

M. Everett Lawson, PhD

Cambridge, MA • (857) 234-4198 • everett@lawsonscientific.com
everettlawson.com • [linkedin.com/in/m-everett-lawson](https://www.linkedin.com/in/m-everett-lawson)

QUALIFICATIONS PROFILE

Highly analytical research scientist and passionate professor with dedicated expertise in multi-sensory perception, optomechanical engineering, human computer interaction (HCI), and 10+ years' experience designing and building cutting-edge technologies for ocular imaging and augmented/virtual reality. Extensive background in leveraging low-level visual processes to develop novel perceptual experiences and display environments, including quantitative modeling and evaluation of psychophysical metrics in human subjects. Proven track record in innovation, with an extensive portfolio of full-stack device development including neural mismatch models for kinetosis mitigation, biomimetics, and multi-sensory situational awareness.

DISSERTATION TITLE

[Biologically encoded augmented reality: multiplexing perceptual bandwidths \(2020\)](#)

EDUCATION

Doctor of Philosophy , Massachusetts Institute of Technology, Cambridge, MA Vision science, perceptual mechanisms, and augmented reality	2015-2020
Master of Science , Massachusetts Institute of Technology, Cambridge, MA Cognitive and pre-cognitive multisensory processes	2010-2012
Bachelor of Fine Arts , School of the Art Institute of Chicago, Chicago, IL Fourier optics and optical mechanics	2007-2010
Soli certificate , Pražská konzervatoř, Prague, CZ Violin performance, Protégé to Jaroslav Foltyn	2003-2006
Bachelor of Fine Arts , Colorado State University, Fort Collins, CO Music theory, violin performance, and pre-medicine	1999-2003

RESEARCH

Doctoral Researcher

MIT Media Lab, Cambridge, MA 02/2015 – 09/2020

Designed and engineered new modes of information delivery in augmented and virtual environments (AR/VR), leveraging hardcoded biological processes and neural plasticity weighed against the granular synthesis of computation. Dissertation contributions demonstrated:

- A foundational approach to peripheral semantic information delivery using motion modulated stimuli targeting low-level visual processes
- Recognition of complex symbols beyond 50 degrees eccentricity without gaze diversion from central fixation in complex natural environments
- Symbol decomposition into static apertures spanning 0.64 degrees of the visual field
- 98% detection accuracy across longitudinal human subject trials in five simulated natural environments

- A 12K display architecture for conducting experiments targeting far peripheral visual regions for real-world, high-load/high-risk applications, i.e. industrial cockpit, aerospace industry, high-altitude flight system controls

Principal Research Scientist and Co-Founder

Lawson Scientific, Winthrop, MA 06/2014 – Present
 Corporate, institutional, and enterprise research and development, specializing in IP, hardware development, and implementation. As principal research scientist, I have overseen and developed full-stack AR/VR interfaces and custom display array environments targeting low-level visual processes to engage motion perception, contrast sensitivity, and adaptation.

Graduate Fellow

MIT Tata Center for Technology and Design, Cambridge, MA 09/2013 – 02/2015
 Designed and engineered computational imaging and ophthalmic optical systems for international resource-constrained settings, including:

- Co-founding and leading engineering for the LVPEI Center for Innovation in Hyderabad
- Working onsite with clinicians and hospitals to develop low-cost device solutions to complex ophthalmic imaging needs

Research Scientist

MIT Media Lab, Cambridge, MA 06/2012 – 09/2013
 Engineered and built a portfolio of full-stack near-eye micro-retinal imaging and ophthalmic optical systems in the Camera Culture group for early detection and monitoring of disease states, bringing in \$1.1 million in research grants and multiple awards including Vodafone Wireless Innovation Prize and CIMIT Primary Care Innovation.

Full Research Assistant

MIT Media Lab, Cambridge, MA 05/2010 – 06/2012
 Developed and implemented optical bench systems for femtosecond imaging and conducted extensive experimentation across multiple environments and media, as well as, writing government grants, leading teams of graduate students and patenting my research on near-eye ophthalmic imaging.

PROFESSING

Advisor, PhD Students

MIT Media Lab, Cambridge, MA 09/2019 – 06/2020
 Provided academic and research guidance to master and doctoral students throughout the process of their graduate and professional careers.

Lead Instructor and Curriculum Developer

MIT Tata Center for Technology and Design, Cambridge, MA 09/2013 – 02/2015
 Designed and led large-scale innovation workshops in Bangalore, Nashik, Pune, Mumbai, and Hyderabad, each with 100-200 senior engineers and clinicians with a primary focus on teaching new hardware and computational methods for low-cost medical interventions in vision

Lead Teaching Assistant,

Engineering Health: Designing and Deploying Affordable Health Diagnostics and Therapeutics

MIT Media Lab, Cambridge, MA 09/2013 – 06/2014
 Designed and constructed cutting-edge health diagnostics and devices, exploring opportunities to test and deploy on international platforms. Conducted lectures and designed curriculum, assignments, and projects for graduate students and invited clinicians for two consecutive academic years.

Lead Teaching Assistant, Computational Camera and Photography

MIT Media Lab, Cambridge, MA

09/2011 – 06/2012

Covered the complete pipeline of computational cameras that attempt to digitally capture the essence of visual information by exploiting the synergistic combination of task-specific optics, illumination, sensors, and processing. Conducted weekly lectures and designed the coursework for enrolled graduate students.

Professor of the Practice

Private Studio Instruction

2006 - 2009

Advanced Galamian technique, practice and theory, specializing in solo violin performance. Studio practice in Prague, CZ, Redondo Beach, CA, and Chicago, IL.

PUBLICATIONS

Biologically encoded augmented reality: multiplexing perceptual bandwidths

Lawson, Matthew Everett. PhD diss., Massachusetts Institute of Technology, 2020.

Smart phone administered fundus imaging without additional imaging optics

Lawson, Matthew Everett, and Ramesh Raskar. Investigative Ophthalmology and Visual Science, 2014.

Femtophotography: capturing and visualizing the propagation of light

Velten, Andreas, Di Wu, Adrian Jarabo, Belen Masia, Christopher Barsi, Chinmaya Joshi, Everett Lawson, Mounji Bawendi, Diego Gutierrez, and Ramesh Raskar. In ACM Transactions on Graphics (TOG), 2013.

Computational retinal imaging via binocular coupling and indirect illumination

Lawson, Everett, Jason Boggess, Siddharth Khullar, Alex Olwal, Gordon Wetzstein, and Ramesh Raskar. In ACM SIGGRAPH 2012 Posters, 2012.

A Priori vision: the transcendence of pre-ontological sight: the disparity of externalizing the internal architecture of creation

Lawson, Matthew Everett. MS diss., Massachusetts Institute of Technology, 2012.

Relativistic ultrafast rendering using time-of-flight imaging

Velten, Andreas, Di Wu, Adrian Jarabo, Belen Masia, Christopher Barsi, Everett Lawson, Chinmaya Joshi, Diego Gutierrez, Mounji G. Bawendi, and Ramesh Raskar. In ACM SIGGRAPH Posters, 2012.

Slow art with a trillion frames per second camera

Velten, Andreas, Everett Lawson, Andrew Bardagjy, Mounji Bawendi, and Ramesh Raskar. In ACM SIGGRAPH Talks, 2011.

CATRA: interactive measuring and modeling of cataracts

Pamplona, Vitor F., Erick B. Passos, Jan Zizka, Manuel M. Oliveira, Everett Lawson, Esteban Clua, and Ramesh Raskar. In ACM Transactions on Graphics (TOG), 2011.

Estimating motion and size of moving non-line-of-sight objects in cluttered environments.

Pandharkar, Rohit, Andreas Velten, Andrew Bardagjy, Everett Lawson, Mounji Bawendi, and Ramesh Raskar. In Computer Vision and Pattern Recognition (CVPR), 2011.

PATENTS

Methods and apparatus for retinal imaging

Lawson, Matthew Everett, and Ramesh Raskar. U.S. Patent No. 9,295,388. 29 Mar. 2016.

Methods and apparatus for retinal imaging

Lawson, Matthew Everett, et al. U.S. Patent No. 9,060,718. 23 Jun. 2015.

Methods and apparatus for anterior segment ocular imaging

Sinha, Shantanu, P. A. R. K. Hyunsung, Albert Redo-Sanchez, Matthew Everett Lawson, Nickolaos Savidis, Pushyami Rachapudi, Ramesh Raskar, and Il Vincent Patalano. U.S. Patent 10,105,049, issued October 23, 2018.

AWARDS

Lemelson "Cure-it!" Student Prize National Finalist (2014)
Vodafone Wireless Innovation Prize (2014)
Finalist, MIT 100K competition (2013)
Finalist, MASSChallenge (2012)
Dow's Sustainability Innovation Student Award, MIT IDEAS Global Challenge (2012)
First Place, CIMIT Innovation in Primary Healthcare (2012)
First Place, Harold and Arlene Schnitzer Prize in the Visual Arts, MIT Council for the Arts (2012)
First Place, Laya & Jerome B. Wiesner Student Art Award, MIT Council for the Arts (2011)

FELLOWSHIPS AND GRANTS

Dentsu Fellowship (2019)
Tata Graduate Student Fellowship (2015)
Army Research Laboratory (2014)
Desphande Center Renewal Grant (2013)
NSF I-CORPS Innovation Grant (2012)
Desphande Center Ignition Grant (2012)

INVITED TALKS

"Biologically Encoded Augmented Reality and the Joy of Mobility" - MIT Media Lab, Cambridge, MA (2019)
"Joy of Mobility: Augmented Reality" - Dentsu, Tokyo, JP (2019)
"Far peripheral visual systems integration" - MIT Media Lab, Cambridge, MA (2019)
"Synthetic Shape Motion" - MIT Media Lab, Cambridge, MA (2018)
"Atmopragmascope: Reflectance Volumetric Display" - MIT Media Lab, Cambridge, MA (2018)
"Perceptual Programming: Reconceptualizing Peripheral Vision for Extended Environments" - MIT Media Lab, Cambridge, MA (2016)
"Invisible Ink: Painting with Orientation Contingent After Effects" - MIT Media Lab (2016)
"Perceptual Masking: Discordance Mismatch Models in Aural and Visual Media" - MIT Media Lab, Cambridge, MA (2015)
TedMed, Washington D.C. (2013)
SIGGRAPH, Los Angeles, CA (2012)
NSF I-CORPS, University of Wisconsin-Milwaukee, WI (2012)
Health Wellness Conference, Washington DC (2012)
Thesis Talk, WMBR-Boston (2012)
Guest lecture, MIT Course Disaster at a Distance, Cambridge, MA (2012)
Guest lecture, MIT "Creative Responses to Conflict & Crisis", Cambridge, MA (2012)
Guest lecture, The New School, New York, NY (2011)
Guest lecture, Monserrat College of Art, Beverly, MA (2011)
Guest lecture, the Cloud Foundation, Boston, MA (2011)
Artist's Talk, Parsons the New School for Design, New York, NY (2011)

“Critical Information: Mapping the Intersection of Art + Technology” - School of Visual Arts, New York, NY (2011)
“The Spectrum of Vision” - Montserrat College of Art, Beverly, MA (2011)
Guest lecture, School of the Art Institute of Chicago, IL (2010)
The Artscience Prize, Cloud Foundation, Boston, MA (2010)
Montserrat College of Art, Beverly, MA (2010)
School of the Art Institute of Chicago, Chicago, IL (2009)
Harold Washington College, Chicago, IL (2009)
Actual and Virtual, School of the Art Institute of Chicago, Chicago, IL (2009)
Guest Instructor, Documentary Practices, School of the Art Institute of Chicago, Chicago, IL (2009)

SELECTED EXHIBITIONS

Schnitzer Prize Exhibition, MIT Wiesner Gallery (2012)
Wiesner Prize Exhibition, MIT Media Lab (2011)
Definitions, CentrePasquArt, Bienne, SZ (2009)
Wassaic Project Summer Festival, Wassaic, NY (2009)
MFA Thesis Exhibition, SAIC, Chicago, IL (2009)
Map of the World, Bridge Art Fair, New York, NY (2009)
Ship in a Bottle, Sullivan Galleries, Chicago, IL (2009)
Nippon Steele Juried Exhibition, Chicago, IL (2008)
New Work, Sullivan Galleries, Chicago, IL (2008)
Rudé Právo, říjen, 1949, Concertina, Prague, CZ (2006)
Maanfield Stámpf, Fabrication, Paris, FR (2006)
Melok, Zoología, Paris, FR (2005)
Žižkov, The Blind Eye, Prague, CZ (2004)

PERMANENT COLLECTIONS

The Greene Collection, Hollywood, CA (2009)
The Walter Roth Collection, Chicago, IL (2008)
Monfort Foundation, Greeley, CO (2004)
Hunt Foundation, Boulder, CO (2001)
The Auschwitz Memorial Museum, Oswiecim, Poland (1999)