

Visual Computing and User Interfaces Group  
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## **RESEARCH INTEREST**

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As computers become faster, smaller and more interconnected, their primary function is shifting from computation to communication. The goal of my research is to develop new computer algorithms and graphically rich user interfaces that enhance visual communication, particularly on small screens. My research combines concepts and methods from visual art, perceptual psychology, information processing, and cognitive science to facilitate a viewer in understanding and interpreting computer imagery.

## **EDUCATION**

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Doctor of Philosophy, June 2005.  
Advisor: Professor Bruce Gooch  
Dissertation Title: Optimizing Computer Imagery for Visual Communication

Master of Science Computer Science, June 2004.  
NORTHWESTERN UNIVERSITY, EVANSTON, IL.

Bachelor of Science in Computer Engineering, with honors, December 2000.  
BANGALORE INSTITUTE OF TECHNOLOGY, BANGALORE, INDIA.

Honors Thesis Title: Behavior Protocols in Internet Auctions  
Honors Thesis Advisor: Professor Yadati Narahari  
Department of Computer Science and Automation,  
INDIAN INSTITUTE OF SCIENCE, BANGALORE, INDIA.

## **RESEARCH EXPERIENCE**

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Senior Researcher, 2006 - present.  
NOKIA RESEARCH CENTER, PALO ALTO, CA.

Currently, working on a joint collaboration project between Stanford University and Nokia Research on topics related to information visualization and summarization, novel ranking algorithms for determining information saliency and new metaphors for visual communication for mobile devices.

Researcher, 2005 - 2006.

NOKIA RESEARCH CENTER, DALLAS, TX.

Worked on technologies of rich media services, i.e. the ability to integrate advances made in the mobile space domain, delivering music, speech, text, raster graphics, scalable vector graphics (SVG) and video. This involves the ability to deliver these modalities, to interact with these modalities, and to do it in a way that allows for the construction, delivery and use of compelling mobile services in an effective and economic manner. This includes contribution to standards (3GPP, OMA, W3C) and developing features to extend SVG to support rich media functionality on Symbian S60 platforms. Several patents were filed and a publication submitted to an IEEE conference. Applications include interactive maps, mobile TV and mobile entertainment.

Involved in the Future UI Program to provide advanced graphics effects, hardware acceleration and optimization to 2D and 3D UI components on S60, S40 and Linux platforms. Exploring a new genre of OpenGL ES 2.0 shader effects for mobile UI. Working with Nokia UI Design team to explore usability concepts and mapping graphics technology to such concepts.

Graduate Research Assistant, 2001 - 2005.

NORTHWESTERN UNIVERSITY, EVANSTON, IL.

**Automatic Image Retargeting**, to provide *effective* small images by preserving the recognizability of important image features during downsizing.

**Semantics**, an information visualization method for automatically generating semantically enhanced file icons in desktop applications.

**Vector-Based Animation Retargeting**, to enable *Flash* animations created for the World Wide Web to accommodate the aspect ratios of handheld display devices.

**Mona Lisa Smile**, a software system that allows non-artists to easily create novel and interesting portraits that depict conflicting emotional states at varying spatial frequencies. This work is based on psychologists' theories on the secret behind Mona Lisa's enigmatic smile.

## PUBLICATIONS

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### REFEREED JOURNAL AND CONFERENCE PUBLICATIONS

Setlur, V., Xu, Y., Gooch, B. Retargeting Vector Animation to Small Displays. IEEE Transactions on Visualization and Computer Graphics. (under review)

Tian, F., Ao, X., Wang, H., Setlur, V., Dai, G. The Tilt Cursor: Enhancing Stimulus-Response Compatibility by Providing 3D Orientation Cue of Pen, CHI 2007. (accepted)

Setlur, V., Lechner, T., Neinhaus, M., Gooch, B., Retargeting Images to Small Displays for Preserving Information Saliency. IEEE Journal on Computer graphics and Applications (CG&A) 2007.

Capin, T., Haro, A., Setlur, V., and Wilkinson, S., Camera-Based Virtual Environment Interaction on Mobile Devices, 21st International Symposium on Computer and Information Sciences (ISCIS), 2006.

- Setlur, V., Optimizing Computer Imagery for More Effective Communication. ACM Grace Hopper Conference for Women in Computing, 2006.
- Setlur, V., Capin, T., Chitturi, S., Vedantham, R., Ingrassia, M. MORE: A Mobile Open Rich Media Environment. IEEE International Conference on Multimedia and Expo (ICME) 2006.
- Setlur, V., Wilkinson, S. Automatic Stained Glass Rendering. Computer Graphics International (CGI) 2006.
- Setlur, V., Takagi, S., Gleicher, M., Raskar, R., and Gooch, B. Image Retargeting. In the Mobile Ubiquitous Multimedia (MUM) Conference 2005, ACM Press 2005.
- Setlur, V., Chen, X., Xu, Y., Gleicher, M., Shum, H., and Gooch, B. Vector-Based Animation Retargeting. In the Mobile Ubiquitous Multimedia 2005, ACM Press 2005.
- Haro, A., Mori, K., Setlur, V., and Capin, T. Mobile Camera-based Adaptive Viewing. In the Mobile and Ubiquitous Multimedia (MUM) 2005, ACM Press 2005.
- Setlur, V., Albrecht-Buehler, C., Gooch, A., Rossoff, S., Gooch, B. Semanticons: Semantic-Based File Icons. In Eurographics 2005.
- Setlur, V., and Gooch, B. Is That a Smile? Gaze Dependent Facial Expressions. In Proceedings of the 3rd International Symposium on Non-photorealistic Animation and Rendering 2004, pp. 79 - 86, ACM Press, 2004.
- Setlur, V., Shamma, D., and Hammond, K. Towards a Non-Linear Narrative Construction. In Proceedings of the 8th International Conference on Intelligent User Interfaces 2003, pp. 82-86, ACM Press, 2003.

#### TECHNICAL REPORTS AND CONFERENCE PRESENTATIONS

- Setlur, V., Albrecht-Buehler, C., Gooch, A., Rossoff, S., Gooch, B. Semanticons: Semantic-Based File Icons. Northwestern University Technical Report. NWU-CS-04-46, 2004.
- Setlur, V., Takagi, S., Raskar, R., Gleicher, M., and Gooch, B. Automatic Image Retargeting. Conference Abstracts and Applications of ACM SIGGRAPH 2004.
- Setlur, V., Takagi, S., Gleicher, M., Raskar, R., and Gooch, B. Automatic Image Retargeting. Northwestern University Technical Report. NWU-CS-04-41, 2004.

#### TEACHING AND MENTORING

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I am interested in teaching interdisciplinary graduate level courses in information visualization, computer graphics, computational aesthetics, art and perception. At the undergraduate level I am interested in teaching algorithms, data structures, introductory programming courses, web technologies, human computer interaction, and graphics.

#### LECTURER, SAN JOSE STATE UNIVERSITY

Spring 2007, teaching *Mobile Multimedia Technologies*, an undergraduate and graduate course on mobile 2d and 3D Java based graphics APIs, web technologies and Flash Lite.

INDUSTRY MENTOR, STANFORD UNIVERSITY

Fall 2006 - Spring 2007, advising 4 students on a specific joint project between Nokia Research Center, Nokia Design and Stanford Design School's ME 310 course. Mentoring involves feedback, suggestions and advice on presentations and prototypes developed by this student group.

TEACHING ASSISTANT, NORTHWESTERN UNIVERSITY

CS 395/495-25: Non-photorealistic Rendering (with Bruce Gooch), Department of Computer Science, Northwestern University, Winter 2004. Developed class web page, led discussion, and performed evaluation.

CS 330: Human-Computer Interaction (with Ben Watson and Louis Gomez), Department of Computer Science, Northwestern University, Winter 2002. Led discussion, grading and example solutions, office hours.

CS 130: Tools and technology of the World-Wide Web (with Kristian Hammond and Sanjay Sood), Department of Computer Science, Northwestern University, Fall 2002. Grading

CS 336: Design and Analysis of Algorithms, Department of Computer Science, Northwestern University, Spring 2001. Grading.

TEACHING MENTOR, NORTHWESTERN UNIVERSITY

Mentored new graduate students on teaching engineering courses at the Searle Center for Teaching Excellence, Northwestern University in Summer 2002. Prepared teaching material, and course notes, and advised students on teaching techniques and grading.

**PATENTS**

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10 patents pending.

**INVITED TALKS**

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Semantilinks: Context Aware Hyperlinks for More effective Browsing, April 2006, Nokia Exchange for Research and Development (NERD) 2006, Helsinki, Finland.

Vector-Based Animation Retargeting, November 6 2004, the Mid-Graph Conference, Northwestern University, Evanston, IL.

Time Management and Balance: A Graduate School Gathering, October 8 2004, Grace Hopper Conference, Chicago, IL.

Vector-Based Animation Retargeting, November 6 2004, the Mid-Graph Conference, Northwestern University, Evanston, IL.

Is that a Smile? Gaze Dependent Facial Expressions, November 10 2003, the Mid-Graph Conference, Washington University, St. Louis, MO.

A Life Without Friction: Tales from the InfoLab, January 2003, the International Conference of Intelligent User Interfaces, Miami, FL.

## **PRESENTATIONS AND SYSTEM DEMONSTRATIONS**

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Image Retargeting and Semantics. At the first annual Computer Science Department Open House, September 2004.

Image Retargeting and Semantics. McCormick External Advisory Committee, September 2004.

Imagination Environment. At the 8th International Conference on Intelligent User Interfaces (with Ayman Shamma), January 2003.

## **INTERNSHIP**

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Spring 2004, worked on a video processing project at Mitsubishi Electric Research Labs (MERL), Cambridge, MA with Dr. Ramesh Raskar.

Project Description:

Involved in a project to interactively edit video as a 3D volume in the space-time domain. This allows users to perform video fast-forwarding by indicating volumetric areas in 3D space that can be skipped or deleted.

## **FELLOWSHIP**

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2002 Teaching Assistant Fellow at the Searle Center for Teaching Excellence, Northwestern University, Evanston, IL.

Designed and conducted teaching assistant workshops.

## **PROFESSIONAL AFFILIATIONS AND SERVICE**

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General chair of the International Conference on Mobile and Ubiquitous Multimedia (MUM) 2006, held at Stanford University.

Reviewer for SIGGRAPH, Eurographics.

Association for Computing Machinery (ACM).

President of the ACM-W (ACM Women in Computing) organization at the Computer Science Department at Northwestern University (2003- 2004)

The Institute of Electrical and Electronics Engineers (IEEE).

## PRESS RELEASES

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An article on my semanticons work was featured in Technology Research News (TRN).  
[http://www.trnmag.com/Roundup/2005/TRN\\_Research\\_News\\_Roundup\\_12-19-05.html](http://www.trnmag.com/Roundup/2005/TRN_Research_News_Roundup_12-19-05.html)

## REFERENCES

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Professor Bruce Gooch (Doctoral Advisor)

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University of Victoria Computer Science Engineering & Computer Science Building Room 504 PO Box 3055, STN CSC Victoria, BC Canada V8W 3P6. Phone: 250-472-5758.

Professor Pat Hanrahan

E-mail: [hanrahan@cs.stanford.edu](mailto:hanrahan@cs.stanford.edu).

Gates Computer Science Building, Room 370 3B Stanford, CA 94305-4070. Phone: 650-723-8530.

Dr. Ying-qing Xu, Researcher and Project Lead

E-mail: [yqxu@microsoft.com](mailto:yqxu@microsoft.com)

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Dr. Ramesh Raskar, Senior Research Scientist

Email: [raskar@merl.com](mailto:raskar@merl.com)

Mitsubishi Electrical Research Labs (MERL) Cambridge, MA 02139 Phone: 617-621-7533.

Professor Benjamin Watson Associate Professor

E-mail: [bwatson@ncsu.edu](mailto:bwatson@ncsu.edu)

Department of Computer Science, North Carolina State University EBII, 890 Oval Dr, Box 8206, Raleigh, NC 27695-8206 USA. Phone: 919-513-0325.

Professor Bryan Pardo

E-mail: [pardo@northwestern.edu](mailto:pardo@northwestern.edu)

Department of Electrical Engineering & Computer Science, Ford Engineering Design Center, Room 3-323 Northwestern University 2133 Sheridan Road Evanston, IL 60208. Phone: 847-491-7184.

Professor Amy Gooch

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Dr. Ramin Vatanparast, Senior Research Manager

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Professor Tolga Capin

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