# Curriculum Vitae


## Rajeev Surati Ph.D.

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**Profile:**

MIT PhD technologist in Electrical Engineering and Computer Science – Builder and Manager of teams translating research into successful Products. Built and sold Microsoft its real-time communications technology platform (2 way messaging, instant messaging, Voip, etc…) Built, ran and sold a top 1000 web site (one of the first offering photo sharing) from 2000-2007 and programmed several key modules including live chat, bulletin boards, photo ratings, photo sharing social networking etc. Built a company around my PhD Thesis that implemented Structured Light based camera systems. Such systems are now a standard requirement in multi-projector based immersive systems (e.g., military simulators). Now a successful Company with Disney, Pixar, Universal and all branches of the military as clients. Areas of expertise include: database backed web sites, web analytics, instant messaging, chat, compilers, display technology, user interfaces, image processing, machine vision, AI, billing, GPU. Also a talented programmer in C++. C, C#, java, python, scheme, LISP, Javascript, php etc.

**Expert Experience:**

Extensive experience in IPR, Patent, Trade Secret, FINRA, ITC, Federal and State Court. Written 10s of Expert Reports. Experienced at least 15 Depositions, Court Tutorial and Trial Testimony.

**Education:**

**Massachusetts Institute of Technology** SB, 1992; SM, 1995; Ph.D.,1999.
GPA: SB 4.9/5.0 SM: 5.0/5.0 Ph.D. 5.0/5.0 all In Electrical Engineering and Computer Science

SB Thesis: *A Parallelizing Compiler Based on Partial Evaluation* – Dept. Thesis Prize (later)
*--Early Days of How to fill Floating Point Pipelines*
SM Thesis: *An Object System Based on Partial Evaluation*
*--Getting Good Computation Throughput – with Abstraction*
Ph.D. Thesis: *Scalable Technology for Large Scale Seamless Displays*
*--Making Massive Resolution Display a Reality*

**Employment:**

**Skyline Nav AI Inc.** **9/2020 – Present**
**Position:** Cofounder, President

Commercializing A Camera Based GPS Alternative – using Visual Cues to Localize. Technology Licensed and Developed at US Army Research Lab.

**Hydrow.** **5/2019 – 3/2020**
**Position:** Skunkworks Technical Head

Ran Innovation Initiative for Connected Fitness Startup to build a VR experience to fully immerse a person into a rowing on the water experience using magic leap and oculus Quest.

**nCent Labs** **4/2018 – 12/2019**
**Position:** Senior Partner

Company is a Stanford, MIT spinout that has created an incentive platform on top of blockchain and is based upon the nCent crypto currency. I worked on corporate, business development, and product development matters.

**Computation and Imaging** **1/2015 – Present**
**Position:** President

Consultancy providing strategic and implementation services to companies related to IP and business issues as well as product development including Android based systems, AI, etc. Clients include NEC, Apple, Sony, Estee Lauder and Hi Marley.

**Scalable Display Technologies** **1/2004 – October 2014**
**Position:** President, Chairman, and Co-Founder

World's leading provider of technologies to build and maintain seamless tiled large displays. Core technology in auto-calibration of large displays. Today, the company is the worldwide leader in auto-calibration in the simulation and training space, largest provider of projector cam software on both an OEM and direct to customer basis with over 100,000 licenses sold worldwide. We created a new class of products that has disrupted the high end of the market by over the last 10 years focusing on folding the cost of warping down from 10,000 dollars per channel to less than 100 dollars per channel. The technology is based on my Ph.D. thesis and seminal projector camera patents filed while at MIT in 1998. I program/product managed our relationships and software architecture integrating it with NVIDIA, AMD, NEC, Sony, etc., based on them as both customers and product channels. We have opened up a huge market for new classes of products for which we are a key component. I also developed our whiteboard strategy which is beginning to bear fruit delivering systems with NEC. I was able to bridge the divide between Japanese brands and their technology focus to bring products to market with their sales organizations by acting as a business/product management intermediary.

**Photo.net.** **7/2000-May 2007**
**Position:** President, Co-Founder, Chairman

Turned world's largest and best amateur photographer site from a simple forum site into a viable growing community based business along with Philip Greenspun. Ran a preLAMP stack based on AOLServer, tcl, and Oracle 9 with innovative features such as: photo-sharing, click through advertising, digital subscriptions for vanity purposes, etc. Innovated very early business models in this space around subscriptions, clickthroughs, banner advertising, and revenue sharing. Sold business quite profitably to NameMedia in 2007. I ran it while running another startup.

**Microsoft** **7/1999 - 7/2000**
**Position:** Software Development Engineer

Worked on Exchange 2000 IM Server and MSN Messenger.
Submitted patents on publish-subscribe architectures etc. Position created post sale of Flash Communications Wrote in C++, used COM, XML etc.

**Flash Communications** **2/1997 – 02/1998**
**Position:** CTO, Co-Founder
Founded company while in PhD program, developed market plan, core technology, and implementation targeted at a Microsoft acquisition. Built team, raised funding, and wrote/ designed product software with team. Company sold to Microsoft, prior to finishing my PhD thesis.

**Oak Ridge National Lab**
**Position: Summer Intern**
Spectroscopy Group building Lab- on-a-Chip.

**MIT AI Lab** **9/1992 – 6/1998**
**Position: Research Assistant**
Worked with computer science and Electrical Engineering Professors: Thomas F. Knight, Gerald Jay Sussman, and Hal Abelson on a wide variety of projects. Helped build an early VLIW computer architecture with HP and mainly designed a special software compiler that did register allocation, parallelization to fill floating point pipeline. I also worked on camera feedback based projector systems, and on projects in the early days of the web: HTTP, TCP, UDP, database backed web systems etc.

**Naval Research Labs**

**Position: Summer Intern**
Worked on wavelet decomposition and classification based on said decomposition of radar return signal in C/C++. Wrote visualization tools that dramatically improved the investigative cycle time. Lots of hacking with postscript to help visualize results.

**Technology Hackers Inc** **6/1992-12/1992**
**Position: Electrical Engineer**
Built a 512 node 2D array of phased array microphones.

**Microsoft** **6/1988-8/1988, 6/1999-9/1999**
Worked on Microsoft PC Client for Mail, Microsoft File, Microsoft Works (pre Windows).

**Technology Advisory Boards:** UnifySquare, Paneve (General Purpose Asic coupled with Compiler Technology), Nexaweb (Realtime Web Application framework using HTTPS), Antix Labs (Compiler Technology for universal gaming platform), Permabit (Content Addressable Storage), Evoque.

**Awards:** Department of Energy Computational Science Graduate Fellow 1995-97, William A Martin Thesis Prize for Best Undergraduate Thesis in Computer Science 1992, Global Indus Technovator Award 2009, Laureate of 2009 Computer World Honors Program, MIT 6.270 Lego Robot 1991 – Robot was named with Nuclear Capabilities on fields of RoboHockey.

**Investments:** Angel Investor in over 40 startups.

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**Patents:**

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| 5,943,478 | System for immediate popup messaging across the internet |
| 6,260,148 | Methods and systems for message forwarding and property notifications using electronic subscriptions |
| 6,415,318 | Inter-enterprise messaging system using bridgehead servers |
| 6,456,339 | Super-resolution display |
| 6,604,133 | Inter-enterprise messaging system using bridgehead servers |
| 8,817,111 | System and method of calibrating a display system free of variation in system input resolution |
| 8,994,757 | System and method for providing improved display quality by display adjustment and image processing using optical feedback |
| 9,215,455 | System and method of calibrating a display system free of variation in system input resolution |
| 9,369,683 | System and method for calibrating a display system using manual and semi-manual techniques |
| 9,497,447 | System and method for color and intensity calibrating of a display system for practical usage |
| 9,860,494 | System and method for calibrating a display system using a short throw camera |
| 10,163,195 | Spatio-temporal differential synthesis of detail images for high dynamic range imaging |
| 10,319,137 | System and method for injection of mapping functions |
| 10,503,059 | System and method for calibrating a display system using manual and semi-manual techniques |
| 10,523,910 | System and method for providing improved display quality by display adjustment and image processing using optical feedback |
| 11,159,774 | System and method for providing improved display quality by display adjustment and image processing using optical feedback |

**Systems Built (Individually or as part of a team):**
Spambot: One of the Internet's first free to use Mailing List Servers that was database backed
Photo.net's photo sharing system: One of the first on the internet, and given rave reviews as one of the best systems out in 2003.
Photo.net's mobile WAP interface
MIT Supercomputing Toolkit: VLIW 8 processor system out of discrete electronic parts

Microsoft Exchange 2000 IM Server and MSN Messenger Service
Internet Coke Machine: 1993 – food transfer protocol (modified ftp server hooked up to micro-controlled coke machine)

**Skills:** C++, C, Scheme, TCL, C#, Java,SQL, dabbled in PERL, python, etc. ], TCP, mobile app development, and networking, image processing, firmware programming etc. Did Oracle DB management for photo.net. Very fast at learning enough to implement what I need done to solve a problem, E&M, machine vision, etc.

## Publications:

Medication Use in the Management of Comorbidities Among Individuals With Autism Spectrum Disorder From a Large Nationwide Insurance Database
By: Feroe, Aliya G., Nishant Uppal, Alba Gutiérrez-Sacristán, Sajad Mousavi, Philip Greenspun, Rajeev Surati, Isaac S. Kohane, and Paul Avillach.
In: *JAMA pediatrics* 175, no. 9 (2021): 957-965.

COVID-19 Contact-Tracing Mobile Apps: Evaluation and Assessment for Decision Makers
By:Raskar, Ramesh, Greg Nadeau, John Werner, Rachel Barbar, Ashley Mehra, Gabriel Harp, Markus Leopoldseder et al. (Rajeev Surati). *arXiv preprint arXiv:2006.05812* (2020).

Video Deconfounding: Hearing-Aid Inspired Video Enhancement.
By: Berlin, Andrew A., and Rajeev Surati.
In: *2018 IEEE 13th Image, Video, and Multidimensional Signal Processing Workshop (IVMSP)*, pp. 1-5. IEEE, 2018.

Measurable augmented reality for prototyping cyberphysical systems: A robotics platform to aid the hardware prototyping and performance testing of algorithms.
By:Omidshafiei, Shayegan, Ali-Akbar Agha-Mohammadi, Yu Fan Chen, Nazim Kemal Ure, Shih-Yuan Liu, Brett T. Lopez, Rajeev Surati, Jonathan P. How, and John Vian
In: *IEEE Control Systems Magazine* 36, no. 6 (2016): 65-87.

Mar-cps: Measurable augmented reality for prototyping cyber-physical systems
By: Omidshafiei, Shayegan, Ali-Akbar Agha-Mohammadi, Yu Fan Chen, Nazim Kemal Üre, Jonathan P. How, John L. Vian, and Rajeev Surati.
In: *AIAA Infotech@ Aerospace*, p. 0643. 2015.

Partial Evaluation for Scientific Computing: The Supercomputer Toolkit Experience A. Berlin and R. Surati, Proc of ACM SIGPLAN Workshop on Partial Evaluation and Semantics-Based Program Manipulation, 1994

Exploiting the Parallelism Exposed by Partial Evaluation.
By: Rajeev J. Surati, Andrew A. Berlin
In: IFIP PACT, 1994

A Parallelizing Compiler Based on Partial Evaluation, MIT Artificial Intelligence Laboratory Technical Report, TR-1377, July, 1993

**Invited Talks:**

*Ultra High Resolution Displays and Interactive Eye-point Using CUDA* NVIDIA GPU Computing Conference 2010

*Using the GPU to Create Seamless Displays from Multiple Projectors* SIGGRAPH 2011 NVIDIA Presentation.

*Seamless Scalable Displays - Using NVIDIA Warp + Intensity API* NVIDIA GPU Computing Conference 2012

*Using Warp and Blend API in Distributed and Single Renderer's / Update on Warping Standards* with Bei Wang (Walt Disney Imagineering), NVIDIA GPU Computing Conference 2013

*Mid-Tier VR: Cost Reducing the Cave by Embracing the GPU* with Bei Wang – Walt Disney Imagineering, NVIDIA GPU Computing Conference 2014

**Teaching:**

MIT Teaching Assistant:
6.001 Structure and Interpretation of Computer Programs (2 times)
6.002 Circuits
6.013 Electro and Magneto Quasi-static Systems
ArsDigita University: Lecturer Probabilistic Systems
ArsDigita Database Programming Bootcamp Instructor
MIT Course on Android Mobile Programming

Harvard Medical School Computational Medicine course – handling BIG Data.