Gabe Johnson

Computational Design
Carnegie Mellon University
September 18, 2012

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Education

Ph.D., Carnegie Mellon University (2012)
Computational Design

B.S., University of Colorado, Boulder (2002)
Computer Science

Research Interests

Design; Human-Computer Interaction (HCI); Software Engineering; Creativity Support; Sketch-Recognition User Interfaces; Computer Supported Cooperative Work (CSCW); Information Visualization; Computer Aided Design and Modeling (CAD/CAM)

Current Project

Starting software company in Boulder, CO to commercialize my dissertation work on sketch-based modeling. Funded by NSF I-Corps. See *Sketch It, Make It* at `http://sketchitmakeit.com`.

Research Projects

Sketch-based interaction techniques for design environments: Thesis work on techniques for interacting with sketch recognition-based design environments. See URL for *Sketch It, Make It* above. (September 2010 to August 2012)

Design Tools for SDR Networks: Building tools to support designers of software-defined radio and Cognitive Radio. Part of *Ravenshield* project at Stevens Technical Institute. (September 2009 to September 2010)

Sketching games: Internet-based games for collecting information on how people make and describe hand-made sketches using 'human computation' techniques. (December 2008 to September 2009)

FlatCAD: Design system for algorithmic generation of form with domain-specific programming language *FlatLang* for output of physical models using rapid prototyping machinery. (September 2006 to May 2008)

Flow Selection: Time-based, modeless interaction technique for pen-based selection and operation. (October 2005 to May 2006)

Designosaur: Sketch-based interface for designing creatures for output to rapid prototyping device such as a laser cutter or 3D printer. (August 2005 to 2006)

Professional Experience

Research Programmer — September 2009 to August 2010
Stevens Technical Institute — Hoboken, NJ
Studied technical and social aspects of software-defined radio (SDR) development to make design tools for SDR networks.

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Software Engineering Intern — Summer 2008
Google — Boulder, CO
Developed search feature in Google 3D Warehouse to make it easier for designers to find appropriate models for their work. Also built support for this in Google SketchUp 7.

Graduate Research Assistant — 2005-2008
Carnegie Mellon University, Computational Design Lab (codelab) — Pittsburgh, PA
Projects related to computationally enhanced construction kits and crafts, including the *Designosaur* and *FlatCAD/FlatLang*.

Research Internship — Summer 2006
Ricoh Innovations, Inc. — Menlo Park, CA
Applied Flow Selection and sketch interaction to an experimental electronic document pad.

Software Engineer — 2002-2005
ReadyTalk — Denver, CO
Developed commercial web and audio conferencing system in Java.

Undergraduate Research Assistant — 1998-2002
University of Colorado — Boulder, CO
Center for LifeLong Learning and Design, Computer Science Department. Assisted graduate students and faculty on various HCI projects.

Software Engineering Intern — Summer 2001
humanIT AG — Sankt Augustin, Germany
Ported commercial information visualization system (InfoZoom) to mobile devices.

Research Engineer — Summer 2000
University of Colorado — Boulder, CO
Department of Applied Mathematics. Led development of the Mathematical Discussion System, a system for embedding conversations about math in online mathematics texts.

Guest Teacher — Fall 2001-Spring 2002
New Vista High School — Boulder, CO
Taught high school students how to program in various languages (Java, Python, HTML).

Publications

Johnson, G. *Sketch-based Interaction for Designing Precise Laser Cut Items* (2012) Ph.D. Thesis, Carnegie Mellon University.

Johnson, G., M.D. Gross, J.I. Hong, E. Y-L. Do. (2009) *Computational Support For Sketching in Design: A Review.* Foundations and Trends in Human-Computer Interaction. (2)1, p1–93.

Johnson, G. and E. Y.-L. Do. (2009) *Games for sketch data collection.* In C. Grimm and J. J. L. Jr., editors, Eurographics Symposium on Sketch-Based Interfaces and Modeling (SBIM 2009), 2009.

Johnson, G. *Picturephone: A game for sketch data capture.* In IUI '09 Workshop on Sketch Recognition, 2009.

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Johnson, G. (2008) *FlatCAD and FlatLang: Kits by Code* IEEE Symposium on Visual Languages and Human-Centric Computing. Herrsching am Ammersee, Germany.

Johnson, G. (2008) *Sketching for the Refinement Stage of Design* IEEE Symposium on Visual Languages and Human-Centric Computing, Workshop on Sketch Tools for Diagramming. Herrsching am Ammersee, Germany.

Johnson, G. (2007). *A Tiny Ethnography of a Professional Design Studio.* CHI 2007 Workshop on Supporting Design Studio Culture in HCI. San Jose, CA.

Johnson, G. (2006). *Modeless Sketch Interaction Using Flow Select.* CHI 2006 Workshop on Sketching. Montreal, Quebec.

Johnson, G., M.D. Gross, E. Y-L. Do. (2006). *Flow Selection: A Time-Based Selection and Operation Technique for Sketching Tools.* In proc. 8th International Working Conference on Advanced Visual Interfaces (p83–6), ACM Press, Venice, Italy.

Oh, Y., G. Johnson, M.D. Gross, E. Y-L. Do. (2006). *The Designosaur and the Furniture Factory: Simple Software for Fast Fabrication.* Second International Conference on Design Computing and Cognition, Springer, Eindhoven, The Netherlands.

Johnson, G. (2002). *The Mathematical Discussion System.* 2002 Conference on Computer Supported Collaborative Learning, Lawrence Erlbaum, Boulder, CO.

Professional Service

Reviewer, Journal of the Pattern Recognition Society, 2012

Reviewer, ACM Conf. on Designing Interactive Systems (DIS 2012)

Reviewer, ACM Conf. on Human Factors in Computing Systems (CHI 2012)

Reviewer, ACM Conf. on Human Factors in Computing Systems (CHI 2011)

Reviewer, ACM Conf. on Tangible, Embedded and Embodied Interaction (TEI 2011)

Reviewer, ACM Conf. on Creativity & Cognition (C&C 2009)

Reviewer, ACM Symp. on User Interface Software and Technology (UIST 2008, 2009)

Reviewer, Artificial Intelligence for Engineering Design, Analysis and Manufacturing. Special issue on Tangible Interaction for Design. (AIEDAM 2008)

Assistant organizer, Design Research Summer School, Carnegie Mellon University, Summer 2007.

Reviewer, International Conf. on Multimodal Interfaces (ICMI 2006)

Reviewer, Conf. on Designing for User Experience (DUX 2005)

Reviewer, ACM Conf. on Human Factors in Computing Systems, Late-Breaking Papers (CHI 2004)

Student Volunteer Conf. Co-chair, Computer Supported Collaborative Learning (CSCL 2002)

Student Volunteer: CHI 2000, CHI 2001, GROUP 2001

Technical Skills

Java, Objective C, ANTLR, HTML, XML, JSP, SQL, Python, Ruby, Lisp, bash scripting, C/C++, Perl, Linux/Unix, OS X, Emacs, Eclipse, Xcode, ant, git, cvs/svn, programming language design.