

## CV for Daniel Howard

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### Key Educational Qualifications

- Taught college-level undergraduate electromagnetics, modern physics, and graduate telecommunications to STEM majors at Georgia Tech, and also taught electronics to non-technical majors at GSU
- Created and led an SCTE initiative to re-invent the training and certification program for cable professionals using on-site, online, and on-demand material delivery, and created much of the advanced course content personally using a home-studio/voice-over setup
- Developed patent-pending method for remotely assessing cable technician's craft skills using equipment found in most cable edge facilities and leveraging the pre-equalization coefficients of cable modem systems.
- Co-developed cable engineer management development course with Ga Tech Scheller School of Management
- 26 US patents, 18 publications, one book chapter, dozens of online modules and presentations for on-demand education
- Developed and presented seminars to Ga Tech startups on patent writing and strategies for protecting intellectual property; assisted startups in rapidly developing new patents
- Developed key RF impairment and bandwidth growth models for cable networks for MSOs
- Led the effort to convince Atlanta Public Schools (APS) to switch to a thin client/Open Source model by planning and executing a proof of concept at a school, training teachers, providing TCO and performance benefits, knowledge transfer to APS IT staff and formulating a strategy and cost model for scaling the approach to the greater school district
- Cofounder and CTO of high-tech startup company Digital Furnace, grown from 3 engineers to over 35 in 16 months and sold for \$137M for 16x ROI to investors
- Associate Director and cofounder of Ga Tech Broadband Telecom Center with over \$6M funding awards for facilities development, R&D and industry memberships, and led graduate student research in cable telecommunications

### Work Experience

Adjunct Instructor, Physics Department, Oglethorpe University (2019-Present)

PhD Student in Biophysics, Concentration: Neurophysics and Electrophysiology, M. Dhamala, advisor, Georgia State University. (2021-Present)

Principal, Enunciant LLC. Consultancy for cable technical and educational consulting. Performed network upgrade designs and planning, professional training, and operational troubleshooting. (2018-present)

Director, Energy and Environmental Efficiency, Hitachi Consulting Corp., Atlanta, GA. Focused on improving energy efficiency in cable access network edge facilities and data centers, and supporting Hitachi's participation in SCTE standards and SCTE Cable-Tec Expo. (2016-2018)

Fellow, Society of Cable Telecommunications Engineers, Exton, PA. Provided technical subject matter expertise and content generation in the areas of access networks, DOCSIS, WiFi/wireless, FTTH, network operations, digital video, energy efficiency, and development of standards, operational practices, and training content. (2015-2016)

CTO, Society of Cable Telecommunications Engineers, Exton, PA. Innovated professional learning processes, led and developed modules for full suite of curriculum for instructor led, online, and on-demand course for cable professionals and associated certifications, co-founded cable engineer management development course with Ga Tech Scheller School of Management, led standards development teams, evangelized SCTE programs in Standards and Professional Development in the US and abroad, developed current leading-edge content for training material, SCTE Expo, and other national and international conferences, and developed and executed telecommunications strategies with NCTA, CableLabs, International outreach programs and other partners. (2010-2015)

CTO VQLink, Inc., Atlanta, GA. Developed new digital video quality measurement and monitoring technology based on Ga Tech Ph.D thesis, quantified and characterized video quality of existing cable, satellite and telco systems to identify areas for improvement. (2008-2010)

Systems Architect, Motorola, Inc., Atlanta, GA. Developed models of network bandwidth use and growth from new applications. Worked with national standards bodies to develop new specifications for broadband technology. Developed new cable technologies and architected customer-specific solutions for cable operators. (2007-2008)

IT/Thin Client Consultant/Volunteer, Atlanta Public Schools, Atlanta, GA. Created and led a pilot program at Morris Brandon Elementary to convert aging classroom computers into Linux thin clients, resulting in a 2:1 student to PC ratio in classrooms (1:1 in higher grades) for less than \$20k of PTA funds. Increased CRCT test scores and put Brandon at the top the following year, resulting in Atlanta Public Schools piloting the technology in 7 schools and subsequently deploying in 45 schools in Atlanta. Won Excalibur Award for Excellence in Educational Technology from the Technology Association of Georgia and a national FOSS award from NCOSE for the project and results. (2005-2007)

President and CEO, Quadrock Communications, Atlanta, GA. Interactive TV startup. Wrote 3 patents pending in ITV technology, developed demonstrations of advanced advertising system for DVR-based ITV. (2004-2005)

Technical Director, Broadcom Corp., Duluth, GA. Technical solutions architecting and demonstration to US and European MSOs and Broadcom customers on operation and advantages of, and how to use new signal processing technology. Strategic positioning of new technology especially SCDMA and ATDMA. (2000-2003)

CTO, Digital Furnace Corporation, Atlanta, GA. Developed technology to reduce bandwidth requirements of telephony/video over cable. Developed strategic technology and product roadmaps. (1998-2000)

Sr. Research Engineer, Georgia Tech Research Institute, Atlanta, GA. Assoc. Director/Co-Founder of Broadband Telecom Center, \$6M budget/3 yrs. Developed cable research lab for GT students and faculty research in cable. (1990-1998)

## Education

Georgia Institute of Technology, BS Physics with honor, emphasis on solid state and quantum theory

Georgia Institute of Technology, MS Electrical Engineering. Fields of Study: Theoretical solid state physics, electromagnetics, and communications, controls, and signal processing.

Georgia Institute of Technology, work towards PhD in Electrical Engineering: nanotechnology fabrication for communications applications and basic physics exploration of the Aharonov–Bohm effect in nanoscale electronic devices, and conversion of a commercial scanning electron microscope into an electron beam lithography tool for basic research.

## Synergistic Activities

Session chair many times for SCTE Cable-Tec Expo; DOCSIS 1.1 and 2.0 international specification for cable modems, co-author, lead inventor on Broadcom's main DOCSIS 3.0 patent; Interop Session Chair, Broadband Residential Technologies, session chair multiple times for ANGA cable conference in Cologne, Germany.

## Volunteer Experience

IT/thin client consultant and parent volunteer for Brandon Elementary School, Sutton Middle School, and North Atlanta High School; FERST Robotics Theme Consultant; Science fair judge for local Atlanta schools.

## Issued US Patents

	Patent No.	Patent Title (click to view)
1	12093875	<a href="#">Systems and Methods for Remote Evaluation of Craft Skills</a>

2	10,139,845	<a href="#">System and method for energy consumption management in broadband telecommunications networks via adaptive power management</a>
3	9,350,491	<a href="#">System and method for mitigating burst noise in a communications system</a>
4	8,774,300	<a href="#">Signal processing under attenuated transmission conditions</a>
5	8,681,615	<a href="#">Multichannels for a communications management system</a>
6	8,667,362	<a href="#">System and method for mitigating burst noise in a communications system</a>
7	8,654,775	<a href="#">Methods of allocating packets in a wireless communication system</a>
8	8,472,541	<a href="#">Signal processing under attenuated transmission conditions</a>
9	8,279,987	<a href="#">System and method for canceling interference in a communication system</a>
10	8,130,642	<a href="#">Downstream synchronous multichannels for a communications management system</a>
11	7,953,170	<a href="#">Signal processing under attenuated transmission conditions</a>
12	7,912,066	<a href="#">Methods of allocating packets in a wireless communication system</a>
13	7,889,821	<a href="#">System and method for canceling interference in a communication system</a>
14	7,733,912	<a href="#">Allocation of packets in a wireless communication system</a>
15	7,697,543	<a href="#">System and method for multiplexing data from multiple sources</a>
16	7,631,242	<a href="#">System, method and computer program product for mitigating burst noise in a communications system</a>
17	7,567,638	<a href="#">System and method for canceling interference in a communication system</a>
18	7,529,289	<a href="#">Signal processing under attenuated transmission conditions</a>
19	7,450,579	<a href="#">Downstream synchronous multichannels for a communications management system</a>
20	7,420,986	<a href="#">Method and apparatus for the detection and classification of collisions on a shared RF network</a>
21	7,418,240	<a href="#">Dynamic adaptation of impaired RF communication channels in a communication system</a>
22	7,334,253	<a href="#">Method and apparatus for detection and classification of impairments on an RF modulated network</a>
23	7,218,694	<a href="#">System and method for canceling interference in a communication system</a>
24	7,050,516	<a href="#">System and method for periodic noise avoidance in data transmission systems</a>
25	7,024,680	<a href="#">Method and apparatus for detection and classification of impairments on a RF modulated network</a>
26	6,804,251	<a href="#">System and method for multiplexing data from multiple sources</a>
27	6,798,854	<a href="#">System and method for canceling interference in a communication system</a>

## Publications

D. Howard, M.Meier, "Meeting Laboratory Course Learning Goals Remotely via Custom Home Experiment Kits," The Physics Teacher, Vol. 59, September 2021.

D. Howard, C. Day, K. Gantt, J. Holobinko, R. Howald, D. Marut, R. Kirsche, T. Loeffelholz, K. Miles, R. Spee, D. Stoneback, J. Ulm, L. West, and D. Whitehouse, "Operational Practices for Energy Conservation/Sustainability Measures in the Cable Outside Plant," NCTA Technical Papers, 2018.

J. Dolan, D. Howard, A. Murphy, K. Nickel, and D. Smargon, "Guidelines for Cable Facility Climate Technology Optimization: Cooling Optimization for Edge Facilities," SCTE-ISBE/NCTA/Cablelabs Fall Technical Forum, SCTE Cable-Tec Expo 2017.

D. Marut, D. Howard, G. Gosko, S. Dharkar, R. van Niekerk, T. McManus, M. Baselice, and G. Baron, "Energy Conservation Measure Recommendations for Cable Edge Facilities: Energy Audits and Analysis of Ten Cable Headends," SCTE-ISBE/NCTA/Cablelabs Fall Technical Forum, SCTE Cable-Tec Expo 2017.

A. Murphy, J. Dolan, M. Glaser, T. Hurley, D. Howard, D. Smargon, and G. Gosko, "Computational Fluid Dynamics Air Flow Modeling: Can it improve cooling in your facilities?" SCTE Journal of Energy Management, Vol. 2 No. 3, December 2017, pp. 50-55.

D. Stoneback, J. Moran, L. West, and D. Howard, "Evaluating HFC Network Readiness for Deployment of D3.1 Technology and Services," SCTE-ISBE Cable-Tec Expo 2016.

G. Mitchinson, D. Howard, T. Loeffelholz, R. Spee, C. Carroll, and L. West, "Measuring and Baseline Power Consumption in Outside Plant Equipment and Power Supplies: Method, prediction and case study," SCTE-ISBE Cable-Tec Expo 2016.

S. Windle, R. Hranac, N. Segura, K. Couch, M. Darragh, G. Tresness, and D. Howard, "Operational Practice for Minimizing Signal Leakage in the UHF Spectrum," SCTE Journal of Network Operations, vol. 1 no.1, January, 2016, pp. 55-78.

D. Howard, M. Green, R. Palaniappan, and N. Jayant, "Visibility of Digital Video Artifacts in Stereoscopic 3DTV," SMPTE Motion Imaging Journal, 120(4), pp. 49-53, DOI: 10.5594/j18044, 2011.

D. Howard, "Video Quality Impairments 101 for MSOs," NCTA Spring Technical Forum, available from [www.nctatechnicalpapers.com](http://www.nctatechnicalpapers.com), 2010.

D. Howard, "Cable Thin Clients: A New Revenue Opportunity for MSOs," NCTA Technical Papers, 2007.

D. Howard, "Reviving Your Old Technology Using K12LTSP Software and Thin Client Architecture: Giving all Georgia children access to educational software and preparation for the future," Georgia Educational Technology Conference 2006, Atlanta, GA

**Broadband Last Mile: Access Technologies for Multimedia Communications**, Jayant, Nikil, Ed., lead author on Cable access chapter, 2005.

D. Howard, L. Hall, K. Brawner, H. Hsu, N. Hamilton-Piercy, R. Ramroop, and S. Liu, "Methods to Increase Bandwidth Utilization in DOCSIS 2.0 Systems," NCTA Technical Papers, 2003.

D. Howard and H. Roberts, "Dynamic Adaptation to Impaired RF Upstream Channels Using Advanced PHY," NCTA Technical Papers, 2002.

D. Howard, "System Identification and Adaptation to RF Impairments Using Advanced PHY," Communications Design Conference proceedings, San Jose, CA, October 2001.

D. Howard, "Detection and Classification of RF Impairments for Higher Capacity Upstreams Using Advanced PHY," NCTA Technical Papers, 2001.

D. Howard, "Security Issues for Remote Access and Virtual Private Networks Involving Cable Modems," NCTA Technical Papers, 1999.

K-H. Li, A. Huang, M. A. Ingram, and D. Howard, "Impulse noise identification for the HFC upstream channel," IEEE Trans. Broadcasting, vol. 44, no. 03, pp. 324-329, Sep. 1998.