Stanford



Pat Hanrahan

Canon Professor in the School of Engineering and Professor of Electrical Engineering, Emeritus

Computer Science

CONTACT INFORMATION

- **Administrator**

  Monica Niemiec - Administrative Associate

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Bio

BIO

Professor Hanrahan's current research involves rendering algorithms, high performance graphics architectures, and systems support for graphical interaction. He also has worked on raster graphics systems, computer animation and modeling and scientific visualization, in particular, volume rendering.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Computer Science
- Member, Institute for Computational and Mathematical Engineering (ICME)

HONORS AND AWARDS

- Visualization Career Award, Institute of Electrical and Electronics Engineers (2006)
- Two Technical Awards, American Academy of Motion Picture Arts and Sciences (2013)
- Stephen A. Coons Award, ACM SIGGRAPH (2013)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, National Academy of Engineering (2013 - present)
- Member, American Academy of Arts and Sciences (2013 - present)

PROGRAM AFFILIATIONS

- Stanford SystemX Alliance

PROFESSIONAL EDUCATION

- PhD, Wisconsin (1986)

LINKS

- http://www-graphics.stanford.edu/~hanrahan: http://www-graphics.stanford.edu/~hanrahan

Teaching

COURSES

2023-24

- Computer Systems from the Ground Up: CS 107E (Win)

STANFORD ADVISEES

Master's Program Advisor

Vardhan Agrawal, Siddhartha Javvaji

Publications

PUBLICATIONS

- **AHA: An Agile Approach to the Design of Coarse-Grained Reconfigurable Accelerators and Compilers** *ACM Transactions on Embedded Computing Systems*
  Koul, K., Melchert, J., Sreedhar, K., Truong, L., Nyengele, G., Zhang, K., Liu, Q., Setter, J., Chen, P., Mei, Y., Strange, M., Daly, R., Donovick, et al
  2023; 22 (2)
- **Improving Energy Efficiency of CGRAs with Low-Overhead Fine-Grained Power Domains** *ACM Transactions on Reconfigurable Technology and Systems*
  Nayak, A., Zhang, K., Setaluri, R., Carsello, A., Mann, M., Torng, C., Richardson, S., Bahr, R., Hanrahan, P., Horowitz, M., Raina, P.
  2022
- **fault: A Python Embedded Domain-Specific Language for Metaprogramming Portable Hardware Verification Components** *International Conference on Computer Aided Verification*
  Truong, L., Herbst, S., Setaluri, R., Mann, M., Daly, R., Zhang, K., Donovick, C., Stanley, D., Horowitz, M., Barrett, C., Hanrahan, P.
  2020
- **Space-Time Hierarchical Occlusion Culling for Micropolygon Rendering with Motion Blur** *High Performance Graphics*
  Boulos, S., Luong, E., Fatahalian, K., Moreton, H., Hanrahan, P.
  2010
- **Hardware Implementation of Micropolygon Rasterization with Motion and Defocus Blur** *High Performance Graphics*
  Brunhaver, John, S., Fatahalian, K., Hanrahan, P.
  2010
- **Data-Parallel Rasterization of Micropolygons with Defocus and Motion Blur** *High Performance Graphics*
  Fatahalian, K., Luong, E., Boulos, S., Akeley, K., Mark, William, R., Hanrahan, P.
  2009
- **Interactive k-D Tree GPU Raytracing**
  Horn, D., Sugerman, J., Houston, M., Hanrahan, P.
  2007
- **Enhancing Visual Analysis of Network Traffic Using Knowledge Representation**
  Xiao, L., Gerth, J., Hanrahan, P.
  2006
- **Sequoia: Programming the Memory Hierarchy** *IEEE Supercomputing*
  Fatahalian, K., Dally, William, J., Hanrahan, P., Knight, T., Houston, M., Erez, M.
  2006
- **Light Field Photography with a Hand-Held Plenoptic Camera** *Technical Report CSTR 2005-02, Computer Science Department*
  Ng, R., Levoy, M., Bredif, M., Duval, G., Horowitz, M., Hanrahan, P.
  2005

- **Understanding the Efficiency of GPU Algorithms for Matrix-Matrix Multiplication**
  Fatahalian, K., Sugerman, J., Hanrahan, P.
  2004
- **Triple Product Wavelet Integrals for All-Frequency Relighting**
  Ng, R., Ramamoorthi, R., Hanrahan, P.
  2004
- **Efficient Partitioning of Fragment Shaders for Multiple-Output Hardware**
  Foley, T., Houston, M., Hanrahan, P.
  2004
- **Identification and Validation of Cognitive Design Principles for Automated Generation of Assembly Instructions**
  Heiser, J., Phan, D., Agrawala, M., Tversky, B., Hanrahan, P.
  2004
- **Photon Mapping on Programmable Graphics Hardware**
  Purcell, Timothy, J., Donner, C., Cammarano, M., Jensen, H. W., Hanrahan, P.
  2003
- **Viewing Complex Environment with Hierarchical Light Fields** *Technical Report CS-TR-2002-03, Computer Science Department*
  Chen, X., Pereira, L., Hanrahan, P.
  2002
- **Efficient Partitioning of Fragment Shaders for Multipass Rendering on Programmable Graphics Hardware**
  Chan, E., Ng, R., Sen, P., Proudfoot, K., Hanrahan, P.
  2002
- **A Signal-Processing Framework for Reflection** *ACM Transactions on Graphics*
  Ramamoorthi, R., Hanrahan, P.
  2002
- **Query, Analysis, and Visualization of Hierarchically Structured Data using Polaris** *ACM SIGKDD Knowledge Discovery and Data Mining*
  Stolte, C., Tang, D., Hanrahan, P.
  2002
- **ICrafter: A Service Framework for Ubiquitous Computing Environments**
  Hanrahan, P., Ponnekanti, Shankar, R., Lee, B., Fox, A., Hanrahan, H., Winograd, T.
  2001
- **A Practical Model for Subsurface Light Transport**
  Jensen, H. W., Marschner, S., Levoy, M., Hanrahan, P.
  2001
- **Rivet: A Flexible Computer Systems Visualization Environment** *Computer Graphics*
  Bosch, R., Stolte, C., Tang, D., Gerth, J., Rosenblum, M., Hanrahan, P.
  2000
- **Distributed Rendering for Scalable Displays** *IEEE Supercomputing*
  Humphreys, G., Buck, I., Eldridge, M., Hanrahan, P.
  2000
- **Tracking Graphics State For Networked Rendering**
  Buck, I., Humphreys, G., Hanrahan, P.
  2000
- **Visualizing Application Behavior on Superscalar Processors**
  Stolte, C., Bosch, R., Hanrahan, P., Rosenblum, M.
  1999

- **Parallel Texture Caching**
  Igehy, H., Eldridge, M., Hanrahan, P.
  1999
- **Simple Models of the Impact of Overlap in Bucket Rendering**
  Chen, M., Stoll, G., Igehy, H., Proudfoot, K., Hanrahan, P.
  1998
- **The Design of a Parallel Graphics Interface**
  Igehy, H., Stoll, G., Hanrahan, P.
  1998
- **Realistic Modeling and Rendering of Plant Ecosystems**
  Hanrahan, P., Deussen, O., Hanrahan, P., Lintermann, B., Mech, R., Pharr, M.
  1998
- **The Two-User Responsive Workbench: Support for Collaboration Through Individual Views of a Shared Space**
  Agrawala, M., Beers, A., Froehlich, B., Hanrahan, P., McDowall, I., Bolas, M.
  1997
- **Rendering Complex Scenes with Memory-Coherent Ray Tracing**
  Pharr, M., Kolb, C., Gershbein, R., Hanrahan, P.
  1997
- **Geometry Caching for Ray-Tracing Displacement Maps**
  Pharr, M., Hanrahan, P.
  1996
- **Flow and Changes in Appearance**
  Dorsey, J., Pedersen, H., Hanrahan, P.
  1996
- **Light Field Rendering**
  Levoy, M., Hanrahan, P.
  1996
- **Modeling and Rendering of Metallic Patinas**
  Dorsey, J., Hanrahan, P.
  1996
- **A Realistic Camera Model for Computer Graphics**
  Kolb, C., Mitchell, D., Hanrahan, P.
  1995
- **Partitioning and Ordering Large Radiosity Computations**
  Teller, S., Fowler, C., Funkhouser, T., Hanrahan, P.
  1994
- **Wavelet Methods for Radiance Computations**
  Schroeder, P., Hanrahan, P.
  1994
- **Compression Performance of the Xremote Protocol**
  Danskin, J., Hanrahan, P.
  1994
- **Profiling the X Protocol**
  Danskin, J., Hanrahan, P.
  1994

- **Textures and Radiosity: Controlling Emission and Reflection with Texture Maps**
  Gershbein, R., Schroeder, P., Hanrahan, P.
  1994
- **On the Form Factor between Two Polygons**
  Schroeder, P., Hanrahan, P.
  1993
- **Visibility Computations for Global Illumination Algorithms**
  Teller, S., Hanrahan, P.
  1993
- **Reflection from Layered Surfaces due to Subsurface Scattering**
  Hanrahan, P., Krueger, W.
  1993
- **A Hierarchical Illumination Algorithm for Surfaces with Glossy Reflection**
  Hanrahan, P., Aupperle, L.
  1993
- **Wavelet Projections for Radiosity**
  Schroeder, P., Gortler, S., Cohen, M., Hanrahan, P.
  1993
- **Wavelet Projections for Radiosity**
  Hanrahan, P., Schroeder, P., Gortler, S., Cohen, M., Hanrahan, P.
  1993
- **Importance and Discrete Three Point Transport**
  Hanrahan, P., Aupperle, L.
  1993
- **Wavelet Radiosity**
  Gortler, S., Schroeder, P., Cohen, M., Hanrahan, P.
  1993
- **Illumination from Curved Reflectors**
  Hanrahan, P., Mitchell, D.
  1992
- **Fast Algorithms for Volume Ray Tracing**
  Hanrahan, P., Danskin, J., Hanrahan, P.
  1992
- **A Hierarchical Radiosity Algorithm**
  Hanrahan, P., Salzman, D., Aupperle, L.
  1991
- **Hierarchical Splatting: A Progressive Refinement Algorithm for Volume Rendering**
  Hanrahan, P., Hanrahan, P., Laur, D.
  1991
- **A Rapid Hierarchical Radiosity Algorithm for Unoccluded Environments**
  Hanrahan, P., Salzman, D.
  1990
- **Effects of Visual and Verbal Presentation on Cognitive Load in Vigilance, Memory and Arithmetic Tasks** *Psychophysiology*
  Klingner, J., Tversky, B., Hanrahan, P.
- **Performance Analysis and Visualization of Parallel Systems Using SimOS and Rivet: A Case Study**

Bosch, R., Stolte, C., Stoll, G., Rosenblum, M., Hanrahan, P.