
Alark Joshi

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EDUCATION

Yale University

Postdoctoral Associate

“Novel visualization techniques for neurosurgical planning and stereotactic navigation”

Advisor: Dr. Xenophon Papademetris

New Haven, CT
February 2008 - Present

University of Maryland Baltimore County

Ph.D. Computer Science

“Art-inspired techniques for visualizing time-varying data”

Advisor: Dr. Penny Rheingans

Baltimore, MD
November 2007

State University of New York at Stony Brook

M.S. Computer Science

“Innovative painterly rendering techniques using graphics hardware”

Advisor: Dr. Klaus Mueller

Stony Brook, NY
December 2003

University of Minnesota

M.S. Computer Science

“Interactive Visualization of Models of Hyperbolic Geometry”

Advisor: Dr. Douglas Dunham

Duluth, MN
July 2001

University of Pune

B.E. Computer Science

Pune, India
June 1999

RESEARCH AND INDUSTRY EXPERIENCE

Postdoctoral Associate

Department of Diagnostic Radiology, Yale University

- Working on identifying visualization techniques for visualizing vascular data
- Developing novel interaction techniques for neurosurgical planning and navigation
- Developing visualization tools for BiImage Suite, an open source image analysis software

02/08 - Present

Graduate Research Assistant

Department of Computer Science, University of Maryland, Baltimore County

- Developed novel illustration-inspired techniques for visualizing time-varying datasets
- Identified novel visualization techniques for atmospheric physics in collaboration
- Conducted expert evaluations to identify effective visualizations for hurricane exploration

01/04-12/07

Research Intern

Architecture and Technology Group, Vital Images, Plymouth, MN

- Developed a medical reporting prototype using .NET, Direct3D and HLSL
- The volume was rendered using 3D textures and the shaders were written in HLSL
- Developed a single-pass raycaster on the GPU using Rendermonkey on a GeForce FX5600

06/04- 09/04

Research Intern 05/03 - 09/03
Imaging and Visualization Department, Siemens Corporate Research, Princeton, NJ
- Implemented a method to perform hardware accelerated convolution on images and volumes
- Developed a Hardware-accelerated Volume Renderer using 3D texture mapping
- Investigated the use of Non-Photorealistic Volume Rendering techniques

Software Development Intern 05/00 - 09/00
America Online Inc. , Mountain View, CA
- Worked on the Web version of AOL 6.0 Address Book
- Created the User Interface using AOLServer Dynamic Pages (HTML with embedded TCL scripts)
- Fixed bugs for the Netscape Netcenter Address book on the Web
- Ported an application from the GNU Compiler to the Sun C++ Compiler

TEACHING EXPERIENCE

Lecturer 01/10- 05/10
Davenport College, Yale University
- Teaching *Understanding Effective Visual Representations* in the Yale College
- Developed a new data visualization course that emphasizes critical evaluation of data visualizations
- The course aims to instill a thorough understanding of good data visualization principles

Co-Instructor 01/09- 05/09
Department of Biomedical Engineering, Yale University
- Co-Instructor with Xenophon Papademetris for the *Programming for Image Analysis* course
- Created notes and detailed handouts for every class
- Co-taught lectures on computer graphics and volume rendering
- Developed and made available code samples and relevant data

Instructor (via Video Conferencing) 01/09- 05/09
Department of Computer Science and Information Technology, University of Pune, India
- Conducted the *Introduction to Computer Graphics* course to 160 students in Spring '09 semester
- Responsible for teaching lectures using Skype
- Developed and graded assignments and made exams for the class

Co-Instructor 01/08- 05/08
Department of Diagnostic Radiology, MRRC, Yale University
- Co-Instructor with Xenophon Papademetris for the *BioImage Suite Users Training* course
- Created handouts, lecture notes and sample programs
- Taught classes on foundations of computer graphics

Instructor 01/05- 05/05
Department of Computer Science, University of Maryland, Baltimore County
- Taught the *CMSC 435: Introduction to Computer Graphics* course in the Spring '05 semester
- Was responsible for teaching, developing the assignments and making exams for the class

Teaching Assistant
User Interface Development, CSE/ISE333, SUNY Stony Brook Spring 02-03
User Interface Design, CS5551, University of Minnesota Fall 2000
Computer Graphics, CS5721, University of Minnesota Spring 2000
Computer Organization, CS2521, University of Minnesota Spring 2001
Software Development using C++, CS2511, University of Minnesota Fall 99/2000

BOOKS

Xenophon Papademetris and Alark Joshi, *Introduction to Programming for Image Analysis with VTK*, 2nd Edition, 283 pages, November 2009.

Alark Joshi, *Art-inspired Techniques for Visualizing Time-varying Data*, VDM Verlag, 228 pages, 2008.

PUBLICATIONS

Alark Joshi, Dustin Scheinost, Hirohito Okuda, Dominique Belhachemi, Isabella Murphy, Lawrence H. Staib, Xenophon Papademetris, "Unified framework for development, deployment and robust testing of neuroimaging algorithms," *Journal of Neuroinformatics* (submitted), March 2010.

Alark Joshi, Alexander Papanastassiou, Kenneth P. Vives, Dennis D. Spencer, Lawrence H. Staib, Xenophon Papademetris, "Light-Sensitive Visualization of Multimodal Data for Neurosurgical Applications," *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2010.

Levent Alpoge, **Alark Joshi**, Dustin Scheinost, John Onofrey, Xiaoning Qian, Xenophon Papademetris, "A VTK-based CUDA-optimized Non-Parametric Vessel Detection Method," *The VTK Journal*, January 2010.

Alark Joshi, Jesus Caban, Penny Rheingans, Lynn Sparling, "Case Study on Visualizing Hurricanes Using Illustration-Inspired Techniques," *IEEE Transactions on Visualization and Computer Graphics*, vol. 15, no. 5, pp. 709-718, Sep./Oct. 2009.

Alark Joshi, Dustin Scheinost, Hirohito Okuda, Isabella Murphy, Lawrence H. Staib, Xenophon Papademetris, "Unified framework for development, deployment and testing of image analysis algorithms", 2009 MICCAI Workshop on Systems and Architectures for Computer Assisted Interventions, September 2009.

Alark Joshi, Dustin Scheinost, Marisa Spann, Xenophon Papademetris, "Evaluation of Multi-viewport based visualization for Electrode Navigation during Stereotactic Image Guided Neurosurgery", (Oral presentation), *International Brain Mapping and Interoperative Surgical Planning Society's 6th World Congress for Brain Mapping and Image Guided Therapy*, August 2009.

Alark Joshi, Dustin Scheinost, Kenneth P. Vives, Dennis D. Spencer, Lawrence H. Staib and Xenophon Papademetris, "Novel interaction techniques for neurosurgical planning and stereotactic navigation," *IEEE Transactions on Visualization and Computer Graphics*, vol.14, no.6, pp.1587-1594, Nov.-Dec. 2008.

Alark Joshi, Xiaoning Qian, Donald P. Dione, Ketan R. Bulsara, Christopher K. Breuer, Albert J. Sinusas and Xenophon Papademetris, "Effective visualization of complex vascular structures using a non-parametric vessel detection method," *IEEE Transactions on Visualization and Computer Graphics*, vol.14, no.6, pp.1603-1610, Nov.-Dec. 2008.

Alark Joshi and Penny Rheingans, "Evaluation of illustration-inspired techniques for time-varying data visualization," In *Proceedings of the Eurographics/IEEE TCVG Symposium on Visualization* (Eindhoven, Netherlands, May 26-28, 2008), *EuroVis* 2008.

Jesus Caban, **Alark Joshi** and Penny Rheingans, "Texture-Based feature tracking for effective time-varying data visualization," *IEEE Transactions on Visualization and Computer Graphics*, (Vol. 13, No. 6), pp. 1472-1479, 2007.

Jesus Caban, **Alark Joshi** and Paul Nagy, "Rapid Development of Medical Imaging Tools with Open Source Libraries," *Journal of Digital Imaging* 20(1), pp. 83-93, 2007.

Alark Joshi and Penny Rheingans, "Illustration-inspired techniques for visualizing time-varying data," *Proceedings of the IEEE Visualization 2005*, pp. 679-686.

Alark Joshi and Penny Rheingans, "Pointillism-inspired visualization of attribute change in time-varying data," *Transactions of Visualization and Computer Graphics 2010* (In preparation).

Alark Joshi and Douglas Dunham, "Interactive Visualization of Models of Hyperbolic Geometry," *Masters Thesis*, Computer Science Department, University of Minnesota Duluth, June 2001.

INVITED TALKS

Introduction to GPU Computing in the Department of Cell Biology at Yale University - December 2009.

Enabling Insight and Exploration through Data Visualization at the Young Investigators Meet organized by the Translational Health Science and Technology Institute at MIT - September 2009.

Interdisciplinary Research through Visualization at Tufts University - August 2009.

Visualization Techniques for Neurosurgical Planning and ROI Connectivity at the Yale University fMRI Seminar Series - September 2008.

Teaching a Users' Training Course at the National Institutes of Health (NIH), 1st Annual NITRC Enhancement Grantee Meeting - June 2008.

Illustration-inspired Visualization at the Johns Hopkins University Whiting School of Engineering - April 2007

Illustration-inspired Techniques for Time-varying Data Visualization at the IBM T. J. Watson Research Center - November 2006.

Illustration-inspired Volume Rendering at the Johns Hopkins University Whiting School of Engg. - April 2006.

Conducting Research at the Vishwakarma Institute of Technology, India - January 2007.

Conducting Research at the Pune Institute of Computer Technology, Pune, India - January 2007.

Illustration-inspired techniques for time-varying data visualization at the UMBC CSEE Department Student Speaker Colloquium - December 2005.

AWARDS

- Best Panel Award at the IEEE Visualization 2009 conference for the panel "New faculty and postdoctoral fellows spill the beans". Co-Panelists were Jeffrey Heer, Gordon Kindlmann, Miriah Meyer.
- Recipient of the National Biomedical Computation Resource (NBCR) Summer Institute 2008 Scholarship. Presented a poster on 'Novel interaction techniques for neurosurgical planning and stereotactic navigation' at the Annual NBCR conference
- Best Graduate Teaching Assistant, Department of Computer Science, State University of New York at Stony Brook, 2001-2002, 2002-2003
- Outstanding Graduate Teaching Assistant of the year, Department of Computer Science at the University of Minnesota Duluth, 2000-2001
- First place at UMBC's Annual Business Plan Competition for 2007
- Third Prize in the Poster category for the "Exaggerated shading for volumetric data" at the Annual CSEE Research Conference 2007, held at the University of Maryland Baltimore County
- Third Prize in the Annual Greater Baltimore Technology Council's "Mosh Pit 2006" business plan competition. Our team consisted of Sandor Dornbush, Zach Radtka, Jeremy Shopf, Robairta Romiti and myself
- Best Senator of the Year for the Graduate Student Association for the 2005-06 academic year
- Third Prize in the Poster category for the "Illustration-inspired Visualization of Hurricane Structures" at the Annual CSEE Research Conference 2006, held at the University of Maryland Baltimore County
- Third Prize for the presentation entitled "Illustration-inspired techniques for time-varying data visualization", Graduate Research Conference 2005 held at the University of Maryland Baltimore

SERVICE

- Posters Chair for IEEE Visualization conference - 2009 and 2010
- Reviewer for International Journal of Computer Assisted Radiology and Surgery
- Reviewer for Elsevier's Image and Vision Computing Journal
- Reviewer for Magnetic Resonance in Medicine Journal
- Reviewer for the IEEE Transactions on Visualization and Computer Graphics
- International Program Committee for the International Symposium on Visual Computing - 2009
- Reviewer for IEEE Visualization conference - 2005-09
- Reviewer for the Symposium on Interactive 3D Graphics and Games conference - 2006
- Reviewer for the Computer Supported Cooperative Work (CSCW) conference - 2008
- Reviewer for the Eurographics workshop on Visual Computing for Biomedicine - 2008
- Reviewer for the EuroVis conference - 2007-09
- Student Volunteer at the IEEE Visualization conference - 2004-2007

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- Student Volunteer at the ACM SIGGRAPH conference - 2006
 - Student Volunteer at Symposium on Interactive 3D Graphics and Games (I3D) - 2005
 - Vice President for the Graduate Student Association - 2006-07
 - Senator for the Computer Science and Electrical Engineering Department at UMBC - 2005-06
 - External Customer for the CMSC 345: Introduction to Software Engineering for Spring 2006-07

AFFILIATIONS

- Association for Computing Machinery (ACM).
- Institute of Electrical and Electronics Engineers (IEEE).

REFERENCES

Penny Rheingans, Ph.D.

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