Eric Penner

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Google — *Staff Software Engineer / Tech Lead Manager*

February 2011 - PRESENT

During 10 years at Google, I have led several high-impact teams/projects solving difficult ambiguous problems in vision, graphics, and ML. I've worked mostly on mobile and real-time systems, but have also utilized Google's cloud at scale.

- **Intelligent Photography:** As tech lead / manager, I designed and built a real-time ML pipeline, and an accurate simulation pipeline in the cloud (for eval, tuning and training). This is currently used to power TopShot in the Google Pixel Camera, as well as powering other unique vision based user experiences.
- **Live Action VR:** As TL of a 3D Reconstruction and view synthesis team, I built a scalable cloud pipeline used to reconstruct and render images that powered live action 6-DOF images/video in VR.
- **Chrome for Android:** I helped launch Chrome for Android. I was responsible for graphics acceleration, tiling, async texture uploads, power and latency optimization across the system, and execution of plugins in secure multi-process sandboxes.

Electronic Arts — *Software Engineer*

June 2008 - February 2011

- Implemented multi-threaded command-buffer dispatch engine used by several AAA sports titles (e.g. NHL/NBA/Fifa etc.).
- Lead on George Borshukov's R&D team. Developed real-time versions of techniques used in The Matrix films and other techniques
- Developed novel prototypes using gestural interfaces (e.g. depth sensors later acquired for Microsoft's Kinect system).

Radical Entertainment — *Software Engineer*

May 2005 - January 2007

- Developed an open world shadow mapping system (used in the AAA game series Prototype).
- Researched and implemented new rendering techniques.

Other Experience and Education

Calgary Scientific - Volume Rendering Consultant (Feb 2007 - May 2008)

SMART Technologies - Intern (Feb 2003 - September 2003)

Schlumberger Information Solutions - Intern (May 2002 - February 2003)

University of Calgary M.Sc./B.Sc. (3.9/4.0) - Computer Science (Thesis)

SKILLS

15 Years Engineering

2 Years Management

C++, Java, Python, C#, GLSL, HLSL

OpenGL, DirectX, Vulkan

Data-Parallel Distributed Systems

Optimization / Multi-threading

Domain expert in computer graphics, computer vision, system tuning and real-time ML.

Highlights / Portfolio

TopShot and Photobooth in Pixel Camera have been featured in several ads.

Light field reconstruction pipeline published at Siggraph. Inspired change to volumetric techniques.

Active in the community, with talks, publications, patents, and book chapters on real-time techniques and volume rendering.

Real-time rendering of Tiger Woods (circa 2009) using techniques from The Matrix films.

Selected Publications, Talks and Patents

Penner, E. Methods and Systems for Processing Imagery
U.S. Patent filed Sept 18, 2018 (not yet issued)

Penner, E. and Zhang, L. (2017) Soft 3D Reconstruction for View Synthesis
ACM Transactions on Graphics (Proc. SIGGRAPH Asia)

Penner, E. and Hatch, S. Method for reducing input latency on GPU accelerated devices and applications
U.S. Patent 9,384,523 filed July 30, 2013, and issued July 5, 2016.

Hatch, S. and **Penner E.** (2013) Processing an input event within an application
U.S. Patent 8,973,016 filed March 28, 2014, and issued March 3, 2015.

Penner, E. (2011) Pre-Integrated Skin Shading
Presented at *Siggraph 2011 - Advances in Real-time Rendering*

Penner, E. and Borshukov, G. (2011) Pre-Integrated Skin Shading
GPU Pro 2 - Advanced Rendering Techniques. Natick, MA: A K Peters Ltd.

Penner, E. (2011) Shader Amortization using Pixel Quad Message Passing
GPU Pro 2 - Advanced Rendering Techniques. Natick, MA: A K Peters Ltd.

Penner, E. Roberts, M. (2010) Advanced Medical Volume Rendering and Segmentation on the GPU
Presented at the 2010 GPU Technology Conference (GTC). San Jose, California

Penner, E. (2009) Three-Dimensional Medical Image Visualization Techniques on Modern Graphics Processors *(M.Sc. Thesis). University of Calgary*

Penner, E. and Mitchell, J.R. (2008) Isosurface Ambient Occlusion with Filterable Occlusion Maps
IEEE/EG International Symposium on Volume and Point-Based Graphics

Penner, E. and Mitchell, J.R. (2008) Improved Diagnostic Quality in 3D Medical Visualization Using the GPU, *SIIM 2008, Seattle, Washington*

Penner, E.* Chan, S. and Mitchell, J.R. (2007) State Of The Art Interactive 3D Medical Visualization Using the GPU, *Presented at the Apple Worldwide Developer Conference (WWDC)*

Penner, E. Parker, J.R. (2007) The Virtual Window Simulator
ACM FuturePlay 2007, Toronto, Ontario, November 2007

Penner, E. Schmidt, R., Carpendale, M.S.T. (2006) The GPU Cluster without the Clutter: A Drop-in Scalable Programmable-Pipeline with Several GPUs and Only One PC
Symposium on Interactive 3D Graphics and Games (I3D)

Schmidt, R., **Penner, E.**, Carpendale, M.S.T. (2004) Reconfigurable Displays.
Ubiquitous Display Environments at Ubiquitous Computing(UBICOMP), Nottingham, England.

Schmidt, R., **Penner, E.**, Carpendale, M.S.T. (2004) MAD Boxes: A Plug-And-Play Tiled Display Wall,
Technical Report TR-2004-768-33. University of Calgary