Anjul Patney

Senior Research Scientist, NVIDIA   *apatney AT nvidia DOT com*
http://idav.ucdavis.edu/~anjul

Education

2007–13 **Ph.D. in Electrical and Computer Engineering**
University of California, Davis
GPA: 4.0/4.0

2007–09 **MS in Electrical and Computer Engineering**
University of California, Davis
GPA: 4.0/4.0

2003–07 **Bachelor of Technology in Electrical Engineering**
Indian Institute of Technology Delhi
GPA: 9.3/10.0

Experience

2015– **Senior Research Scientist**, *NVIDIA Corporation, Redmond, WA*

2013–15 **Research Scientist**, *NVIDIA Corporation, Redmond, WA*
Investigating algorithms and architectures to accelerate next-generation real-time computer graphics, with continued involvement in technology transfer to future NVIDIA products

2007–13 **Graduate Student Researcher**, *University of California, Davis, CA*
Made fundamental contributions to techniques in the area of programmable graphics pipelines on modern GPUs, and proposed Piko, an abstraction to help design flexible, efficient and portable graphics systems

2010 **Summer Intern**, *NVIDIA Research, Santa Clara, CA*
Designed, simulated and evaluated improved architectures for polygon rasterization in GPU architectures

2009 **Summer Intern**, *NVIDIA Research, Santa Clara, CA*
Worked under Chief Scientist Bill Dally to devise compiler-assisted optimizations of large register files in manycore processors

2008 **Graduate Technical Intern**, *Intel Corporation, Santa Clara, CA*
Worked towards performance modeling and evaluation of Intel Larrabee Architecture

2006 **Summer Intern**, *NVIDIA Corporation, Bangalore*
Developed tools in Perl for verification and FPGA testing of a high-end Media and Communications Processor

Publications

2015 Anjul Patney, Stanley Tzeng, Kerry A. Seitz, Jr., and John D. Owens, "*Piko: A Framework for Authoring Programmable Graphics Pipelines*," ACM Transactions on Graphics, 34(4) (Proceedings of SIGGRAPH)

2014 **(Book Chapter)** Mohamed S. Ebeida, Scott A. Mitchell, Anjul Patney, Andrew A. Davidson, Stanley Tzeng, Muhammad A. Awad, Ahmed H. Mahmoud, and John D. Owens, "*Exercises in High-Dimensional Sampling: Maximal Poisson-disk Sampling and k-d Darts*," Topo-

logical and Statistical Methods for Complex Data – Tackling Large-Scale, High-Dimensional, and Multivariate Data Sets

2014 Mohamed S. Ebeida, Anjul Patney, Scott A. Mitchell, Keith R. Dalbey, Andrew A. Davidson, and John D. Owens, "*k-d Darts: Sampling by k-Dimensional Flat Searches*," ACM Transactions on Graphics

2013 Anjul Patney, "*Programmable Graphics Pipelines*," Ph.D. Dissertation, University of California at Davis

2012 Stanley Tzeng, Anjul Patney, Andrew A. Davidson, Mohamed S. Ebeida, Scott A. Mitchell, and John D. Owens, "*High-Quality Parallel Depth-of-Field Using Line Samples*," Proceedings of High-Performance Graphics

2012 Mohamed S. Ebeida, Scott A. Mitchell, Anjul Patney, Andrew Davidson, and John D. Owens, "*A Simple Algorithm for Maximal Poisson-Disk Sampling in High Dimensions*," Computer Graphics Forum, (Proceedings of Eurographics)

2011 Mohamed S. Ebeida, Anjul Patney, Scott A. Mitchell, Andrew Davidson, Patrick M. Knupp and John D. Owens, "*Efficient Maximal Poisson-Disk Sampling*," ACM Transactions on Graphics, (Proceedings of SIGGRAPH)

2010 Anjul Patney, Stanley Tzeng and John D. Owens, "*Fragment-Parallel Composite and Filter*," Computer Graphics Forum, (Proceedings of Eurographics Symposium on Rendering)

2010 Stanley Tzeng, Anjul Patney, and John D. Owens, "*Task Management for Irregular-Parallel Workloads on the GPU*," Proceedings of High Performance Graphics

2010 Mohamed S. Ebeida, Anjul Patney, John D. Owens, and Eric Mestreau, "*Isotropic Conforming Refinement of Quadrilateral and Hexahedral Meshes using Two-Refinement Templates*," International Journal for Numerical Methods in Engineering

2009 Anjul Patney, Mohamed S. Ebeida and John D. Owens, "*Parallel View-Dependent Tessellation of Catmull-Clark Subdivision Surfaces*," Proceedings of High Performance Graphics

2008 Anjul Patney and John D. Owens, "*Real-Time Reyes-Style Adaptive Surface Subdivision*," ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH Asia)

2008 B. V. N. Silpa, Anjul Patney, Tushar Krishna, Preeti Ranjan Panda, and G. S. Visweswaran, "*Texture Filter Memory – A Power-Efficient and Scalable Texture Memory Architecture for Mobile Graphics Processors*," IEEE/ACM International Conference on Computer-Aided Design

2008 Mark Silberstein, Assaf Schuster, Dan Geiger, Anjul Patney, and John D. Owens, "*Efficient Computation of Sum-Products on GPUs Through Software-Managed Cache*," ACM International Conference on Supercomputing

Fellowships and Awards

2014 Honorable mention, Zuhair A. Munir Award for best doctoral dissertation, *UC Davis*

2011 **Intel Ph.D. Fellowship**

2011, 2012 Summer Graduate Student Research Award, *UC Davis*

2011 CITRIS Davis Research Award

2010 **NVIDIA Research Fellowship**

2010 ECE Winter Block Grant Fellowship, *UC Davis*

2009 **NVIDIA Research Fellowship**

2009 ECE Winter and Spring Block Grant Fellowship, *UC Davis*

2008 Graduate Student Travel Award, *UC Davis*

2007 ICIM Stay Ahead Award, *IIT Delhi*

2003–07 Four Merit Prizes for Academic Excellence, *IIT Delhi*

2002 Finalist, Indian National Mathematics and Physics Olympiads

Patents

2014 **Coverage Caching**, *Michael C. Shebanow and Anjul Patney*
United States Patent 8,860,742

2014 **Conflict-Free Register Allocation**, *Anjul Patney and William J. Dally*
United States Patent 8,832,671

2013 **Conflict-free register allocation using a multi-bank register file with input operand alignment**, *Anjul Patney and William J. Dally*
United States Patent 8,555,035

2012 **Grid Walk Sampling** (application), *Michael C. Shebanow and Anjul Patney*
United States Patent Application 13/461,666

Talks

2009 **Real-Time Reyes: Analysis of a Programmable Rendering Pipeline**
Crytek Academy, Frankfurt, Germany

2008 **Real-Time Reyes: Programmable Pipelines and Research Challenges**
Course Talk at SIGGRAPH Asia 2008, Singapore

2008 **Real-Time Reyes-Style Adaptive Surface Subdivision**
Microsoft Research, Redmond, WA
Berkeley Graphics Lunch, UC Berkeley, CA

Activities

Program / Paper Committee Membership

2016 Publicity Chair and Paper Committee Member, ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games

2015–16 Publicity Chair, High Performance Graphics

Dissertation Committee

2015 Srinath R., M.S. in CSE, IIIT, Hyderabad, India

Technical Paper Reviewing

2016 SIGGRAPH, Computer Graphics Forum, Eurographics, I3D Symposium

2015 Journal of Parallel and Distributed Computing (JPDC), High Performance Graphics

2014 SIGGRAPH, High Performance Graphics, Pacific Graphics

2013 ACM Transactions on Graphics

2012 SIGGRAPH, SIGGRAPH Asia, and IEEE Transactions on Visualization and Computer Graphics

2011 SIGGRAPH Asia, and Eurographics Parallel Graphics and Visualization

2010 High Performance Graphics, SIGGRAPH Asia, and ACM Transaction on Graphics

2009 SIGGRAPH and Eurographics

Personal Projects

2014 **Ahkoncha** tinyurl.com/ahkoncha

An independent video game built to use the Microsoft Kinect for Windows controller; Awarded 2nd prize at the Microsoft Kinect v2 hackathon (Seattle), and first prize in the Microsoft "Ready, Set, NUI" contest

Teaching

2008 **EEC70: Assembly Language**
Teaching Assistant under Prof. Kent Wilken
University of California, Davis

Computer Skills

Languages

Fluency   C, C++, LaTeX, CUDA, GLSL, Python
Familiarity   C#, HTML, CSS, JavaScript, Verilog, Perl

Programming Systems

SSE, DirectX, OpenGL, WebGL, Unity3D