SPENCER AHRENS

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CURRENT COURSEWORK

Massachusetts Institute of Technology Grad student in MechE – *enrolling Feb 2007*

University of California at Berkeley B.S. Mechanical Engineering – *May 2006*

3.56 AGPA, Computer Science minor, honors physics.

Technical Electives – 3.66 GPA

Aerodynamics (me163), Lagrangian Dynamics (me175), Microfluidics (me167), Microprocessor Controlled Mechanical Systems (me135), Programming Language Compilers and Security (cs164), Software Engineering (cs169), Computer Graphics (cs184).

WORK EXPERIENCE

Contract Engineer MIGA Motor Company – *Aug 2006 - Present*

Developed shape memory alloy actuator user interface and control demonstration kit for BASIC Stamp controller. Developing second generation actuator with reduced size and increased durability. Expanding product line into rotary motion. Working with Dr. Mark Gummin.

- migamotors.com

Independent Researcher UC Berkeley – *May 2005 - Present*

Developed low power sensor systems with micro-scale renewable energy sources. Learned and employed theoretical energy maximization, circuit design, circuit fabrication, embedded software development, java based data collection and analysis, and HVAC control algorithms. Worked with Professor Paul Wright and Ph.D. candidate Nathan Ota of the Berkeley Mechanical Engineering department.

- dr.me.berkeley.edu

Independent Researcher UC Berkeley – *Feb 2005 - Present*

Developed a bipedal robot capable of walking based on neural networks and central pattern generators. Worked as mechanical lead building SolidWorks model to be interfaced with PSPICE circuit models to simulate walking dynamics in COSMOSMotion. Circuits implement analog solution to reaction-diffusion ODEs for walking gait waveforms which are translated to PWM signals to control servos in the robot joints. Worked with Professor Leon Chua and Ph.D. candidate Bharathwaj Muthuswamy of the Berkeley EECS department, and Professor David Auslander of the Berkeley Mechanical Engineering department.

- nonlinear.eecs.berkeley.edu/raptor

Independent Researcher UC Berkeley – *August 2004 - Dec 2004*

Partially developed a prosthetic knee capable of power assisted stair ascent. Emphasized energy regeneration technology to increase efficiency of operation. Worked with Professor Homayoon Kazerooni, head of the Berkeley Human Engineering Lab in the Mechanical Engineering department.

- bleex.me.berkeley.edu

Undergraduate Research Assistant UC Berkeley – *Jan 2004 - May 2004*

Improved and rebuilt a portable haptic interface workstation for integration with Berkeley's Collaborative Haptic Mark-Up Environment software. Modified system for optimization of user interface and optical parameters. Supervisor Sara McMains, University of California, Berkeley. Full report available upon request.

Consultant Griffo Brothers, Inc – *June 2003 - Aug 2003*

Brainstormed ideas and developed code for an automatic tool calibration system on Mazak milling machines equipped with Renishaw instruments.

- griffobros.com

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SKILLS AND TRAINING

Project Management – Berkeley Solar Car *Aug 2005 - Present*

Dynamics Team Lead - Responsible for development of steering, suspension, and braking subsystems and integration with body, fairings, and chassis sub groups. Coordinated work amongst three freshman and more experienced students. Taught new members everything that is needed to know for the design dynamic vehicle systems.

Project Management – Human Powered All-Terrain Vehicle *July 1998 - Aug 2002*

Principle design engineer and construction coordinator. Worked closely with a small group to design vehicle. Modeled and drafted vehicle, fundraised, promoted, welded, machined, piloted in race. Won various regional awards.

Project Management – FIRST robotics competition *Aug 2001 - July 2002*

Drove project inception. Directed principle design work and drafting of blueprints and draft layouts. Integrated independent systems and coordinated resources among 18 students. Machined, soldered, and assembled components. Winner of Pacific Northwest regional competition (34 competitors) and the Motorola Quality Award. Won first round of 2002 Nationals with 73 competitors.

Circuit Design and Fabrication – Various Projects *May 2005 - Present*

Conceptualized, designed, machined, and soldered 2 layer circuit boards for ultra low power solar and vibration energy harvesting systems for use with low power wireless sensor systems. Circuits included digital and analog surface mount ICs.

Rapid Prototyping – Wireless Node Based HVAC Control *May 2005 - Aug 2005*

Designed parts and constructed them with fused deposition rapid prototyping techniques. Primarily ergonomic cases designed for convenient snap together assembly and aesthetics.

Construction and Metalworking – Various projects *July 1998 - Present*

MIG welding (primarily aluminum), CNC milling, composite processes (carbon and Kevlar vacuum and non-vacuum processes), machining I and II classes at Linn-Benton Community College covering advanced mill and lathe projects.

Mechanical Design and Analysis – Berkeley Solar Car *Aug 2004 - Present*

Conceptualized, designed, modeled, analyzed and constructed steering system and several suspension components. Analyzed highway driving dynamics analytically, designed and analyzed components using finite element analysis, primarily through the COSMOSWorks software package for SolidWorks.

Software and Programming Languages – Proficiencies *Aug 2002 - Present*

SolidWorks, EAGLE, PSPICE, AutoCAD, MasterCAM, Java, tinyOS/nesC, Matlab, C, C++, C#, BASIC, Verilog HDL, MIPS and x86 assembly.

PUBLICATIONS AND AWARDS

Nathan Ota, Spencer Ahrens, and Paul Wright, poster: *Residential Energy Management with TinyOS*, TinyOS Technology Exchange III, Stanford, CA, February 2006 – Most Significant Benefit to Society Award.

Demand Response Group, presentation to CA Energy Commission: *Wireless Sensor Networks Reduce Peak Loads in CA*, UC Berkeley, June 2006 – Contributing Student.

B. Muthuswamy, I. Szatmari, L. Chua, S. Sastry, poster: *Cellular Neural Network Based Central Pattern Generators for Bipedal Walkers*, Berkeley EECS Research Symposium 2005, February 2005 – Contributing Student.

North American Solar Challenge 2005 – 2nd place in stock class

Engineering 28 Class Competition – Spring 2003 Champions

FIRST Robotics 2002 – Motorola Quality Award

FIRST Robotics 2002 Pacific Northwest Regional Competition – Champions

FIRST Robotics 2002 National Competition – Won first two matches

National Merit Scholarship Finalist

Da Vinci Days Kinetic Sculpture Competition – Various awards for four vehicles from 1999-2002

REFERENCES

Mark Gummin, Ph. D. – General Manager of MIGA Motor Company
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- me.berkeley.edu/faculty/wright

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