

CURRICULUM VITAE

William E. Green

Current Position

Ph.D. Candidate
Mechanical Engineering
Drexel University
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Professional Preparation

Ph.D.	Drexel University, Pennsylvania	Mechanical Engineering	2007 (anticipated)
M.Sc.	Drexel University, Pennsylvania	Mechanical Engineering	2004
B.Sc.	Drexel University, Pennsylvania	Mechanical Engineering	2002 (Honors)

Research Experience

Micro Air Vehicle to Fly in Caves, Tunnels and Buildings

A fixed-wing MAV, which flies like an airplane and hovers like a helicopter, was developed for autonomous surveillance and reconnaissance in caves, tunnels, and buildings. A modular flight control system was designed and integrated with an inertial measurement unit to achieve the first documented success of autonomously hovering a fixed-wing MAV. The low-level quaternion attitude controller serves as the foundation for higher-level controllers currently being developed for collision avoidance in cluttered environments. *Acquired Skills:* Quaternion attitude control, PCB design, and GPS waypoint navigation.

<http://www.pages.drexel.edu/~weg22/fwHovering/fixeWingHovering.html>

Closed Quarter Aerial Robotics (CQAR)

Developed an aerial platform to fly in and around buildings. An optic flow sensor suite mimicking insect flight stratagems was also used to achieve autonomous tasks such as landing and collision avoidance. *Acquired Skills:* Aircraft and control system design, microcontroller programming, and optic flow theory.

Civilian Medical Response Center (CIMERC) Project

Real-time image processing algorithms such as edge detection were used to communicate ingress and egress routes to emergency response teams. *Acquired Skills:* Computer vision and image processing techniques, wireless video, and 802.11 networking.

Publications

The following is a list of refereed conference papers, journals, and book chapters in the areas of collision avoidance, aircraft design and control systems.

- Book Chapters
 1. Green, W.E., Oh, P.Y., "The Integration of a Multimodal MAV and Biomimetic Sensing for Autonomous Flight in Near-Earth Environments," *Advances in Unmanned Aerial Vehicles*, ed. K. Valavanis, Springer Verlag, Berlin, 2007 (in press).

- Journals

1. Green, W.E., Oh, P.Y., "Optic Flow Based Collision Avoidance on a Hybrid MAV," *IEEE Robotics and Automation Magazine*, (in press).
2. Oh, P.Y., Green, W.E., "CQAR: Closed Quarter Aerial Robot Design for Reconnaissance, Surveillance and Target Acquisition in Urban Areas," *International Journal of Computational Intelligence*, Vol. 1 No. 4, pp. 353-360, 2004.
3. Oh, P.Y., Green, W.E., "A Mechatronic Kite and Camera Rig to Rapidly Acquire, Process and Distribute Aerial Images," *IEEE/ASME Transactions on Mechatronics*, Vol. 9, No. 4, pp. 671-678, December 2004.

- Conferences

IEEE

1. Green, W.E., Oh, P.Y., "A Fixed-Wing Aircraft for Hovering in Caves, Tunnels, and Buildings," *IEEE American Control Conference*, Minneapolis, MN, pp. 1092-1097, June 2006.
2. Green, W.E., Oh, P.Y., "Autonomous Hovering of a Fixed-Wing Micro Air Vehicle," *IEEE International Conference on Robotics and Automation*, Orlando, FL, pp. 2164-2169, May 2006.
3. Green, W.E., Oh, P.Y., "A MAV That Flies Like an Airplane and Hovers Like a Helicopter," *IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Monterey, California, pp. 699-704, July 2005.
4. Sevcik, K.W., Green, W.E., Oh, P.Y., "Exploring Search-And-Rescue in Near-Earth Environments for Aerial Robots," *IEEE International Conference on Advanced Robotics*, Seattle, WA, pp. 693-698, July 2005.
5. Green, W.E., Sevcik, K.W., Oh, P.Y., "A Competition to Identify Key Challenges for Unmanned Aerial Robots in Near-Earth Environments," *IEEE International Conference on Advanced Robotics*, Seattle, WA, pp. 309-315, July 2005.
6. Green, W.E., Oh, P.Y., Barrows, G., "Flying Insect Inspired Vision for Autonomous Aerial Robot Maneuvers in Near-Earth Environments," *IEEE International Conference of Robotics and Automation*, New Orleans, LA, pp. 2347-2352, April 2004.
7. Green, W.E., Oh, P.Y., "An Aerial Robot Prototype for Situational Awareness in Closed Quarters," *IEEE Intelligent Robots and Systems Conf.*, Las Vegas, NV, pp. 61-66, Oct. 2003.
8. Oh, P.Y., Green, W.E., "A Kite and Teleoperated Vision System for Acquiring Aerial Images," *IEEE International Conference of Robotics and Automation*, Taipei, Taiwan, pp. 1404-1409, September 2003.

ASME

9. Oh, P.Y., Green, W.E., Barrows, G., "Neural Nets and Optic Flow for Autonomous Micro-Air-Vehicle Navigation," *ASME International Mechanical Engineering Congress and Exposition*, Anaheim, CA, Volume 2, pp. 1-7, 2004, November 2004.
10. Green, W.E., Oh, P.Y., Barrows, G., Sevcik, K.W., "Autonomous Landing for Indoor Flying Robots Using Optic Flow," *ASME International Mechanical Engineering Congress and Exposition*, Washington, D.C., v2, pp. 2347-2352, November 2003.
11. Green, W.E., Oh, P.Y., Yoon, S., "An Aerial Image Acquisition and Distribution System for Situational Awareness," *ASME International Mechanical Engineering Congress and Exposition*, Washington, D.C., v2, pp. 1341-1346, November 2003.

Other

12. Tholey, G., Pillarisetti, A., Green, W.E., Desai, J., "Design, Development, and Testing of an Automated Laparoscopic Grasper with 3-D Force Measurement Capability," *International Symposium on Medical Simulation*, 2004.
13. Oh, P.Y., Green, W.E., "Closed Quarter Aerial Robot Prototype to Fly In and Around Buildings," *International Conference on Computer, Communication and Control Technologies*, Orlando, FL, v5, pp. 302-307, July 2003.
14. Green, W.E., Oh, P.Y., "An Aerial Vision Platform for Acquiring Situational Awareness," *International Conference on Computer, Communication and Control Technologies*, Orlando, FL, v5, pp. 289-295, July 2003. **Received Best Paper Award in Robotics.**

Teaching Experience

Instructor *Simultaneous Localization and Mapping (SLAM)* Summer 2006

Attended the 2006 SLAM Summer School, which was a week long program held at the University of Oxford. Students were introduced to several techniques including EKF SLAM, vision-based SLAM, subsea SLAM, etc. Using the acquired knowledge, I created a short course on SLAM and instructed several graduate students on the theory and implementation behind the technology.

<http://prism2.mem.drexel.edu/~billgreen/slam/slam.html>

Instructor *Dynamic Systems and Control (MEM 351)* Summer 2006

Instructed students on the analysis and control of dynamic systems through advanced simulation and experimental methods. This included in-class experiments on sensors, actuators, microcomputer data acquisition and feedback control systems.

Instructor *Dynamic Systems and Control (MEM 351)* Summer 2005

Teaching Assistant *Dynamics (MEM 238)* Summer 2003

Teaching Assistant *Engineering Design & Lab (tDEC 130-133)* 2003–2004

Teaching Assistant *Engineering Design & Lab (tDEC 130-133)* 2002–2003

Professional Experience

Lockheed Martin's Advanced Technology Labs *Cherry Hill, NJ* July–September 2003

Applied vision-based algorithms enabling a ground robot to search for and locate biohazardous symbols and also to differentiate between team members and a human sentry.

MaGrann Associates *Mt. Laurel, NJ* Sept–March 2000

Sept–March 2001

Designed residential heating/cooling duct systems; performed residential load and energy code analysis; responsible for residential predrywall and presettlement inspections.

Awards and Honors

2005 Lockheed Martin – George Law Fellowship (1 year) – awarded to graduate students in Mechanical Engineering for academic merit

2004 Koerner Fellowship, Drexel University (1 year)
Honorable Mention, NSF Graduate Research Fellowship

2003 Honorable Mention, NSF Graduate Research Fellowship
Best Paper Award in Robotics, CCCT Conference

2002 Dean's Fellowship, Drexel University (5 years)
Graduated with Honors – Magna Cum Laude

1999 Inducted into Golden Key National Honor Society

1998 Inducted into Pi Tau Sigma Mechanical Engineering Honor Society
Inducted into Phi Eta Sigma National Honor Society

1997 A.J. Drexel Scholarship, Drexel University (5 years) – awarded to top 10% of incoming freshman

Leadership and Service Experience

2005–2006 Engineering Graduate Association, Officer

2004–2005 Engineering Graduate Association, Officer

2005–present Member of AUVSI Society

2003–present Member of ASME Society

2003–present Member of IEEE Society