

## Jonathan A. N. Fisher, Ph.D.

**Assistant Professor**, New York Medical College  
**Scholar-in-Residence**, U.S. FDA

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### Education:

**Ph.D., Physics**, August 2007  
University of Pennsylvania, Philadelphia, PA

**B.A. with Honors in Physics**, Minor in English, May 2000  
University of Pennsylvania, Philadelphia, PA

### Employment and Professional Experience:

- 2014 – present      New York Medical College, Valhalla, NY  
Assistant Professor  
Department of Physiology
- 2014 – present      U.S. Food and Drug Administration, Silver Spring, MD  
Scholar-in-Residence  
Center for Devices and Radiological Health  
Division of Biomedical Physics
- 2007 – 2014        The Rockefeller University, New York, NY  
Postdoctoral Associate  
Mentor: A. J. Hudspeth, M.D., Ph.D.  
Laboratory of Sensory Neuroscience and Howard Hughes Medical Institute
- 2001 – 2007        University of Pennsylvania, Philadelphia, PA  
Graduate Researcher  
Advisor: Arjun G. Yodh, Ph.D.  
Department of Physics and Astronomy  
Dissertation: “Linear and Non-Linear Fluorescence Imaging of Neuronal Activity”
- Summer 2002      Los Alamos National Laboratory, Los Alamos, NM  
Visiting Graduate Research Fellow  
Advisors: John S. George, Ph.D. and David Rector, Ph.D.  
Biological and Quantum Physics Group
- 1998 – 2000        University of Pennsylvania, Philadelphia, PA  
Undergraduate Researcher  
Experimental Astrophysics  
Advisor: Mark J. Devlin, Ph.D.  
Department of Physics and Astronomy  
Honors thesis: “A Fourier transform spectrometer for millimeter to far-infrared frequencies”

## Grants and Fellowships:

- 2016 NSF (Award No. 1641133, \$79,905; Fisher, PI) Micro- and macro-scale validation of diffuse correlation spectroscopy for monitoring functional hemodynamics in the microvasculature of the cerebral cortex
- 2015 NSF (Award No. 1541612, \$79,768; Fisher, PI) Multimodal characterization of quantitative biomarkers for traumatic brain injury measured via portable device technology
- 2015 FDA Medical Countermeasures (\$245,000; Fisher, co-PI)  
Application of Somatosensory Evoked Potentials to the Diagnosis of Mild TBI: A Translational Approach
- 2013 Richard Lounsbery Foundation (\$99,470, Fisher, PI) Visualizing neuroimaging data in immersive display environments
- 2013 Kickstarter (\$27,314, 448 backers; Fisher, PI) Neurodome: dome-format exploration of the brain
- 2011 American Hearing Research Foundation Grant (\$20,000; Fisher, PI)  
Novel optical techniques for investigating active hearing in the mammalian cochlea
- 2008 Bristol-Myers Squibb Postdoctoral Fellowship in Basic Neurosciences (\$156,000, 3-year)
- 2003 Graduate School of Arts and Sciences Travel Grant (U. Penn)
- 1999 Nassau Grant for Undergraduate Research (U. Penn)

## Honors and Awards:

- 2015 FDA / Center for Devices and Radiological Health (CDRH) Director's Special Citation Award  
*"For the development of multiple research avenues to assess the long-term reliability of neural prostheses"*
- 2015 Japanese Science and Technology Forum (STS) Future Leader  
*Representative for North America*
- 2013 Blavatnik Award for Young Scientists  
*One of two winners at the postdoctoral level; \$30,000 unrestricted funds awarded*
- 2006 Optical Society of America New Focus / Bookham Student Award  
*For excellence and leadership in optics; one of seven finalists selected internationally*
- 2006 GAPSA-Provost's Award for Interdisciplinary Innovation (U. Penn; \$6000)
- 2001 Nominated for Dean's Award for Distinguished Teaching (U. Penn)
- 2000 William E. Stephens Memorial Prize (U. Penn Physics Department Award)  
*Awarded to graduating physics major demonstrating most promise as scientist*

## Grant Review Services:

Defense Advanced Research Projects Agency (DARPA): HAPTIX Program (Hand Proprioception & Touch Interfaces for Prosthetic Limbs), 2014.

## FDA Regulatory Services:

Co-authored consults on medical device Premarket Notification (510(k)) submissions, Investigational Device Exemption (IDE) applications, Premarket Approval (PMA) applications, as well as Pre-submission ("Q-sub") applications. Technologies included non- or minimally invasive neural stimulation devices and neural prostheses.

## Professional Activities and Memberships:

Member, Society for Neuroscience  
Member, Optical Society of America  
Member, SPIE (The Society of Photo-Optical Instrumentation Engineers)  
Member, The American Association for the Advancement of Science (AAAS)  
Member, The New York Academy of Sciences  
Member, Blavatnik Award Alumni Council (NYAS)  
Member, The International Planetarium Society (IPS)

Reviewer, *Proceedings of the National Academy of Sciences of USA*  
Reviewer, *Journal of Neuroscience*  
Reviewer, *Scientific Reports*  
Reviewer, *NeuroReport*  
Reviewer, *Physics in Medicine and Biology*  
Reviewer, *Medical Physics*  
Reviewer, *Journal of Neuroscience Methods*  
Reviewer, *Biophysical Journal*  
Reviewer, *Optics Letters*  
Reviewer, *Optics Express*  
Reviewer, *Applied Optics*  
Reviewer, *Journal of Optics*

## Consulting Activities:

2012 - Hybra Advance Technology: *toward development of wireless, bone-conduction headset that delivers high-quality personal audio without obstructing ambient sound*

## Governmental Policy Related Activities:

2007 - Invited committee member, *Governors Island Science and Technology (GIST) ad hoc advisory committee, headed by Alan J. Gerson, NYC Council Member*

## Refereed Journal Publications:

**J. A. N. Fisher**, S. Huang, M. Ye, M. Nabili, W. B. Wilent, V. Krauthamer, M. Myers, C. G. Welle, 2016. Real-Time Detection and Monitoring of Acute Brain Injury Utilizing Evoked Electroencephalographic Potentials. *IEEE Transactions on Neural Systems & Rehabilitation Engineering*. [in press].

S. Huang, **J. A. N. Fisher**, M. Ye, M. Nabili, Y. Kim, R. Ma, Y-S Kim, T. Coleman, E. F. Civillico, V. Krauthamer, and M. Myers. 2015. Detecting Ultrasound-Induced Brain Injury in the Mouse with a Novel Flexible Epidermal Electrode Array. *Neurotherapeutics* 12(3): 683-684.

**J. A. N. Fisher**, F. Nin, T. Reichenbach, R. Uthaiyah, A. J. Hudspeth. 2012. The spatial pattern of cochlear amplification. *Neuron* 76(5): 989-997. [cover]

[Above article reviewed in: T. Ren and P. G. Gillespie. 2012. Probing the cochlear amplifier by immobilizing molecular motors of sensory hair cells. *Neuron* 76(5): 868-870.]

F. Nin, T. Reichenbach, **J. A. N. Fisher**, A. J. Hudspeth. 2012. The contribution of active hair-bundle motility to

nonlinear amplification in the mammalian cochlea. *Proceedings of the National Academy of Sciences of USA*  
DOI: 10.1073/pnas.1219379110.

K. Susumu, **J. A. N. Fisher**, J. Zheng, D. N. Beratan, A. G. Yodh, M. J. Therien. 2011. Two-photon absorption properties of proquinoidal D-A-D and A-D-A quadrupolar chromophores. *Journal of Physical Chemistry A* 115(22): 5525-5539.

**J. A. N. Fisher**, L. Kowalik, A. J. Hudspeth. 2011. Imaging electrical resonance in hair cells. *Proceedings of the National Academy of Sciences of USA* 108(4): 1651-1656.

**J. A. N. Fisher**, K. Susumu, M. Therien, A. G. Yodh. 2009. One- and two-photon absorption of highly conjugated multiporphyrin systems in the two-photon Soret transition region. *Journal of Chemical Physics* 130(13):134506.

**J. A. N. Fisher**, J. R. Barchi, C. G. Welle, G-H. Kim, P. Kosterin, A. L. Obaid, A. G. Yodh, D. Contreras, B. M. Salzberg. 2008. Two-photon excitation of potentiometric probes enables optical recording of action potentials from individual mammalian nerve terminals *in situ*. *Journal of Neurophysiology* 99: 1545-1553. [Highlighted in *Innovative Methodology* section]

**J. A. N. Fisher**, V. A. Marchenko, A. G. Yodh, R. F. Rogers. 2005. Spatiotemporal activity patterns during respiratory rhythmogenesis in the rat ventrolateral medulla. *Journal of Neurophysiology* 95: 1982-1991.

**J. A. N. Fisher**, B. M. Salzberg, A. G. Yodh, 2005. Near infrared two-photon cross sections of voltage-sensitive dyes. *Journal of Neuroscience Methods* 148: 94-102.

**J. A. N. Fisher**, E. F. Civillico, D. Contreras, A. G. Yodh. 2004. *In vivo* fluorescence microscopy of neuronal activity in three dimensions by use of voltage-sensitive dyes. *Optics Letters* 29(1): 71-73.

## Review Articles:

**J. A. N. Fisher**. 2016. Ear-tracking: Can auditory gaze be tracked? *Annals of the New York Academy of Sciences* [invited review, in preparation].

## Chapters in Books:

**J. A. N. Fisher**, B. M. Salzberg. (2015). Two-photon excitation of fluorescent voltage-sensitive dyes: Monitoring membrane potential in the infrared. *In*: M. Canepari, D. Zecevic, and O. Bernus (Eds.): *Membrane potential imaging in the nervous system and in the heart*. Springer.

**J. A. N. Fisher**, B. M. Salzberg. (2010). Monitoring membrane voltage using two-photon excitation of fluorescent voltage-sensitive dyes. *In*: M. Canepari & D. Zecevic (Eds.): *Membrane Potential Imaging in the Nervous System: Methods and Applications*. Springer.

## Doctoral Thesis:

**J. A. N. Fisher**. 2007. *Linear and Non-Linear Fluorescence Imaging of Neuronal Activity*. Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA.

## Invited Talks:

*iED SUMMIT (Immersive Education)*, 2016  
Denver Museum of Nature and Science, Denver, CO

*INSTITUTE FOR PHOTONIC SCIENCES (ICFO)*, 2016  
L4H Seminar, Barcelona, Spain

*IBM THOMAS J. WATSON RESEARCH CENTER*, 2016  
Yorktown Heights, NY

*IMMERSIVE WORLDS CONFERENCE*, 2016  
Baruch Performing Arts Center, New York, NY

*iX SYMPOSIUM (Immersion / Experience)*, 2015  
Société des Arts Technologiques (SAT), Montréal, Canada

*DENVER MUSEUM OF NATURE AND SCIENCE*, 2015  
Gates Planetarium, Denver, CO

*CALIFORNIA ACADEMY OF THE SCIENCES*, 2014  
Morrison Planetarium, San Francisco, CA

*JOHNS HOPKINS UNIVERSITY, SCHOOL OF MEDICINE*, 2013  
Center for Hearing and Balance Seminar, Baltimore, MD

*U.S. FOOD AND DRUG ADMINISTRATION*, 2013  
Division of Physics, Silver Spring, MD

*SENSE TO SYNAPSE (Biophysical and Molecular Mechanisms of Perception)*, 2013  
Columbia University, New York, NY

*HUNTER COLLEGE*, 2013  
Physics Department Colloquium, New York, NY

*NIH / NATIONAL INSTITUTE ON DEAFNESS AND OTHER COMMUNICATION DISORDERS* 2013  
Institute Seminar, Bethesda, MD

*NEW YORK MEDICAL COLLEGE*, 2013  
Department of Physiology Seminar, New York, NY

*COURANT INSTITUTE OF MATHEMATICAL SCIENCES (NYU)*, 2013  
Biomathematics / Computational Biology Colloquium, New York, NY

*COLUMBIA UNIVERSITY*, 2012  
Neural Engineering Seminar, Department of Biomedical Engineering, New York, NY

*BRANDEIS UNIVERSITY*, 2012  
Physics department colloquium, Waltham, MA

*NEW YORK UNIVERSITY SCHOOL OF MEDICINE NEUROSCIENCE INSTITUTE*, 2012  
SPINES Neuroscience Seminar, New York, NY

*SPIE PHOTONICS WEST (Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues)*, 2012

San Francisco, CA

*LEHIGH UNIVERSITY, 2011*

Department of Biological Sciences, Bethlehem, PA

*UNIVERSITY OF ROCHESTER, 2011*

Biomedical Engineering Department Seminar, Rochester, NY

*UNIVERSITY OF PENNSYLVANIA, 2011*

"Advances in Biomedical Optics" Seminar Series, Philadelphia, PA

*YALE UNIVERSITY, 2011*

Neuroscience Seminar, Department of Biological and Biomedical Sciences, New Haven, CT

*COLUMBIA UNIVERSITY, 2011*

"Neuro Lunch" Neuroscience Seminar, New York, NY

*BARD COLLEGE, 2011*

Annandale-on-Hudson, NY

*UNIVERSITY OF MESSINA, 2008*

Department of Physiology, Messina, Italy

*WEIZMANN INSTITUTE OF SCIENCE (Neurobiology Department Seminar), 2007*

Department of Neurobiology, Rehovot, Israel

*HUMBOLDT UNIVERSITY, 2005*

Bernstein Center for Computational Neuroscience, Berlin, Germany

*CHARITÉ UNIVERSITY, 2005*

Department of Experimental Neurology, Berlin, Germany

*GORDON RESEARCH CONFERENCE (Lasers in Medicine and Biology), 2004*

Kimball Academy, NH

## Meeting Abstracts:

[Installation] ACM SIGGRAPH, VR Village, 2015, Los Angeles, CA,

**J. A. N. Fisher.** Neurodome (*360-degree Immersion Dome*)

U.S. FOOD AND DRUG ADMINISTRATION SCIENCE FORUM, 2015, Silver Spring, MD

M. Ye, M. Nabili, **J. A. N. Fisher**, S. Huang, Y. Kim, E. F. Civillico, V. Krauthamer, M. Myers, C. G. Welle. Evaluation of electrophysiological biomarkers for the diagnosis of mild brain injury in a novel mouse model.

AMERICAN SOCIETY FOR EXPERIMENTAL NEUROTHERAPEUTICS, 2015, Washington, DC

M. Ye, M. Nabili, **J. A. N. Fisher**, S. Huang, Y. Kim, E. F. Civillico, V. Krauthamer, M. Myers, C. G. Welle. Electrophysiological signatures of mild brain injury in a novel mouse model.

SOCIETY FOR NEUROSCIENCE, 2014, Washington, DC

**J. A. N. Fisher**, S. Huang, M. Ye, M. Nabili, E. F. Civillico, V. Krauthamer, M. Myers, C. G. Welle. Modification of somatosensory evoked potentials following focal traumatic brain injury in the mouse.

INTERNATIONAL PLANETARIUM SOCIETY CONFERENCE. 2014, Beijing, China

**J. A. N. Fisher**, P. McPike, M. SubbaRao, D. Arnberg, J. Nises, M. Dayan, J. D. Salvi, A. Steiner. "Neurodome: Visualizing neuroimaging data in immersive, full-dome planetarium environments."

ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY, 2013, Baltimore, MD

**J. A. N. Fisher**, F. Nin, T. Reichenbach, R. Uthaiyah, A. J. Hudspeth. The spatial pattern of cochlear amplification.

PHOTONICS WEST (SPIE), 2012, San Francisco, CA

**J. A. N. Fisher**, F. Nin, T. Reichenbach, R. Uthaiyah, A. J. Hudspeth. Interferometric measurement of traveling waves in the mammalian cochlea *in vivo* combined with photo-deactivation of prestin, a cellular force-generating protein.

MECHANICS OF HEARING, 2008, Keele University, Keele, UK

**J. A. N. Fisher**, L. Kowalik, A. J. Hudspeth. Stroboscopic fluorescence imaging of electrical resonance in the chicken's basilar papilla.

OPTICAL IMAGING OF BRAIN FUNCTION, 2005, Bad Honnef, Germany

**J. A. N. Fisher**, E. F. Civillico, V. A. Marchenko, D. Contreras, B. M. Salzberg, R. F. Rogers, A. G. Yodh. Spontaneous and stimulated neural activity patterns *in vivo* and *in situ* revealed by 3D fluorescence microscopy with potentiometric dyes.

IMAGING NEURONS & NEURAL ACTIVITY, 2005, Cold Spring Harbor Labs, NY

**J. A. N. Fisher**, A. Reid, B. M. Salzberg, E. F. Civillico, D. Contreras, A. G. Yodh. Two-photon microscopy using voltage-sensitive dyes.

PHOTONICS WEST (SPIE), 2005, San Jose, CA

**J. A. N. Fisher**, E. F. Civillico, D. Contreras, A. G. Yodh. Spatiotemporal dynamics of mouse cortical response to whisker stimulation *in vivo* measured in three-dimensions by voltage-sensitive dye imaging.

SOCIETY FOR NEUROSCIENCE, 2004, San Diego, CA

V. Marchenko, **J. A. N. Fisher**, A. G. Yodh, D. Rector, and R. F. Rogers. Optical recording of respiratory-related activity from the ventrolateral medulla of artificially-perfused juvenile rats.

SOCIETY FOR NEUROSCIENCE, 2004, San Diego, CA

**J. A. N. Fisher**, B. M. Salzberg, A. G. Yodh. Two-photon fluorescence excitation cross-sections of voltage-sensitive dyes from 790 – 1050 nm.

BIOMED (OSA) 2004, Miami, FL

**J. A. N. Fisher**, E. F. Civillico, D. Contreras, A. G. Yodh. 2004. *In vivo* fluorescence microscopy of neural activity in three dimensions using voltage-sensitive dyes. (featured in "Frontiers in Spectral Microscopy" section)

PHOTONICS WEST (SPIE) 2003, San Jose, CA

**J. A. N. Fisher**, E. F. Civillico, D. Contreras, D. M. Rector, J. S. George, B. M. Salzberg, L. Finkel, A. G. Yodh. Fluorescence imaging of neuronal activity of mouse somatosensory cortex *in vivo* using a depth-specific GRIN lens probe and voltage-sensitive dyes.

ECI 2003, Banff, Canada

**J. A. N. Fisher**, E. F. Civillico, D. Contreras, A. G. Yodh. *In vivo* fluorescence microscopy of neuronal activity in three dimensions using voltage-sensitive dyes.

SOCIETY FOR NEUROSCIENCE 2003, New Orleans, LA

E. F. Civillico, N. Roy, **J. A. N. Fisher**, M. Harvey, A. G. Yodh, D. Contreras. Spatiotemporal properties of

cortical responses to electrical stimulation at different frequencies studied with voltage-sensitive dyes *in vivo*.

BIOMED (OSA) 2002, Miami, FL

**J. A. N. Fisher**, D. M. Rector, J. S. George, D. Contreras, R. F. Rogers, B. M. Salzberg, L. Finkel, A. G. Yodh.  
Fluorescence potentiometric depth-specific imaging of neuronal systems.

### **Additional Information:**

- Concert pianist; website at [www.fisherworks.net/index\\_piano.html](http://www.fisherworks.net/index_piano.html)

- Director and co-founder of the Neurodome project ([neurodome.org](http://neurodome.org)), which promotes neuroscience education through immersive display technology.