

# Matthew T. Brewer

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5840 Hobart Ave. Pittsburgh, PA. 15217

## Education

- B.S., Computer Science, minor in Math. Carnegie Mellon University, Pittsburgh, PA. 2006

## Skills

- Proficient in SML, OCaml, C, C++, x86 assembly, Java, sh, L<sup>A</sup>T<sub>E</sub>X
- Some experience in Matlab, Visual Basic, Pascal, Python, and others.
- \*nix administration, Comfortable soldering, and with physical systems assembly.
- Algorithms design and usage, Logic/Type theory, and proofs.
- Teaching (including high school students, college level students, educators, senior citizens).

## Publications

- S. Uppala, D. R. Karuppiah, M. Brewer, S. Chandu Ravala, R.A. Grupen (2002)  
On Viewpoint Control. *proceedings IEEE ICRA*

## Experience

**CMU Operating Systems TA** - Fall 2006, Spring 2007

- Helped to modify curriculum, wrote support code, helped students face to face, held office hours, and graded students work

**National Robotics Engineering Center** - Summer 2005

- Ported existing LAGR mobile robot system (hardware and software) to use experimental Flash Lidar Cameras for obstacle detection/avoidance. This involved everything from rewiring the robot, to kernel driver hacking and testing and calibration of the cameras. We then demoed the system for a walk through tour at the Penn State Optics Lab.

**CMU Biorobotics Lab** - Summer 2004

- Worked on a planning system for highly articulated robots. This involved development of a computational geometry library for computing local minima, and a test program in the form of a ray-tracer.

**CMU Physics TAA** - Fall 2003/Spring 2004

- For Matter and Interactions I and II - responsibilities include: grading, holding office hours, and helping students during class.

**UMASS Laboratory for Perceptual Robotics** - Summers 2000 through 2003

- For a mobile robot, reimplemented Fox and Thrun's sonar-based localization algorithm, as well as designing and implementing an innovative two-layer harmonic function based path planning system.
- Rewrote the low-level robot interface for an RWI robot by combining CMU's GPL'd CARMEN project, and the GPL'd Player project. This also involved reverse engineering of the serial line protocol. The resultant code is now on SourceForge and in use at several other research institutions.
- As part of a group, built and demonstrated a system allowing a user to control a robot at various levels of abstraction via a wearable computing interface, including rendering the robot into a 3D model of the environment in real-time.

## Relevant Coursework Includes

- Operating systems (15-410): Wrote a minimal operating system kernel with such basic functionality as virtual memory, a preemptable kernel, and preemptive scheduling.
- Hot Compilers (15-501): Wrote the upper levels of a compiler for SML. This includes type-inference, elaboration, phase-splitting, CPS conversion, and of course, type checking.
- Artificial Neural Networks (15-496): Studied, wrote, and experimented with various practical neural network systems, such as the ALVINN car driving project.
- Intensive Introduction to Computational Complexity Theory (15-855): Studied various models of computation and used them to analyze the computational difficulty of various problems.
- Lambda Calculus (21-805): Studied the mathematical perspective of the simply typed lambda calculus.

## Interests

- Provable/ultra-stable systems (microkernels).
- Parallel systems utilization.
- Type safe compilers, creating a higher order typed systems language.
- Neural networks research: Played with neural network, and other AI models since early high-school.
- Developer for PlayerStage robot interface library project on SourceForge.

## Future Plans

- Interesting systems or type theory research or job.
- Eventually Grad School in Type Theory and Systems.
- Research, Teaching, and Open Source Development.