



Rich Gossweiler

Experiences are more valuable than things almost every time.
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Summary

I enjoy collaborating with small teams, building innovative systems, rapid prototyping, doing science, and tinkering. I am currently working on new models, APIs, and implementations for augmented reality (AR+AI). I am also working on new models and rapid prototype implementations for the web (that is, how we gather, organize, present and share).

skills: research scientist, front-end engineer, systems architect, tech lead, project lead, HCI, UX. I've worked as an early Googler (10+ years), NASA Ames principal scientist (Mars mission), Tableau scientist, eng at a successful start-up, HP, IBM, Xerox PARC, SGI, and as a consultant to large and small companies.

past roles: principal scientist, managed multiple labs, technical lead, team leader, system architect, user experience researcher, front-end engineer, consultant. Most of my career has been working on very large scale web-based systems (Google) and moonshot innovations across many domains. My Ph.D. is in perception-based, time-critical 3D graphics but over the years I have been excited by and explored many domains (health, mobile, TV, data visualizations, game development, wearables, etc.)

domains: designed, led, and implemented several research and product efforts across a broad range of product domains including interactive 3D graphics (VR, AR), information visualization, mobile, television, travel, retail, health, and multi-person, interactive, collaborative displays, game design. I hold around [one hundred patents](#) .

see also: [wikipedia entry for rich gossweiler](#)

Projects

This is a long list, so it is under construction

Education

Ph.D. - University of Virginia *Perception-Based Time Critical Rendering*

- (DIVER) designed, developed, deployed the first network-accessible VR platform at UVA, connecting SGIs, hardware trackers, and a VPL headset. The network ran across multiple workstations running async, interactive python scripts. This architecture and API abstracted development and handled time critical, real time rendering.
- defined and implemented a specialized socket library and a high level object and event API for the VR platform. External python scripts manipulated the virtual environments through provided

higher level object and event abstractions transparently over the network.

- leveraged DIVER to create a [VR perception lab and run perceptual psychology studies](#)
- DIVER was the rendering engine and underlying API for the [Alice platform](#)
- the UVa Robotics Group also used the platform to create simulations and train robots

Master of Computer Science, minor mathematics - University of Virginia

Application Independent Object Selection from Multimodal Input

- Akin to "Put That There", combined multi-modal, probabilistic, ambiguous input from voice and gesture to recommend selection results

Work History

Verily (2019-2020) *staff research scientist*

Reported to founder, ran lab, worked on special projects and external relations

- Jessica Frank (intern) led ML+JS heart anomaly project
- HealthMesh - initial API and platform integrating personal, community, and global health data
- Volatile Organic Compound (VOC) multidimensional data visualization
- moonshot project concepts: medicine in/for space
- research for L'Oréal visit on skincare and healthcare

Google Health (2017-2019) *senior research scientist, lab manager*

- co-ran early internal Google Health conference bringing together separate teams to coordinate on healthcare and google
- ran multiple labs facilitating cross-team coordination for health studies; lab also used to present health work; lab also used to explore concepts in bringing clinics into the home
- worked with google architects on clinics of the future
- LabelTool -- tool to adjudicate multiple human labelers deciding what terms to label and how
- Data Authentication Tool -- tool to visualize and alert health managers about health worker survey and experiments data
- scribe tool -- rapid prototype (hardware and software) to act as a portable scribe tool for a medical practitioner.
- tools and methodologies for reducing skin tone bias in medical practice
- doc-in-a-box: rapid prototypes on creating spaces for doctors and AI to work with patients (communities, home)
- FHIR data ETL and visualization tools
- Malory: a simple client-server-JSON architecture making it easy to rapidly prototype medical audio and language research.
- rapid prototypes exploring new ways to gather, analyze, view personal medical health over time

Tableau (2015 - 2017): *senior research scientist*

- *Davi*: mobile and desktop, statistics-based data visualization platform. Developed with VP Leland Wilkinson
- ran small ad hoc research team (cartographer, game engineer, myself)

- [Eviza: NLP for Visual Analysis](#) (this was 99% the other team members but I helped a little)
- web-based component architecture for data cleaning, analytics, and data visualization
- interactive, modular, extensible tool for binning and visualizing data
- holodeck interactive large display with support for gestures, voice,
- multi-person, very-large display interaction web-based, GPU animation platform
- Innovating and implementing desktop, browser, and mobile data visualization systems.

Google (2005 - 2014): *mad scientist, technical lead, front end engineer*

- **newsBoard** *a large, multi-person, public, interactive information display* - led the design, research development, and engineering deployment of a large, depth-sensing, interactive, multi-person display system
 - designed and prototyped in research, presented at a Google research consortium
 - joined knowledge team, migrated and engineered to interact with real time news
 - implemented and deployed in-house, 24/7
 - presented to all of Google at a company-wide engineering all-hands
- **quickSuggest** -- innovative UX and recommendation system for YouTube television (launched) co-developed, [published](#), and helped deploy listings recommendation system and remote control interaction experience. Significant improvement in speed and experience when entering searches from a remote control.
- **argos** - built [a new platform and model](#) for rapid application development on Android devices
 - led a small team of researchers
 - developed platform, applications and API
 - integrated 2D (web), 3D (OpenGL) and realtime (camera) information into single model
 - supported external sensor extensions
 - published in IEEE Pervasive Computing
 - presented at Google research consortium
 - presented to Android CEO and senior staff
- **gulliver** - (launched) co-developed collaborative, [mobile travel application](#). developed and tested in research, deployed with engineering team. Worked with Lonely Planet partnership for content.
- **Google I/O 2011** - worked with vision researchers and Android team on developing face-tracking applications for mobile devices (using the GPU). Team presented platform to Larry, Sergey, Andy, senior staff to be integrated into Android core. Applications were presented at [Google I/O Android keynote](#).
- **world-wide tv listings** - Co-tech lead, lead on interaction and design of [a world-scale television guide](#). Allowed millions of viewers all over the planet to explore and interact with listings and related information.
- **Smaller initiatives:**
 - [watch interfaces](#) with Android
 - security: a novel [CAPTCHA system \(published\)](#)
 - sketch-up team on [a 3D warehouse interactive model catalog](#)
 - Google production code reviewer for JavaScript

- GoogleCard and GoogleCheckout: prototypes for shopping experiences
- sketchup, Android 3D, Google Games
- Browser-centric AR experiments and prototypes

HP Labs (2003 - 2005): *research scientist*

- **CustomTV** - part of a team that designed and developed a way to create [personal television channels](#). A channel was a streaming search result (e.g. "news", "wearables", "my vacation"), browsed with a remote control.
 - worked with USC school of film and television
 - implemented the design
 - presented at CES HP keynote
- **Plog**- a mobile phone [image sharing and storytelling platform](#) developed when cameras were first integrated with cell phones. Images were clustered on the server into stories and were shared to desktops, tvs, and printers as postcard collage.
- **Plog News** - an automatic newspaper generated based on determining news-worthiness from plog pictures clustered in time and location.
- **Media2Go** - mobile interaction with [public displays](#) via bluetooth. People could walk up to digital posters and get information, coupons, and video trailers beamed to their phones.
- **Principal Investigator** - University of California, Berkeley Industry Collaboration - worked with HP and Berkeley on funding and sharing innovations.

NASA Ames (2002 - 2003): *principal research scientist*

- **MERBoard** - [a collaborative system](#) of large touchscreen displays designed, developed and deployed for the Mars Exploration Rover (MER) mission. Multiple publications.

AdSpace Networks (acquired start-up) (2001 - 2002): *senior software engineer*

- **CoolSign Network** - complex software system that delivers and manages digital assets to large digital signs.
 - ad selling modeled after television auctions
 - network included theatre chains, shopping malls, Las Vegas signs
 - mixed real time information, entertainment, advertising

IBM Almaden Research (2000 - 2001): *research scientist and systems developer*

- **BlueBoard** - co-designed and developed a web-based, in situ, [easy-to-use collaboration system](#). Allowed people to easily hold meetings, retain state, share to other boards and external devices.
 - presented to the CEO of IBM
 - deployed at various IBM locations for senior executives around the world
 - basis for a system used by NASA
 - multiple publications
- **Dspace** - project lead for a system supporting real-time, distributed user interfaces on the internet. The toolkit provided developers with an easy way to create distributed widgets that could react to digital and physical sensors. Based on a Gelernter tuple model.

Xerox PARC (1997 - 2000): research scientist

- **Side Impact** - a modified browser with [a side tray](#) that reacted to the pages you visited, could store gathered information, present enhanced interfaces for the page.
- **ConeGraph** - developed [a 3D widget](#) for simultaneously viewing hierarchy and linkage structures.
- **Grid** - developed a PC-based, [interactive 3D graphics infrastructure and API](#) used for information visualization.
- **Bookplex I and II** - developed [an interactive 3D graphics application](#) allowing users to read a scanned book plus all of its references online, perform queries and recommendations on the Bookplex.
- **Penguin Portfolio** - worked with Bernardo Huberman developing an economics-based model for managing graphics resources, treating objects as stocks with risk-reward [rendering characteristics](#).
- **NavCards** - developed a project integrating a digital 3D world with physical RF tags to navigate three-dimensional spaces.

Silicon Graphics Inc. (SGI) (1995 - 1997): 3D graphics engineer

- **CosmoWorlds** - part of a large engineering team. Helped produce [an interactive 3D graphics modeling system](#) used to create virtual worlds on the web.
- contributed to the VRML specification

Publications and Talks

[Perceiving geographical slant](#)

Dennis Proffitt, Mukul Bhalla, Rich Gossweiler, J. Midgett - Psychonomic Bulletin & Review, 1995, pp. 409-428.

[Alice: Rapid prototyping system for virtual reality](#)

Randy Pausch, Tommy Burnette, A.C. Capeheart, Matthew Conway, Dennis Cosgrove, Rob DeLine, Jim Durbin, Rich Gossweiler, Shuichi Koga, and Jeff White, IEEE Computer Graphics and Applications 15(3), 1995, 8-11.

[An Introductory Tutorial for Developing Multi-User Virtual Environments](#)

Rich Gossweiler, Robert J. Laferriere, Michael L. Keller, and Randy Pausch. "An introductory tutorial for developing multiuser virtual environments." Presence 3, no. 4 (1994): 255-264.

[On the design of personal and communal large information scale appliances](#)

Daniel Russell, Rich Gossweiler, Ubicomp 2001: Ubiquitous Computing, pp. 354-361, Springer Berlin Heidelberg, 2001.

[Distributed and Disappearing User Interfaces in Ubiquitous Computing](#)

Beverly Harrison, Rich Gossweiler, SIGCHI 2001 Workshop. 2001.

[What's up CAPTCHA?: a CAPTCHA based on image orientation](#)

Rich Gossweiler, Maryam Kamvar, Shumeet Baluja, proceedings of the 18th international conference on World wide web, pp. 841-850, ACM, 2009.

[Enhancing a digital book with a reading recommender](#)

Allison Woodruff, Rich Gossweiler, James Pitkow, Ed H. Chi, and Stuart K. Card, proceedings of the SIGCHI conference on Human factors in computing systems, pp. 153-160, ACM, 2000.

[Visualizing the evolution of web ecologies](#)

Ed Chi, James Pitkow, Jock Mackinlay, Peter Pirolli, Rich Gossweiler, and Stuart K. Card, Proceedings of the SIGCHI conference on Human factors in computing systems, pp. 400-407. ACM Press/Addison-Wesley Publishing Co., 1998.

[Alice: A Rapid Prototyping System for Building Virtual Environments](#)

Matthew Conway, Randy Pausch, Rich Gossweiler, Tommy Burnette, Conference companion on Human factors in computing systems. pp 295-296, ACM, 1994.

[Alice: Lessons Learned from Building a 3D System for Novices](#)

Matthew Conway, Steve Audia, Tommy Burnette, Dennis Cosgrove, and Kevin Christiansen, Rob Deline, Jim Durbin, Rich Gossweiler, Shuichi Koga, Chris Long, Beth Mallory, Steve Miale, Kristen Monkaitis, James Patten, Jeff Pierce, Joe Shochet, David Staack, Brian Stearns, Richard Stoakley, Chris Sturgill, John Viega, Jeff White, George Williams, Proceedings of the SIGCHI conference on Human factors in computing systems, pp. 486-493. ACM, 2000.

[DIVER: a Distributed Virtual Environment Research Platform](#)

Rich Gossweiler, Chris Long, Shuichi Koga, and Randy Pausch. In Virtual Reality, 1993. Proceedings., IEEE 1993 Symposium on Research Frontiers in Virtual Reality, pp. 10-15. IEEE, 1993.

[NASA's MERBoard](#)

Jay Trimble, Roxana Wales, Rich Gossweiler. In Public and Situated Displays, pp. 18-44. Springer Netherlands, 2003.

[NASA position paper for the cscw 2002 workshop on public, community and situated displays: MERBoard](#)

Jay Trimble, Roxana Wales, Rich Gossweiler, 2002 Conference on Computer Supported Cooperative Work, 2002.

[ContentCascade incremental content exchange between public displays and personal devices](#)

Himanshu Raj, Rich Gossweiler, and Dejan Milojicic, Mobile and Ubiquitous Systems: Networking and Services, pp. 374-381, IEEE, 2004.

[Content Exchange Appliances](#)

Dejan Milojicic, John Ankcorn, Rich Gossweiler, Jim Rowson, Larry Rudolph, Sonia Garg, Franklin Reynolds, Rajnish Kumar, and Himanshu Raj, HPL-2003-139, 2003.

[PLOG: Easily Create Digital Picture Stories Through Cell Phone Cameras.](#)

R Gossweiler, J Tyler - IWUC, 2004 - hpl.hp.com

[SketchUp: An Easy-to-Use 3D Design Tool that Integrates with Google Earth](#)

Rich Gossweiler, Mark Limber. In Adjunct Proceedings of the 19th annual ACM Symposium on User Interface Software and Technology (UIST06), 19, p. 3, 2006.

[Alice and Diver: A software architecture for building environments.](#)

Randy Pausch, Matthew Conway, Robert DeLine, Rich Gossweiler, and Steve Miale, INTERACT'93 and CHI'93 Conference Companion on Human Factors in Computing Systems, pp. 13-14. ACM, 1993.

[Argos: Building a Web-Centric Application Platform on Top of Android](#)

Rich Gossweiler, Colin McDonough, James Lin, and Roy Want

[A System for Application Independent Time Critical Rendering](#)

Rich Gossweiler, ACM, 1994.

[Amortizing 3D Graphics Optimization Across Multiple Frames](#)

Jim Durbin, Rich Gossweiler, and Randy Pausch. "Amortizing 3D graphics optimization across multiple frames." In Proceedings of the 8th annual ACM symposium on User interface and software technology, pp. 13-19. ACM, 1995.

[Principles of Visual Perception and Its Applications in Computer Graphics](#)

Victoria Interrante, Penny Rheingans, James Ferwerda, Rich Gossweiler, and Toms Filsinger, SIGGRAPH 97 Course Notes 33.

[UserVerse: Application-Independent Object Selection Using Inaccurate Multi-Modal Input](#)

Randy Pausch, Rich Gossweiler, Multimedia interface design, pp. 139-145, ACM, 1992.

also as a chapter in *Multimedia interface design*, Meera Blattner, Roger Dannenberg, Addison-Wesley, April 1992.

[PHIZ: Discovering TVs Long Tail through a Channel-Centric Model](#)

James Rowson, Rich Gossweiler, Kurt MacDonald, 3rd European Conference on Interactive Television, EuroITV 2005, Aalborg University, Denmark, 2005.

[Google TV search: dual-wielding search and discovery in a large-scale product](#)

Manish Patel, Rich Gossweiler, Mehran Sahami, John Blackburn, David Brown, and Andrea Knight, proceedings of the 1st international conference on Designing interactive user experiences for TV and video, pp. 95-104. ACM, 2008.

[Enabling informal communication of digital stories](#)

Debaty, Philippe, Patrick Goddi, Rich Gossweiler, Rakhi Rajani, Alex Vorbau, and Josh Tyler, HPL-2004-180, 2004. 2004 - hpl.hp.com

[QuickSuggest: character prediction on web appliances](#)

Ulas Gargi, Rich Gossweiler, proceedings of the 19th international conference on World wide web, pp. 1249-1252. ACM, 2010.

[Eviza: A Natural Language Interface for Visual Analysis](#)

Vidya Setlur, Sarah Battersby, Melanie Tory, Rich Gossweiler, Angel X. Chang, ACM User Interfaces and Software Technology (UIST) 2016

Stanford Talk on Argos Platform for Android (2/6/2013)

[USC Interactive Media and Games talk on \(1/31/2007\)](#)

[USC Cinematic Arts talk on Collaborative Systems\(1/26/2011\)](#)

USC Design Intelligence Symposium (3/3/2011) - Intelligent Physical Architectures

Patents

- [US8665238B1 - Determining a dominant hand of a user of a computing device](#)
- [US10515121B1 - Systems...using natural language processing for visual analysis of a data set](#)
- [US8368723B1 - User input combination of touch and user position](#)
- [US9519351B2- Providing a gesture-based interface](#)
- [US9355425B2 - Soft posting to social activity streams](#)
- [US10795902B1 - Applying Natural Language Pragmatics in a Data Visualization User Interface](#)
- [US8832567B1 - Using visualization techniques for adjustment of privacy settings in social networks](#)
- [US20150195624A1 - Media-Related Trends](#)
- [US11010396B1 - Data visualization user interface using ... sequential natural language commands](#)
- [US9071282B1 - Variable read rates for short-range communication](#)
- [US20140129545A1 - Sorting search results](#)
- [US8832789B1 - Location-based virtual socializing](#)
- [US9141617B1 - Social lens for search](#)
- [US9042605B2 - Determining a viewing distance for a computing device](#)
- [US9292878B1 - API for audio recommendation, discovery, and presentation within a social network](#)
- [US9084025B1 - System for displaying both multimedia events search results and internet search results](#)
- [US20140258943A1 - Providing events responsive to spatial gestures](#)
- [US10275536B2 - Systems, methods, and computer-readable media for displaying content](#)
- [WO2015168580A1 - Computerized systems for providing information related to displayed content](#)
- [US20150156154 - Storage and retrieval of electronic messages using linked resources](#)
- [WO2013082311A1 - Contactless Payment System Providing Supplemental Content...](#)
- [WO2012154832A3 - Object Tracking](#)
- [CA2685577A1 - Hiding portions of display content](#)
- [WO2008121967A3 - Interactive media display across devices](#)
- [WO2008134749A3 and CA2685419A1 - Program guide user interface](#)
- [WO2008134742A1 and CA2685566A1 - Customizable media channels](#)
- [CA2719138A1 - Lightweight three-dimensional display](#)
- [US20130163390A1 - Smart-watch including flip up display](#)
- [WO2011056610A3 - Predictive text entry for input devices](#)
- [US8368723B1 - User input combination of touch and user position](#)
- [US20130033366A1 - Method and system for providing haptic feedback of variable intensity](#)
- [US20140007164A1 and US8640167B2 - System for displaying and searching multimedia events...](#)
- [US8542251B1 - Access using image-based manipulation](#)
- [US8886669B2 - File access via conduit application](#)
- [CA2428678C - Display and manipulation of hierarchical and non-hierarchical data](#)
- [US8572649B1 - Electronic program guide presentation](#)
- [DE112012004250B4 - Blurring an acceleration sensor signal](#)
- [US8640167B2 - System and method for displaying multimedia events scheduling information](#)

- [US8522281B1 - Head end generalization](#)
- [US8542251B1 - Access using image-based manipulation](#)
- [US8533761B1 - Aggregating media information](#)
- [Navigation methods, systems, and computer program products for virtual three-dimensional books](#)
- [US8624836B1 - Gesture-based small device input](#)
- [US8484192B1 - Media search broadening](#)
- [US8612767B2 - Obscuring an accelerometer signal](#)
- [US8504008B1 - Virtual control panels using short-range communication](#)
- [US8488912B2 - Systems and methods for socially-based correction of tilted images](#)
- [US8392986B1 - Evaluating text-based access strings](#)
- [US8606933B1 - Selective pairing of devices using short-range wireless communication](#)
- [US8467270B2 - Smart-watch with user interface features](#)
- [US20130016129A1 - Region-Specific User Input](#)
- [US6573916 - Navigation of rendered virtual environments using physical tags](#)
- [WO2005076482A1 and US20060031517A1 - Information transfer system and method](#)
- [US8291454B2 - System and method for downloading multimedia events scheduling information...](#)
- [US20130113760 - Techniques providing localized tactile feedback via an electro-acoustic touch display...](#)
- [US20130222743A1 - Privacy display](#)
- [US8255953B1 - Arrangement of content within a custom television channel](#)
- [CA2816842A1 and EP2635951A1 - Social aspects of media guides](#)
- [WO2008134736A1 - Momentary electronic program guide](#)
- [US20050225647A1 - Method and system of creating photo vignettes](#)
- [WO2008134373A1 - Virtual channels](#)
- [US7089288B2 - Interactive ... navigation of graphical data sets using multiple physical tags](#)
- [US6400372B1 - Methods for selecting levels for objects having multi-resolution models...](#)
- [US20080270395A1 - Relevance Bar for Content Listings](#)
- [US20080244681A1 - Conversion of Portable Program Modules for Constrained Displays](#)
- [US7379078B1 - Controlling text symbol display size on a display using a remote control device](#)
- [US6856313B2 - The simultaneous display and manipulation of hierarchical and non-hierarchical data](#)
- [US6422474B1 - N-space indexing of digital data representations using physical tags](#)
- [US6441817B1 - Methods for performing z-buffer granularity depth calibration in graphics displays](#)
- [US7069518B2 - Indexing methods, systems...for virtual three-dimensional books](#)
- [US7248269B2 - Magnification methods, systems...for virtual three-dimensional books](#)
- [US7917508B1 - Image repository for human interaction proofs](#)
- [US6952806B1 - Medium containing information gathered from material...for displaying the information](#)
- [US20050151849A1 - Method and system for image driven clock synchronization](#)
- [US8725113 - User proximity control of devices](#)
- [US8531551B2 - System and method for image sharing](#)
- [US20130287269A1 - Creating social network groups](#)
- [US8258390B1 - System and method for dynamic, feature-based playlist generation](#)

- [WO2013074140A1 - Methods and systems to determine a context of a device](#)
- [US8649563 - Object tracking](#)
- [US8693807 - Systems and methods for providing image feedback](#)
- [US8700643 - Managing electronic media collections](#)
- [US8713002 - Identifying media content in queries](#)
- [US8717401 - Secure, location-based virtual collaboration](#)
- [US8754926 - Managing nodes of a synchronous communication conference](#)
- [US8024765 - Method and system for communicating media program information](#)
- [US9203924 - Recommending a new audio file to a member of a social network](#)
- [US9152247 - Computing device with force-triggered non-visual responses](#)
- [US7038680B2 - Graphical display and interactive exploratory analysis of data and data relationships](#)