

# Dane Powell

☎ 713-348-2300

✉ [danep@rice.edu](mailto:danep@rice.edu)

🌐 [danepowell.com](http://danepowell.com)



*Note that some parts of this document (e.g. GPA and sensitive contact information) have been redacted for web publication*

---

## Education

- Jun 2011– Present **Ph.D. (expected)**, *Rice University*, Houston, TX, — GPA.  
Mechatronics and Haptic Interfaces Lab
- Jan 2011– Jun 2011 **Study Abroad**, *University of British Columbia*, Vancouver, BC.  
Sensory Perception and Interaction Research Group
- May 2008– Dec 2010 **M.S. Mechanical Engineering**, *Rice University*, Houston, TX, — GPA.  
Mechatronics and Haptic Interfaces Lab
- Aug 2003– May 2008 **B.S. Mechanical Engineering**, *Rice University*, Houston, TX, — GPA.  
Specialization in robotics, system dynamics and control. President's Honor Roll.
- Aug 2006– Dec 2006 **Study Abroad**, *Queen Mary, University of London*, London, UK, — GPA.

---

## Master's Thesis

- title *Implementation and Analysis of Shared-control Guidance Paradigms for Improved Robot-mediated Training*
- advisor Dr. Marcia K. O'Malley
- description Many dynamic tasks have a clearly defined optimal trajectory or strategy for completion. Human operators may discover this strategy naturally through practice, but actively teaching it to them will increase their rate of performance improvement. Haptic devices, which provide force feedback to an operator, can physically guide participants through the optimal completion of a task, but this alone does not ensure that they will learn the optimal control strategy. In fact, participants may become dependent on this guidance to complete the task. This research focuses on developing and testing ways in which guidance can be modulated such that it conveys the proper task completion strategy without physically dominating the operator and thus encouraging dependency. These guidance schemes may also be applied to the real-time execution of tasks in order to convey computer-generated task completion strategies to a user without allowing the computer to physically dominate control of the task.

---

## Publications

Dane Powell and M.K. O'Malley. Efficacy of shared-control guidance paradigms for robot-mediated training. In *IEEE World Haptics Conference*, Istanbul, Turkey, 2011.

Dane Powell. Implementation and analysis of shared-control guidance paradigms for improved robot-mediated training. Master's, Rice University, Houston, 2010.

Dane Powell and Marcia K. O'Malley. Co-presentation of force cues for skill transfer via shared-control systems. In *16th Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (HAPTICS)*, 2010.

Ozkan Celik, Dane Powell, and Marcia K. O'Malley. Impact of visual error augmentation methods on task performance and motor adaptation. In *IEEE 11th International Conference on Rehabilitation Robotics (ICORR 2009)*, pages 793–798, 2009.

---

## Research

Jan 2011–  
Jun 2011 **Improved Touch-Sensing for the Haptic Creature**, *SPIN Lab*, University of British Columbia, Vancouver, BC.

Aug 2008–  
Dec 2010 **Shared Control for Robot-mediated Skill Transfer**, *MAHI Lab*.  
This is my thesis research. Read more at [http://mahilab.rice.edu/project/skill\\_transfer](http://mahilab.rice.edu/project/skill_transfer).

Dec 2008–  
June 2009 **Laptics: A Low-cost Haptic Laparoscopic Surgical Simulator**, *MAHI Lab*.  
Laparoscopic surgeons currently train using either physical or virtual mock-ups of virtual environments. Physical training environments are limited in their versatility and ability to provide objective performance feedback, while virtual environments and the associated hardware can be prohibitively expensive and thus limit the amount of training that surgeons receive. In cooperation with students in the Rice Department of Computer Science and residents from Baylor College of Medicine, we developed Laptics: a low-cost haptic-enabled training environment intended to teach gross skills to surgeons before they proceed to the more advanced (and expensive) simulators. Costs were kept low by using off-the-shelf Novint Falcons (\$150) and keeping the system requirements of the simulator low, so that it can be run on any modern laptop. Additionally, Laptics is unique among surgical simulators in that it supports up to 4 haptic devices (such as the Falcons) simultaneously, so that a surgeon can train simultaneously with tools, cameras, and/or an assistant.

Jan 2008–  
Jan 2009 **Robot-assisted Rehabilitation for CIMT**, *MAHI Lab in collaboration with BCM*.  
Read more about this project at the MAHI Lab website. I developed a more stable and streamlined user interface using C++ and OpenGL for use by patients and therapists, and developed data analysis procedures for providing quick and object feedback to patients using robotic measures such as trajectory error, smoothness of movement, and hit count. Read more at [http://mahilab.rice.edu/project/cimt\\_corr](http://mahilab.rice.edu/project/cimt_corr).

Jan 2008–  
Jan 2009 **Automation for Electron Cryomicroscopy**, *MAHI Lab in collaboration with BCM*.  
I developed a proof-of-concept demonstration of a completely automated cryomicroscopy sample grid preparation process. Read more at <http://mahilab.rice.edu/project/cryo>.

Aug 2008–  
Dec 2008 **Impact of Visual Error Augmentation Methods on Task Performance and Motor Adaptation**, *MAHI Lab*.  
This project focused on how amplifying perceived error in a visually-distorted reaching task can increase the rate and quality of motor adaptation to the visual distortion. Read more at <http://mahilab.rice.edu/project/rof>.

- Aug 2007–  
May 2008 **Thermal Energy Storage System, Rice University Senior Design.**  
Thermal energy storage systems operate by "storing" thermal energy in a phase-change material during off-peak hours when electricity is less expensive and air handling systems are more efficient, and then "releasing" that energy during on-peak hours, thus saving electricity and money. We focused on developing a system using novel techniques and materials that is inexpensive enough for use in homes as small as 500 sq ft.

---

## Vocational Experience

- May 2008–  
Present **Graduate Research Assistant, Rice University Department of Mechanical Engineering and Materials Science, Houston, TX.**
- Jan 2007–  
Present **Teaching Assistant, Rice University, Houston, TX.**  
Instructed and graded for several upper-level mechanical engineering classes and labs
- Jun 2005–  
Present **Web Developer, FDAISO.com, mahilab.rice.edu, et al.**  
More information at <http://danepowell.com/portfolio>
- May 2007–  
Aug 2007 **Engineering Consultant, Nimbic Systems, Houston, TX.**  
Developed a patent-pending surgical site isolation device; designed and executed a research study into operating room air quality
- May 2004–  
Aug 2006 **Banker, CSR, Sales Specialist, REI (Recreational Equipment, Inc), Austin, TX.**
- Aug 2005–  
May 2006 **Campus Computing Associate, Rice University, Houston, TX.**  
Provided technical support to students and staff at our college, as well as helping to maintain the network and college-owned computers
- May 2003–  
Aug 2003 **Database Developer, Susan G Komen Race for the Cure, Houston, TX.**  
Provided technical support to students and staff at our college, as well as helping to maintain the network and college-owned computers
- 2001,2003 **Intern, Zebra Imaging, Austin, TX.**  
Helped to design, build, and test prototype computerized lighting systems used to create short, full-motion holographic "videos" and special effects.

---

## Activities

- ? **Guest Lecturer, RCEL.**
- May  
2008–Present **Volunteer contributor, Drupal.**  
Drupal, a free open-source content-management system (CMS), is one of the world's most popular CMS platforms and used by sites including WhiteHouse.gov. I develop and contribute "modules" (feature-extending code) back to the Drupal project and community, and build Drupal-based websites that are used by a number of Rice Organizations including ROPE, MAHI Lab, NPL, and MRSL. More information at <http://danepowell.com/fserver>, <http://danepowell.com/portfolio>, and <http://drupal.org/user/339326>
- May 2008–  
Present **Trip Leader, Webmaster, Rice Outdoors Programs and Education.**  
I regularly lead groups of 6-10 students on climbing and camping trips around Texas and neighboring states and assist with the planning and execution of numerous clinics and special events every semester. I am also a member of the program's strategic planning committee. I am currently developing a Drupal-based content, inventory, reservation, and member management system that will make our program a leader in the outdoors industry.

- Jan 2004–  
May 2008 **President, Webmaster, Rice Outdoors Club.**  
As president and webmaster, I tripled the membership of the club to 150 annual paying members, with several hundred more participating in over 100 events annually, making us the single largest club at Rice. I also wrote a custom PHP-based content, inventory, reservation, and event-management system with more features than that of any known campus outdoors organization. The Rice Outdoors Club merged with and assumed the name of Rice Outdoors Programs and Education (ROPE), in which I am still involved (see above).
- Aug 2008–  
2009 **Member, Rice Robotics Club.**
- Jan 2007–  
May 2008 **President, Founder, Rice Triathlon Club.**  
The Rice Triathlon Club was an organization whose goal was to promote multisport participation at Rice University, with plans to host an on-campus triathlon which I have been a principle organizer of. It has been succeeded by the Rice University Cycling and Triathlon club.
- Aug 2003–  
May 2004 **Sound Designer, Engineer, The Rice Players.**  
Designed roughly half a dozen shows with the Players as well as other community organizations
- Contributing Writer, Rice Thresher and OPEN Magazine.**

## Computer skills

CAD Software	Inventor, SolidWorks, CFDesign	Haptic Software	X3D, H3D, HDAL
CMS Software	Drupal, Sharepoint	Academic Software	Matlab, Mathematica, SPSS, SAS
Languages	C++, PHP, MySQL, XHTML, CSS, JS	Development Software	SVN, Git, MSVS7/8/9, Komodo, Eclipse, CMake, Doxygen, etc

## Awards and Honors

- Fall 2011 - Recipient of NASA Space Technology Research Fellowship
- Summer 2003 - Texas Aerospace Scholars Design Competition - Winner - Nominated by a Texas State Legislator to participate in TAS, a year-long relationship with NASA that includes individual design projects and mentoring by NASA engineers and astronauts, culminating in a week-long hands-on design competition at NASA's Johnson Space Center; as elected systems manager I led our team to an overall victory
- Fall 2003 - Rice LegoLab Engineering Design Competition - Winner - Designed the winning robot in an annual competition between over 24 teams of engineers. More info at <http://www.owlnet.rice.edu/elec201/>
- Recipient of Merit Scholarship for Aspiring Aerospace Engineers

## Theatre Work

- Sound Designer - And Baby Makes Seven (Rice Players)
- Sound Operator/Engineer - Terra Nova (Rice Players)
- Sound Designer - Red Scare on Sunset (Rice Players)

- Sound Operator - SAS Night 2004 (campus cultural awareness event)
- Sound Operator/Engineer - St. Andrew's Evening of Music (fundraiser for merit-based scholarships)

## Outdoor and Medical Certifications

- Red Cross First Aid / CPR Certified
- NOLS Wilderness First Aid Certified
- Leave No Trace Certified Trainer

## Teaching

- Completed requirements for Rice OGPS Teaching Certificate

Spring 2007 **TA**, *Mech 331*.

Fall 2008 **TA**, *Mech 431*.

Spring 2009 **TA**, *Mech 420*.

Fall 2009 **TA**, *Mech 308/407*.

Spring 2010 **TA**, *Mech 308/408*.

Fall 2010 **TA**, *Mech 308/407*.

Fall 2011 **TA**, *Mech 308/407*.