

Current Address:
Schenley House Apt. 10A
151 N. Craig St.
Pittsburgh, PA 15213

Uland Wong

uyw@andrew.cmu.edu

Permanent Address:
Carnegie Mellon Univ.
Robotics Institute
5000 Forbes Ave
Pittsburgh, PA 15213

EDUCATION

- Carnegie Mellon Robotics Institute, *Pittsburgh, PA* August 2006 – Current
- **Doctor of Philosophy**, Robotics
 - Advised by William “Red” Whittaker
 - GPA: 4.0/4.0
 - Research Areas: Sensing, Space and Field Robotics
- Carnegie Mellon University, *Pittsburgh, PA* August 2002 – May 2006
- **Master of Science**, Electrical and Computer Engineering, earned May 2006
 - Simultaneously earned with Bachelor of Science
 - GPA: 4.0/4.0 for graduate classes
 - Focus Areas: Programming Languages, Robotics
 - **Bachelor of Science**, Electrical and Computer Engineering, earned May 2006
 - University Honors (GPA)
 - CIT Research Honors (Thesis)
 - GPA: 3.94/4.00

TEACHING EXPERIENCE

- Robotics 865, Advanced Mobile Robot Design Spring 2008
- Graduate course to engineer robot prototype for the Google Lunar X-prize
- Taught lectures, designed curriculum, and managed student component of moon team
- CS 212, Principles of Programming Languages Fall 2005, Fall 2006
- Foundations class in language design, functional programming and semantics
- Taught recitations, led review sessions and developed assignments
 - Responsible for the development of an interpreter for Standard ML and a compiler for music notation as class projects

WORK EXPERIENCE

- Student Researcher, *Robotics Institute, CMU* Summer 2004–2005
- Developed mission-critical software for the Field Robotics Center at Carnegie Mellon
 - Worked on projects including close air support systems, secure embedded video transmission and context-sensitive mapping from GPS
- Research Assistant, *Portland State University* Summers 2001–2003
- Conducted research in machine learning and computer vision

SELECTED RESEARCH

Mapping for Survey from Vision

- Fused vision and LIDAR data for high resolution mapping and scene reconstruction
- Used knowledge of the lightfield and sparse range data to predict correspondences between consecutive images and solve for scene geometry
- Provided a comprehensive mapping and navigation suite for CaveCrawler robot

Ferret, *Subterranean Robotics*

- Co-designed Ferret 4.0, a 3” borehole-deployable LIDAR mapping robot
- Architected entire software system for Ferret 4.0
- Responsible for complete software system redesign of Ferret 3.0, an older borehole-

deployable robot

- Participated in patent defense for Robotic Modeling of Voids (Whittaker ,et al)
- Co-authored Kennecott Copper mine survey proposal (pending acceptance)

Hazard and Assistance Detection, *Tele-Supervised Autonomous Robots*

- Developed a laser based obstacle avoidance and planning system for rovers used by the Lunar Prospecting project at CMU with funding from NASA
- Implemented low-level motor control to actuate a tilting laser scanner
- Implemented the Vandapel-Hebert terrain classification algorithm

Scene Recognition, *Independent Research*

- Developed a method for illumination invariant visual scene recognition through stable keypoints analysis and finding optimal subgraph isomorphisms of feature graphs
- Co-developed an algorithm for segmentation by cutting hypergraphs of geometry-invariant features from separable dichromatic BRDFs

Human Odometer, *Undergraduate Honors Thesis*

- Assisted in construction of a wearable dynamic mapping system and localization suite for first responders on a grant from NIOSH
- Researched and developed sensor web, heuristic Kalman Filtering, and statistical learning methods
- Presented research at the 2005 Advanced Protective Personal Equipment conference

Robotic Fence Maintainer, *Red Team Initiative*

- Constructed a robot to automatically spray vegetation along electric livestock fences
- Provided sensing and navigation consultation and developed fence detection and avoidance system using LIDAR and vision

Robotic Intrusion-Detection and Detention, *Undergraduate Research*

- Acquired a grant from Honeywell to conduct research in genetic algorithms, automated security, and asynchronous team search
- Developed extensive hardware and software for the embedded TINI platform to construct a simulation environment and test bed for a multi-agent robotic system

Intelligent Robotic Theater, *Independent Research*

- Built an animatronic robotic greeter that included voice recognition and vision based object detection to interact with other robots and humans
- Adapted the MVSIS logic package for inductive learning using Boolean minimization

PUBLICATIONS

A. Morris, U. Wong, Z. Omohundro, et al. "3D Modeling of Subterranean Environments by Robotic Survey." Submitted to Conference on Field and Service Robotics, 2007

U. Wong, C. Lyons, S. Thayer. "An Analysis of the Human Odometer." Tech. Report, CMU-RI-TR-05-47, Robotics Institute, Carnegie Mellon University, September, 2005

M. Perkowski, T. Sasao, A. Iseno, U. Wong, et al. "Use of Machine Learning Based on Constructive Induction in Dialogs with Robotic Heads." Proc. International Conference on Rehabilitation Robotics. S. Korea, April 23-25, 2003

M. Perkowski, U. Wong. "A New Approach to Robotic Imitation of Behaviors by Decomposition of Multiple-Valued Relations." Proc. International Boolean Workshop. Freiberg, Germany, Sept 19-20, 2002

HONORS

Edward J. Sargent scholarship for Electrical Engineering

Judge's Choice award for Human Odometer project in 2005 Lockheed Martin/Eta Kappa Nu project competition

Member of Eta Kappa Nu honors society

Member of Tau Beta Pi honors society

Member of National Society of Collegiate Scholars

Dean's List Honors Fall 2002 – Fall 2003, Fall 2004 – May 2006

SELECTED COURSES

Computer Architecture, Programming Language Design, Compiler Design, Mobile Robot Programming Lab*, Subterranean Robotics*, Mechatronic Design*, Semantics of Programming Languages*, Mobile Robot Design*, Computer Vision*, Advanced Topics in Semantics*, Sensing and Sensors*, Physics-based Methods in Computer Vision*, Math Foundations of Robotics*, Machine Learning*, Kinematics Dynamics and Control*, Statistical Techniques in Robotics*, Vision Sensors

**graduate level course*

SKILLS

I have extensive background in robotics, software engineering and systems verification. I am experienced in programming C, C++, Standard ML, Matlab, Visual Basic, Java, Scheme, Verilog, x86 and MIPS.