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Education

Ph.D., Mechanical Engineering, 2013 (expected), Duke University.
Advisor: Prof. Devendra P. Garg
Thesis: Distributed Control of Heterogenous Mobile Robotic Agents in the Presence of Uncertainties

M.S., Mechanical Engineering, 2009, Duke University.
Advisor: Prof. Devendra P. Garg
Thesis: Tracking, Identification, and Odometry Calibration of a Multi-Agent Swarm System

B.S., Engineering & Applied Science (M.E. option), 2000, California Institute of Technology.

Employment

Duke University, 2007–present.
Graduate Research Assistant: Swarm Robotics and Control

Boeing-SVS, 2003–2011. (Educational Leave of Absence, 2007–2011)
Guidance, Navigation and Control Engineer: Simulation and Controls

Hughes Space & Communication / Boeing Satellite Systems, 2000–2003.
Engineer/Scientist II: Attitude Control Subsystems

Rocketdyne Technical Services, 1997, 1998.
Intern: System Engineering, Telescope Operator

Rockwell Power Systems, 1995–1996.
Intern: Astronomical Data Analysis, System Engineering

Teaching Experience

ME197/ME198: Independent Study. Undergraduate mentor, robotics and mechatronics.
Fall/Spring 2012, Prof. Devendra P. Garg, Duke University.

EGR123L: Dynamics. Teaching Assistant, Lab Supervisor.
Spring 2009, Prof. Kenneth C. Hall, Duke University.

EGR123L: Dynamics. Teaching Assistant.
Spring 2008, Prof. Earl H. Dowell, Duke University.

ME70: Introduction to Kinematics. Teaching Assistant.
Spring 2000, Prof. Gregory T. Smedley, California Institute of Technology.

Publications

Peer-Reviewed Journal Articles

G. Zhang, G. K. Fricke and D. P. Garg. Spill perimeter detection and surveillance via distributed swarming agents. *ASME/IEEE Trans. Mechatronics*. Online, 12 Sep 2011. DOI:10.1109/TMECH.2011.2164578.

W. Busch, R. W. Twigg, B. Moore, B. Martsberger, J. Jung, I. Pruteanu-Malinici, S. Kennedy, G. K. Fricke, R. L. Clark, U. Ohler, P. N. Benfey. A microfluidic device for automated high throughput live imaging of gene expression. Submitted 6 Dec 2011 *Nature Methods*, under review.

Peer-Reviewed Conference Proceedings

G. K. Fricke, K. M. Lieberman, and D. P. Garg. Swarm formations under nonholonomic and numerosity constraints. In *Proc. ASME Dyn. Syst. and Cont. Conf. (DSCC2012)*. (Accepted, to appear) Ft. Lauderdale, FL. 17-19 Oct 2012.

K. M. Lieberman, G. K. Fricke, and D. P. Garg. Decentralized Control of multi-agent escort formation via Morse potential function. In *Proc. ASME Dyn. Syst. and Cont. Conf. (DSCC2012)*. (Accepted, to appear) Ft. Lauderdale, FL. 17-19 Oct 2012.

B. W. Rogers, G. K. Fricke, and D. P. Garg. Aggregation and Rendezvous in an Unbounded Domain without a Shared Coordinate System. In *Proc. IEEE Conf. Decision and Control and Euro. Control Conf. (CDC-ECC 2011)*. Orlando, FL. 12-15 Dec 2011.

G. K. Fricke, B. W. Rogers, and D. P. Garg. On the stability of swarm consensus under noisy control. In *Proc. ASME Dyn. Syst. and Cont. Conf. (DSCC2011)*. Arlington, VA. 31 Oct-2 Nov 2011.

G. K. Fricke, G. Zhang, A. Caccavale, W. Li, and D. P. Garg. An intelligent sensing network of distributed swarming agents for perimeter detection and surveillance. In *Proc. ASME Dyn. Syst. and Cont. Conf. (DSCC2010)*. Cambridge, MA. 13-15 Sep 2010.

G. Zhang, D. P. Garg and G. K. Fricke. Hazardous spill perimeter detection and monitoring via multiple autonomous mobile robotic agents. In *Proc. ASME Dyn. Syst. and Cont. Conf. (DSCC2010)*. Cambridge, MA. 13-15 Sep 2010.

G. K. Fricke, A. Caccavale, and D. P. Garg. Mobile sensor frame mapping via vision and laser scan matching. In *Proc. Intl. Symp. Resilient Control Syst. (ISRCS2010)*. Idaho Falls, ID. 10-12 Aug 2010.

G. K. Fricke and D. P. Garg. Discrimination and tracking of individual agents in a swarm of robots. In *Proc. American Control Conf. (ACC2010)*. Session Best Paper (ThA11). Baltimore, MD. 30 Jun-2 Jul 2010.

G. K. Fricke, D. Milutinović and D. P. Garg. Robotic pose estimation via an adaptive Kalman Filter using state-varying noise. In *Proc. IASTED Robo. & Autom. Intl. Conf.*. Cambridge, MA. 2-4 Nov 2009.

G. K. Fricke, D. Milutinović and D. P. Garg. Sensing and estimation on a modular testbed for swarm robotics. In *Proc. ASME Dyn. Syst. and Cont. Conf. (DSCC2009)*. Hollywood, CA. 12-14 Oct 2009.

P. W. Kervin, D. L. Nishimoto, P. F. Sydney, J. L. Africano, V. Soo Hoo, D. L. Talent, G. J. Fricke [sic], A. F. Angara, D. G. O'Connell, B. M. Africano. Raven concept applied to asteroid and satellite surveillance. In *Proc. SPIE Optical Astronomical Instrumentation*. Kona, HI. 26 Mar 1998.

Patents

P. N. Benfey, R. W. Twigg, III, R. L. Clark, Jr., S. J. Kennedy, G. K. Fricke. Plant Growth and Imaging Devices and Related Methods and Computer Program Products. US Patent 8,312,673. 20 Nov 2012.

P. N. Benfey, R. W. Twigg, III, R. L. Clark, Jr., S. J. Kennedy, G. K. Fricke. Plant Growth and Imaging Devices and Related Methods and Computer Program Products. US Patent 7,937,891. 10 May 2011.