994 Van Dyke Book Prize, Cornell University
Awarded to the top student in M&AE 323, *Introduction to Fluid Mechanics*
- 1993 John McMullen Dean's Scholar, Cornell University
- 1993 National Merit Scholar

JOURNAL PUBLICATIONS

1. **J. Rife** (submitted, 2009). Influence of GNSS integrity monitoring on risk probabilities for single and multiple fault events. *NAVIGATION, the Journal of the Institute of Navigation*. First published under the title "Influence of GNSS integrity monitoring on single and multiple fault event probabilities" in the *Proc. ION Global Navigation Satellite Systems (GNSS 2008)*, Savannah, GA, where it won the **BEST of Session Award, Session B1: Integrity of Multi-Constellation RAIM**.
2. D. De Lorenzo, P. Enge, and **J. Rife** (submitted, 2009). Calibrating Adaptive Antenna Arrays for High-Integrity GPS. *NAVIGATION, the Journal of the Institute of Navigation*.
3. **J. Rife** and S. Sen (accepted, 2008). Design of a single-frequency filter that minimizes ionosphere divergence error. *NAVIGATION, the Journal of the Institute of Navigation*. First published under the same title in the *Proc. ION Global Navigation Satellite Systems (GNSS 2007)*, Fort Worth, TX.
4. **J. Rife**, S. Khanafseh, S. Pullen, D. De Lorenzo, U. Kim, M. Koenig, T. Chiou, B. Kempny, and B. Pervan (2008). Navigation, interference suppression, and fault monitoring in the sea-based joint precision approach and landing system. *Proceedings of the IEEE*, 96(12), December 2008, pp. 1958-1975.
5. **J. Rife** and R.E Phelts (2008). Formulation of a time-varying maximum allowable error for ground-based GPS augmentation systems. *IEEE Transactions on Aerospace and Electronic Systems*, 44(2), April 2008, pp. 548-560. First published under the same title in the *Proc. ION National Technical Meeting*, 2006, Monterey, CA.
6. **J. Rife** and D. Gebre-Egziabher (2007). Symmetric overbounding of correlated errors. *NAVIGATION, the Journal of the Institute of Navigation*, 54(2), Summer 2007, pp. 109-124. First published under the same title in the *Proc. ION Global Navigation Satellite Systems*, 2006, Fort Worth, TX.
7. **J. Rife**, S. Pullen, B. Pervan, and P. Enge (2006). Paired overbounding for nonideal LAAS and WAAS error distributions. *IEEE Transactions on Aerospace and Electronic Systems*, 42(4), October 2006, pp. 1386-1395. First published under the same title in the *Proc. IEEE Position, Location and Navigation Symposium*, 2004, Monterey, CA.
8. Y. Yun, C. Kee, **J. Rife**, M. Luo, S. Pullen and P. Enge (2006). Detecting RFI through integrity monitoring at a DGPS reference station. *Journal of Navigation*, 59(3), September 2006, pp. 403-422. First published under the same title in the *Proc. ION Annual Meeting*, 2005, Boston, MA.
9. **J. Rife** and S.M. Rock (2006). Design and validation of a robotic control law for observation of deep-ocean jellyfish. *IEEE Transactions on Robotics*, 22(2), April 2006, pp. 282-291.

10. **J. Rife** and S. Pullen (2006). The impact of measurement biases on availability for CAT III LAAS. *NAVIGATION, the Journal of the Institute of Navigation*, 52(4), Winter 2006, pp. 15-228. First published under the same title in the *Proc. ION Annual Meeting*, 2005, Boston, MA.
11. T. Walter, J. Blanch, and **J. Rife** (2004). Treatment of Biased Error Distributions in SBAS. *Journal of Global Positioning Systems*, 3(1-2), pp. 265-272. First published under the same title in the *Proc. Internat. Symp. On GNSS/GPS*, 2004, Sydney, Australia.
12. **J. Rife** and S.M. Rock (2003). Segmentation methods for visual tracking of deep ocean jellyfish using a conventional camera. *IEEE Journal of Ocean Engineering*, 28(4), pp. 595-608.
13. **J. Rife**, J. He, Y. Song, and G.B. Wallis (1997). Measurements of the drift force. *Nuclear Engineering and Design*, 175(1-2), pp. 71-76.

REFEREED CONFERENCE PUBLICATIONS

1. F. Saunders, J. Rieffel, **J. Rife** (2009). A Method of Accelerating Convergence for Genetic Algorithms Evolving Morphological and Control Parameters for a Biomimetic Robot. *Proc. International Conference on Autonomous Robots and Agents 2009*, Wellington, New Zealand.

CONFERENCE PROCEEDINGS

1. S. Sen and **J. Rife** (2008). Reduction of ionosphere divergence error in GPS code measurement smoothing by use of a non-linear process. *Proc. ION/IEEE Position, Location, and Navigation Symposium (PLANS)*, Monterey, CA.
2. **J. Rife**, S. Pullen, and P. Enge (2007). Evaluating fault-mode protection levels at the aircraft in Category III LAAS. *Proc. ION Annual Meeting*, Cambridge, MA.
3. D.S. De Lorenzo, **J. Rife**, P. Enge, and D. Akos (2006). Navigation accuracy and interference rejection for an adaptive GPS antenna array. *Proc. ION Global Navigation Satellite Systems (GNSS 2006)*, Fort Worth, TX.
4. H. Konno, S. Pullen, **J. Rife**, and P. Enge (2006). Ionosphere monitoring methodology for hybrid dual-frequency LAAS. *Proc. ION Global Navigation Satellite Systems (GNSS 2006)*, Fort Worth, TX.
5. G. Phanomchoeng, D. Gebre-Egziabher, and **J. Rife** (2006). A numerical procedure for approximating overbounds on navigation systems error distributions. *Proc. ION Global Navigation Satellite Systems (GNSS 2006)*, Fort Worth, TX.
6. **J. Rife**, S. Pullen, T. Walter, E. Phelts, B. Pervan and P. Enge (2006). WAAS-based threat monitoring for a local airport monitor (LAM) that supports category I precision approach. *Proc. ION/IEEE Position, Location, and Navigation Symposium (PLANS)*, San Diego, CA.
7. S. Pullen, **J. Rife** and P. Enge (2006). Prior probability model development to support system safety verification in the presence of anomalies. *Proc. ION/IEEE Position, Location, and Navigation Symposium (PLANS)*, San Diego, CA.
8. J. Seo, **J. Rife**, S. Pullen, T. Walter, and P. Enge (2006). Field Data Analysis for a Range-Based Local Airport Monitor for WAAS. *Proc. ION National Technical Meeting*, Monterey, CA.
9. H. Konno, S. Pullen, **J. Rife**, and P. Enge (2006). Evaluation of two types of dual-frequency differential GPS techniques under anomalous ionosphere conditions. *Proc. ION National Technical Meeting*, Monterey, CA.
10. D.S. De Lorenzo, J. Gautier, **J. Rife**, P. Enge, and D. Akos (2005). Adaptive array processing for GPS interference rejection. *Proc. ION Global Navigation Satellite Systems (GNSS 2005)*, Long Beach, CA.

11. M. Koenig, **J. Rife**, S. Pullen, and P. Enge (2005). Optimizing channel selection for the JPALS' Land-Based Integrity Monitor. *Proc. ION Global Navigation Satellite Systems (GNSS 2005)*, Long Beach, CA.
12. T. Walter, S. Pullen, **J. Rife**, P. Enge, and J. Seo (2005). The advantages of local monitoring and VHF data broadcast for SBAS. *Proc. European Navigation Conference GNSS 2005*, Munich, Germany.
13. **J. Rife**, S. Pullen, T. Walter, and P. Enge (2005). Vertical protection levels for a local airport monitor for WAAS. *Proc. ION Annual Meeting*, Cambridge, MA.
14. M. Koenig, **J. Rife**, J. Gautier, S. Pullen, and P. Enge (2005). Development of the JPALS land-based integrity monitoring system. *Proc. ION National Technical Meeting*, San Diego, CA.
15. **J. Rife**, T. Walter, and J. Blanch (2004). Overbounding SBAS and GBAS error distributions with excess-mass functions. *Proc. 2004 Internat. Symp. On GNSS/GPS*, Sydney, Australia.
16. **J. Rife**, S. Pullen and B. Pervan (2004). Core overbounding and its implications for LAAS integrity. *Proc. ION Global Navigation Satellite Systems (GNSS 2004)*, Long Beach, CA.
17. **J. Rife** and S.M. Rock (2002). Field experiments in the control of a jellyfish tracking ROV. *Proc. IEEE/MTS OCEANS 2002*, Biloxi, MS, vol. 4.
18. **J. Rife** and S.M. Rock (2001). A pilot aid for ROV based tracking of gelatinous animals in the midwater. *Proc. IEEE/MTS OCEANS 2001*, Honolulu, HI.
19. **J. Rife** and S.M. Rock (2001). A low-energy sensor for AUV-based jellyfish tracking. *Proc. of the 12th International Symposium on Unmanned Untethered Submersible Technology*, Hanover, NH.
20. **J. Rife** and S.M. Rock (2001). Visual tracking of jellyfish *in situ*. *Proc. Intl. Conf. Image Processing*, IEEE, Thessaloniki, Greece.

OTHER ARTICLES

1. **J. Rife** and S. Pullen (Submitted, 2008). Aviation applications. *GNSS Applications: A Hands-On Approach*, S. Gleason and D. Gebre-Egziabher, Eds. Artech House.
2. S. Pullen and **J. Rife** (Submitted, 2008). Differential GNSS: accuracy and integrity. *GNSS Applications: A Hands-On Approach*, S. Gleason and D. Gebre-Egziabher, Eds. Artech House.
3. **J. Rife**, C. Tomlin, and P. Enge (2008). Scanning the issue: special issue on aviation information systems. *Proceedings of the IEEE*, 96(12), December 2008, pp. 1898-1901.
4. **J. Rife** (2008). GNSS Solutions: Do GNSS augmentation systems certified for aviation use, such as the GPS Wide Area Augmentation System (WAAS), have a function other than improving the accuracy of user navigation? *Inside GNSS*, 3(4), May/June 2008, pp. 18-22.

FUNDING PROFILE

Participant, *Chemical Robots: Morphing, soft-material robots for covert access*. DARPA. \$3,298,209. From 2/15/2008 to 2/14/2010.

Participant, *Awards to Enhance Collaborative Research: Soft Tissue Measurement and Modeling for Surgical Simulation and Visualization*. Tufts School of Engineering. \$5,000.

PROFESSIONAL MEMBERSHIPS

Tau Beta Pi, The National Engineering Honor Society
Institute of Electrical and Electronic Engineers (IEEE)
Institute of Navigation (ION)