

# Kevin Beason

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## Objective

Develop excellent software. I'm mainly interested in computer graphics but am open to other challenges.

## Experience

**Sr. Software Engineer**, Rhythm & Hues Studios May 2014 - present

Supporting the studio's large software library including applications, shaders, and plugins for Arnold, Nuke, and Houdini, and our custom queue, pipeline, and lighting tools, in C++, Perl, and Python. Plus some systems administration. Some of the things I've worked on include:

- Queue - Support our render queue manager, file transfer, and asset tracking systems in Perl and C++
- Houdini - Adapt our shaders, nodes, and plugins for version upgrades and Arnold integration
- Systems Administration - Diagnose and resolve issues on Linux, Solaris, and VM systems in two countries, RAID recovery, backups, MySQL DBA, OS migration, PXE booting
- Arnold - Support 1st & 3rd party shaders, installation, troubleshooting, testing, bug reporting
- Crom - Develop Arnold shader nodes for our lighting tool in Python and C++

**Software Engineer**, Rhythm & Hues Studios Jan 2006 - May 2014

Worked on a small team developing a proprietary software renderer used for visual effects in feature films and commercials. Interacted with artists to address rendering issues. Maintained and supported irradiance caching, subsurface scattering, shadow mapping, photon mapping, and displacement.

- Added multi-threaded rendering. Efficient parallelization of the pixel loop, shading, subsurface scattering, deep shadows, photon maps, irradiance cache, shading cache, hair reflection cache, using boost::thread, memory barriers, Quiescent State based Reclamation (RCU)
- Extended irradiance cache with gradients, neighbor clamping, smoothing, and stable placement
- Added adaptive sampler, reduced caustic noise, implemented deterministic sampling techniques
- Prototyped Open Shading Language support
- Migrated department software codebase to new compilers and architectures

**Research Assistant**, Dept. of C.S.I.T., Florida State University 2002 - 2005

Implemented a global illumination renderer. Adapted it for precomputed illumination of levelsets of 2D and 3D scalar heightfields for my thesis. Developed scientific visualizations (including brain, neuron, molecular dynamics, and steam cleaning) for use in a variety of publications. Developed software tools, managed a student assistant, and assisted others with programming and graphics problems.

**Webmaster**, Dept. of Mathematics, Florida State University 1997 - 2002

Two major site redesigns, plus two additional websites for other departments. Wrote software to provide site-wide visual consistency. Coded several secure, interactive web-based applications (Perl CGIs). Installed apache, proftpd, webinator. Provided web-related technical assistance, poster design, photography, configuration, and backup.

## Other Programming Jobs

XML site indexing and news script, Dept. of C.S.I.T., Florida State University 2001  
C++ scientific instrument output formatter, Dept. of Geology, Florida State University 1998  
Java calculation tools and plot fitting, Dept. of Physics (Nuclear Lab), Florida State University 1997  
Pascal mail processing control modification, Rose Printing 1996 - 1997

## Skills

Languages C++, Perl, Python, C, bash, tcsh, MATLAB  
Libraries STL, Boost, pthread, veclib (SSE), cvalarray, OpenMP  
Tools git, CVS, gdb, gperftools, valgrind, helgrind, gmake, rsync, borg  
APIs Inventor, Open Shading Language, Arnold, Nuke, RenderMan, Houdini, IRay, OpenEXR  
Web Programming HTML, JavaScript, CGI, PHP, MySQL, Java, XML, SSI, Apache

## Education

M.S. Computer Science, Florida State University 2000 - 2005  
B.S. Computer Science, Florida State University 1995 - 2000  
Minors in Mathematics, Physics

## Publications

Kevin M. Beason *Precomputed Global Illumination of Isosurfaces*. Electronic Theses, Treatises and Dissertations (Florida State University), 2005.

Kevin M. Beason, Josh Grant, David C. Banks, Brad Futch, M. Yousuff Hussaini. *Pre-Computed Illumination for Isosurfaces*. Conference on Visualization and Data Analysis, 2006.

David C. Banks, Kevin M. Beason. *Retro-rendering with Vector-Valued Light: Producing Local Illumination from the Transport Equation*. Conference on Visualization and Data Analysis, 2006.

Kayne M. Smith, David C. Banks, Neil Druckmann, Kevin Beason, and M. Yousuff Hussaini. *Clustered Ensemble Averaging: A Technique for Visualizing Qualitative Features of Stochastic Simulations* Journal of Computational and Theoretical Nanoscience, 2006.

David C. Banks, Kevin Beason. *Pre-computed global illumination of MR and DTI data*. International Society for Magnetic Resonance in Medicine 14th Scientific Meeting, 2006.

David C. Banks, Kevin Beason. *Fast global illumination for visualizing isosurfaces with a 3d illumination grid*. Computing in Science & Engineering, 2007.

David C. Banks, Kevin Beason. *Decoupling illumination from isosurface generation using 4D light transport*. IEEE Transactions on Visualization and Computer Graphics, 2009.

Ivan Neulander, Toshi Kato, and Kevin Beason. *Rendering fur in Life of Pi*. ACM SIGGRAPH 2013 Talks (SIGGRAPH '13), 2013.

## Projects

- smallpt Small path tracer that renders the Cornell Box in 99 lines of C++.
- Pane Physically based renderer in C++. Features path tracing and progressive photon mapping. Octree/KD-tree/BIH ray acceleration. Triangle/sphere/levelset/SDF/instance/IFS intersection. Area/environment lights with MIS. Multi-threading, pixel filtering, motion blur, irradiance caching. Tone/texture/bump/displacement/noise mapping. Glare, participating media, blackbody emission, spectral rendering. Diffuse/specular/Schlick/Ashikhmin&Shirley/measured BRDFs.
- Fluid 2D & 3D fluid simulator and visualization. Features vorticity confinement, vortex particles, thermal cooling, texture warping, and interactive volume rendering.
- subd Subdivision surface generator.
- Work Log Ray tracing development blog.
- DeviantArt IFS fractal renderings.

## Honors and Awards

- FSU ACM Programming Contest, 1st Place 1997, 2004 (Spr.), 2004 (Fall), 2005
- FSU ACM Programming Contest, 2nd Place 1998, 2001, 2002, 2003
- ACM Southeastern Regional Programming Contest, 6th Place 2001
- ACM Southeastern Regional Programming Contest, 12th Place 1998
- Florida Bright Futures Scholarship 1995 - 2000
- Dean's List 1995 - 1997
- MCI Scholarship, FSU Dept. of C.S. 1999
- Member, Upsilon Pi Epsilon, Honor Society in the Computing Sciences 2000

## Conferences

- ACM SIGGRAPH 2000 - 2015
- High Performance Graphics 2015
- Symposium on Interactive Ray Tracing, Los Angeles, CA 2008
- ACM OOPSLA, Tampa, FL 2001
- Atlanta Linux Conference, Atlanta, GA 2000