

RAJINDER SODHI

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EDUCATION

University of Illinois at Urbana Champaign, Urbana, IL
Ph.D. in Computer Science
Adviser: Professor David Forsyth, Brian Bailey

Present

University of Illinois at Urbana Champaign, Urbana, IL
Master of Science in Computer Science
Adviser: Professor Roy Campbell
GPA: 4.0/4.0

2008 - 2010

University of Illinois at Urbana Champaign, Urbana, IL
Bachelor of Science in Computer Science with Honors
GPA: 3.7/4.0

2003 - 2008

RESEARCH INTERESTS

Human Computer Interaction and Computer Vision, with a focus in exploring novel displays and interaction using spatial augmented reality, projector camera systems, physical and tactile interfaces, 3D scanning and real-time recognition and tracking.

RELATED EXPERIENCE

University of Illinois at Urbana Champaign
Computer Vision Group
Qualcomm Fellow

2010 - Present

Working on novel techniques for around-device interaction with mobile devices. We are specifically exploring the design space made possible by simulating depth sensors embedded in mobile phones.

Microsoft Research, Redmond
Research Intern

Summer 2011

Prototyped a projector depth camera system that projects visual hints on a user's body to guide their movement in space.

Walt Disney Imagineering
Research Associate

Summer 2010

Prototyped a multi-projector camera system that takes camera images and creates an image as if it were seen by a projector. The system is currently being productized for use in theme parks and we are still actively involved in its development.

Research Associate

Summer 2009

Prototyped an interactive projection mapping system with real-time tracking for use in theme parks.

University of Illinois at Urbana Champaign
Cultural Computing Group
Research Assistant

2009 - 2010

Working on novel interaction techniques and gestural interfaces with projection-based surfaces. Deployed a new projector camera system for use in live dance performances and demonstrations.

University of Illinois at Urbana Champaign
ORCHID Research Group
Research Assistant

2008 - 2009

Researching computational tools that foster individual and collaborative creativity in the early conceptual stages of design.

PUBLICATIONS

- R. Sodhi**, Benko H., Wilson A. Projected Visualizations for Hand Movement Guidance, Submitted to *SIGCHI: Proceedings of Human Factors in Computing Systems, 2012.* **2012**
- B. Jones, **R. Sodhi**, D Forsyth, B. Bailey. Mobile Free-space Interaction Techniques for Multi-Scale Navigation. Submitted to *SIGCHI: Proceedings of Human Factors in Computing Systems, 2012.* **2012**
- B. Jones, **R. Sodhi**, R. Campbell, G. Garnett, B. Bailey. Build Your World and Play in It: Interacting with Surface Particles on Complex Objects. To Appear in *ISMAR: Proceedings of the IEEE International Symposium on Mixed and Augmented Reality, 2010. Best Paper Award* **2010**
- Venkataswamy, A., **R. Sodhi**, Y. Abdildin, and B.P. Bailey. Groupware for Design: an Interactive System to Facilitate Creative Processes in Team Design Work. *Proc. Of Hawaii International Conference on System Sciences (HICSS-42), 2009.* **2009**

TEACHING EXPERIENCE

- CS 101: Introduction to Computing for Engineers & Scientists** **Fall 2008**
Teaching Assistant for Prof. Thomas Gambill. Taught three lab sections to supplement lecture material. *Ranked as Excellent University instructor by students.*

ACADEMIC PROJECTS

- Open Light** **2011**
Advised by Professor David Forsyth, University of Illinois at Urbana-Champaign
Will co-develop an open source 3D structured scanner that uses multiple off the shelf projectors and cameras.
- Locally Optimal Projection** **2010**
The Locally Optimal Projection operator published at SIGGRAPH 2007 by Yaron Lipman, et. al, was re-implemented and used for surface approximation of point-set data from LIDAR scans.
- Projection Mapping Toolkit** **2009**
The PMT's is a series of tools that includes preview plug-in for Maya for real-time feedback while mapping animated video textures to a physical surface. The PMT was deployed in a series of performances (see The Magic Flute).
- Automatic Projector Calibration with Embedded Light Sensors** **2009**
A projector displays a series of Gray-code binary patterns, which photosensors embedded in physical object receives and decodes. With this information, we can determine the position of the sensors and the parameters of the projector.
- IdeaSpaces - Undergraduate Thesis (Prof. Brian Bailey)** **2008**
An early prototype of a collaborative system informed by results from a user study that explored group processes and accompanying bottlenecks related to design work.

SELECTED PERFORMANCES/ARTWORK

- HASTAC** **2010**
Used Surface Interaction Engine (*ISMAR 2010*) equipped with IR tracking and integrated 3D scanning in a live dance performance. Performers embedded with accelerometers drove the behavior of surface particles projected on an abstract sculpture.
- Astral Convertible** **2010**
Helped with projections on tower set pieces in a reimagining of a famous dance performance choreographed by Trisha Brown.
- The Magic Flute** **2009**
Created a virtual character to portray The Queen of the Night. The digital character was projected on a physical bust lip-syncing to the 1984 version of the opera performance.

AWARDS

- Qualcomm Innovation Fellowship **2011 – 2012**
Siebel Scholar Fellowship **2009 – 2010**

UIUC CS Grad Student Expo, Best Research Presentation	2010
Millennium Scholarship	2003 – 2005
Barringere Cello Music Scholarship	2003 – 2005

STUDENT'S SUPERVISED

Brian Tran Independent Study, with Roy Campbell. Developing novel interfaces on any user-constructed surface.	2010 – Present
Ryan Humphries Independent Study, with Roy Campbell. Developing open source 3D structured light framework.	2010 – Present
Barry Lau Independent Study, with Roy Campbell. Helped write software to reduce the latency for automatically calibrating a projector with embedded light sensors.	2008 – 2009
Simon Meisthinkas Independent Study, with Roy Campbell. Built interactive Maya preview for texturing physical surfaces.	2008 – 2009

SELECTED WORK APPEARING IN

Web and Blogs:

Hack A Day (2010). "Projector Introduces Augmented Reality to Reality." Nov. 19th.
EDream (2010). "Feature: Augmented Reality." Nov 19th.
Korea IT Times (2010). "Better Than Real." Oct 19th.
Create Digital Motion (2009). "Begone, Flat Screens! A New Projection Mapping, Augmented Reality Toolkit." Mar. 3.

SKILLS

Programming: C, C++, JavaScript, Flex/Flash, ActionScript 3.0, PHP, Python, OpenGL, VTK, CUDA, Assembly
Applications: Matlab, Eclipse, Adobe Creative Suite, Photoshop, Illustrator, Visual Studio, MS Office, Maya
Sample Coursework: Computer Vision, Ubiquitous Computing, User Interface Design, Programming
 Massively Parallel Architectures, Scientific Visualizations, Numerical Analysis
Languages: Punjabi, Spanish

SERVICE

Reviewer
SIGCHI '10

Member
IEEE Student Member
Association for Computing Machinery Student Member
ACM Local Student Chapter President (2004)

Volunteer
ACM SIGCHI 2009 (student volunteer)
Provena Covenant Medical Center (Cardiac Rehabilitation volunteer)