

# Henry H. Houh

## Education

### Massachusetts Institute of Technology, Cambridge, MA

- PhD in Electrical Engineering and Computer Science, February 1998. "Designing Networks for Tomorrow's Traffic," thesis supervised by Professor David Tennenhouse and Professor John Guttag. GPA 4.7/5.0
- Master of Science in Electrical Engineering and Computer Science, February 1991. "Demonstration of a laser repetition rate multiplier," thesis. GPA 4.5/5.0
- Bachelor of Science in Electrical Engineering and Computer Science, June 1989. "Boundary element analysis of arbitrarily shaped dielectric structures," thesis. GPA 4.7/5.0
- Bachelor of Science in Physics, February 1990. GPA 4.7/5.0

## Experience

### H3XL Inc. d/b/a Einstein's Workshop (formerly Lexington Robotics)

- 2009 - present: Founder and President. Started local league providing science and engineering education programs based on LEGO Mindstorms, LEGO WeDo, and FIRST LEGO League. In 2012, grew program into a full science, technology, engineering and math enrichment program and creative/maker space, in 7,000 square feet of space. Serve 2,000+ kids and families annually. As of end of 2015, have delivered an estimated 65,000 student-instruction-hours of STEM courses. Principle Investigator for 2-year DARPA grant to improve 3D Computer Aided Design tool developed in-house for the purposes of teaching 8 year olds and up 3D CAD.

### Houh Consulting Inc. / Independent Consultant

- 2009 - present: Technical consultant specializing in Social Networking, Web 2.0, Web Site Development, Data Networking, Optical Networking, Telecommunications, Media Streaming and Voice Over IP. Representative clients include: BBN, Akin Gump Strauss Hauer & Feld LLP, Covington & Burling LLP, Winston & Strawn LLP, Wilmer Cutler Pickering Hale and Dorr LLP, Kellogg Huber Hanson Todd Evans & Figel PLLC, McGuireWoods LLP, and Sidley Austin LLP.

### Eons

- 2008 - 2009: Chief Technology Officer. Created product that Eons acquired from BBN Technologies. Integrated BBN product with Eons social networking platform and significantly increased the Eons group creation rate. Helped evaluate advertisement platform offerings and rolled out the "Boom Network" advertising network. Eons raised \$32 million from General Catalyst Partners, Charles River Ventures, Sequoia Capital, and Intel Capital.

TWITTER, INC.  
EXHIBIT 1004

## **BBN Technologies**

- 2007 - 2008: Delta Division, Vice President of Technology. Grew “Boomerang” counter-sniper project engineering team and significantly de-risked \$10 million worth of product deliveries. Boomerang was a significant asset leading to the acquisition of BBN by Raytheon in 2009. Created new business plan and grew team; launched new fully-featured social networking web site in 5 months. Served as lead expert witness in patent infringement lawsuit, resulting in \$58 million jury award to client; verdict for patents I testified on were upheld on appeal which resulted in a \$120 million settlement.
- 2004 - 2007: Delta Division, Director of Technology, responsible for commercializing IP and creating new businesses. Hired and grew division's initial engineering team. Wrote three business plans, two of which are funded and active. For call center business plan, acted as general manager, hiring and managing engineering team, inside sales team, and identifying and recruiting a new general manager. Identified and recruited other key employees to Delta Division, including senior members of team leading to successful internal sales growth and spin-outs of projects. Contracted by BBN to BBN spin-out PodZinger as VP of Operations and Technology. Identified sales team for counter-sniper system, leading to \$10 million dollars of new sales within 6 months and \$100+ million in additional orders in the following two years.

## **PodZinger Inc. (BBN spin-out, also known as EveryZing and now RAMP)**

- 2006: Vice President of Operations and Technology. Significantly upgraded capability of consumer-facing search site and redeployed web site from company to co-location facility. Identified key portions of infrastructure for upgrading and cost reduction. Helped write business plan, evaluating advertisement models of revenue. Hired in operations replacement and phased back to BBN.

## **Commonwealth Capital**

- 2004: Entrepreneur-in-residence (informally), performed technical due diligence on business plans, brainstormed ideas for new businesses with venture partner. With venture partner, left for portfolio company BBN to form core of commercialization team.

## **Empirix, Inc./Teradyne, Inc.**

- 2001 - 2004: Chief Technologist, Engineering Manager, Web Application Test Group. Researched potential new product areas; developed product plan and prototype. Responsible for three new and existing products. Managed off-shore development team. Chief architect for all web testing products. Re-architected core testing product, helped write javascript interpreter. Provided technical vision for core product.
- 2000 - 2001: Chief Technologist, Communication Infrastructure Test Group. Responsible for incorporating new technology internally, tracking new technologies, technical evaluation of partnerships and potential acquisitions. Helped develop division strategy. Developed plans which formed core capabilities for successful new products introduced in 2004-5.
- 2000 - 2001: Engineering Manager, Communications Infrastructure Test Group. Execution of new product plan developed in prior role. Grew team from four existing engineers to team of over 30 on immediate team and over 40 on project. Delivered new platform in one year. Platform

and derivatives accounted for large portion of booked products for the division within 2 years and is currently (2008) a key portion of new product offerings.

- 2000: Empirix was formed as a spin-out of Teradyne in January 2000. Reported to CEO in carve-out of Empirix from Teradyne.
- 1999: (Teradyne) Director of Business Development, Software Test Units. Reported directly to Chairman of the Board/Founder and then to general manager of software test unit (6 divisions of Teradyne). Evaluated and researched acquisition and partnership candidates. Internally assessed technology position in market and gaps in product lines. Worked with senior division staff to develop new product strategies. Attended internal Teradyne divisional board meetings. Chairman served as my mentor.

### **3Com Corporation/NBX Corporation**

- 1999: Software Engineer 5. Continued work after 3Com acquisition of NBX. Built cross-division relationships for new products and research directions. NBX was acquired by 3Com in March 1999.
- 1997 - 1999: (NBX) Senior Scientist and Engineer. Work in IP Telephony. Architected next-generation product. Protocol design and validation for core protocol now used tens of millions of times daily. Led team in integration of IP protocols into current product. Designed audio reconstruction algorithms. Developed applications for bug analysis and diagnosis of system problems. Implementation of network simulator. Work on collaborative projects with external partners. Worked to identify gaps in product. Representative at numerous trade shows. Innovated novel methods of using product.

### **MIT Department of Electrical Engineering and Computer Science, Cambridge, MA**

- 1991 - 1998: Research assistant, Telemedia Network Systems Group. Design, development, and implementation of Gigabit ATM network for distributed multimedia system. Studied host interface design issues. ATM network simulation.
- Spring 1989, Fall 1990, Spring 1995: Teaching assistant, Computation Structures digital systems course. (Spring 1995 Head TA)
- 1988 - 1989: Head laboratory teaching assistant for Computation Structures. Responsibilities included writing and revising lab assignments, and maintaining the lab.
- 1987: Laboratory teaching assistant for Computation Structures.
- 1987: Design, construction, and programming of 16-bit computer.

### **Agora Technology Group, Incorporated**

- 1994 - 1996: Founder and CEO. Conceived and oversaw development of targeted advertising-supported Web sites. Responsible for company's vision and direction. Attended the first two WWW Conferences, presenting a workshop and paper at the first, and appearing on the "Commercialization and Economics of the Web" panel and chairing the "Where Commercial Services and the Web Are Headed" panel at the second. Sold company intact; is currently an operating stand-alone company.

AT&T Bell Laboratories, Holmdel, NJ

- 1989 - 1990: Implementation of cascadable all-optical fiber logic gate. Modelocking of all-fiber erbium laser. Construction of modelocked laser repetition rate booster. Strong optics laboratory and fiber optic experience.
- Summer 1988, 1987: Research in integrated optics. Analysis of rectangular waveguides using microwave modeling. Fabrication of integrated optical components.

## Honors

- MIT Alumni Association Great Dome Award, 2010, Baker 60<sup>th</sup> Anniversary Reunion Co-Chair (highest group award given by MIT Alumni Association)
- MIT Alumni Association Presidential Citation Award (now known as Great Dome), 2008, Member of MIT Chairman's Salon committee
- MIT Alumni Association Bronze Beaver Award, 2007 (highest individual award given by MIT Alumni Association)
- MIT Alumni Association Volunteer Honor Roll, February 2004
- MIT Alumni Association Lobdell Award, 1999
- Boston Museum of Science Gold Pin for 1000 hours of Volunteer Service, April 1999
- MIT Alumni Association Presidential Citation Award (now known as Great Dome), 1997, Member of Alumni Online Communications Committee

## Patents and Patent Publications

- US Patent #7,975,296, L. Apfelbaum, H. Houh, T. Mayberry and G. Friedman, "Automated security threat testing of web pages," July 5, 2011. See also US20030159063, WO2003067405.
- US Patent #7,877,736, H. Houh and J. N. Stern, "Computer language interpretation and optimization for server testing," January 25, 2011. See also US20050138104, WO2005043300.
- US Patent #7,801,910, H. Houh and J. N. Stern, "Method and apparatus for timed tagging of media content," September 21, 2010. See also US20070112837, US20090222442, WO2007056535.
- US Patent #7,590,542, D. C. Williams, W. C. Hand, H. Houh, A. R. Seeley, "Method of Generating Test Scripts Using a Voice-Capable Markup Language," September 15, 2009. See also EP1530869, US20030212561, WO2003096663.
- US Patent #6,967,963, H. H. Houh, P. Anderson, C. Gadda, "Telecommunication method for ensuring on-time delivery of packets containing time-sensitive data," November 22, 2005. See also EP1060400, WO2000033092, CA2318774.
- US Patent #5,144,375, M. C. Gabriel, H. H. Houh, N. A. Whitaker, "Sagnac Optical Logic Gate," September 1, 1992. Also issued as European Patent #EP0456422, July 23, 1997, German Patent #DE69126913, August 28, 1997
- US Patent Application Publication No. 20020015387, "Voice Traffic Packet Capture and Analysis Tool for a Data Network" (Abandoned in 2007)
- US Patent Application Publication No. 20020016708, "Method and Apparatus for Utilizing a Network Processor as Part of a Test System" (Abandoned in 2007)
- US Patent Application Publication No. 20020016937, "Method and Apparatus for Utilizing a Network Processor as Part of a Test System." (Abandoned in 2007) See also WO2002011413.
- US Patent Application Publication No. 20070106646, "User-directed navigation of multimedia search results" (Abandoned in 2009)

- US Patent Application Publication No. 20070106660, “Method and apparatus for using confidence scores of enhanced metadata in search-driven media applications” (Abandoned in 2009)
- US Patent Application Publication No. 20070106685, “Method and apparatus for updating speech recognition databases and reindexing audio and video content using the same” (Pending as of 2/24/2015)
- US Patent Application Publication No. 20070106693, “Methods and apparatus for providing virtual media channels based on media search” (Pending as of 2/24/2015)
- US Patent Application Publication No. 20070106760, “Methods and apparatus for dynamic presentation of advertising, factual, and informational content using enhanced metadata in search-driven media applications.” (Pending as of 2/24/2015) See also WO2007056485.
- US Patent Application Publication No. 20070118873, “Methods and apparatus for merging media content” (Pending as of 2/24/2015)
- US Patent Application Publication No. 20090222442, “User-directed navigation of multimedia search results” (Pending as of 2/24/2015)
- US Patent Application 11/395,732, “Search snippet creation for audio and video data” (Abandoned)
- US Patent Application 11/774,931, “Methods and apparatus for managing a social networking web site”
- US Patent Application 11/774,947, “Methods and apparatus for organizing media files”
- US Patent Application 11/774,956, “Methods and apparatus for managing an online event”
- US Provisional Patent Application 61/086,909, “Measuring and ranking relationship activity”
- US Provisional Patent Application 61/086,914, “Detecting media object commonality”
- US Provisional Patent Application 61/086,904, “Message categorization based on message characteristics”
- US Provisional Patent Application 61/086,905, “Photo tagging to request action”

## **Trials, Testimony and Depositions**

- Case No. 1:06CV682 (CMH/BRP), Verizon vs. Vonage, US District Court for the Eastern District of Virginia, filed expert report, was deposed and testified at trial.
- Case No. 1:08CV157 (CMH/TRJ), Verizon vs. Cox, US District Court for the Eastern District of Virginia, was deposed and testified at trial.
- Case No. 5:09-cv-476, Two-Way Media vs. AT&T, US District Court for the Western District of Texas, filed expert report, testified at trial
- Case No. 2:10-cv-248 (RAJ/FBS), ActiveVideo Networks vs. Verizon, US District Court for the Eastern District of Virginia, filed expert report and was deposed as an expert witness
- Case No. 1:11-cv-00880-TSE-JFA, Bear Creek Technologies, Inc. vs. Verizon Services Corp., et al, US District Court for the Eastern District of Virginia, was deposed as an expert witness
- Case No. 3:10-CV-298-BBC, AlmondNet, Inc. vs. Microsoft Corp., US District Court for the Western District of Wisconsin, filed expert report
- Case No. 6:10-cv-00597, Guardian Media Technologies, Ltd. Vs. AT&T Operations, Inc. et al., US District Court for the Eastern District of Texas, Tyler Division, filed expert report
- Case No. ESCV2010-02282C, The Octopus Solution LLC v. Gary Brown et al., Essex, MA Superior Court, testified at trial
- Investigation No. 337-TA-882, In the matter of Certain digital media devices, including televisions, Blu-ray disc players, home theater systems, tablets and mobile phones, components

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