Wilson R Adams

Ph.D. Candidate | Biomedical Engineering
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Education

2015 - Present	Ph.D. Candidate | Biomedical Engineering | Vanderbilt University Dissertation Title: *Exploring the Biophysical Mechanisms of Pulsed Infrared Excitability of Neurons and Astrocytes* Advisor: Dr. Anita Mahadevan-Jansen, Ph.D.
2015	B.S. in Bioengineering, Minor in Physics | University of Maine, Orono

Research Experience

2015 – Present	Dissertation Research | Dr. Anita Mahadevan-Jansen, Vanderbilt University Nonlinear and Coherent Raman Microscopy, Neuroscience, Glia, Image Analysis
2014 – 2015	Microscopy & Spectroscopy | Dr. Michael Mason, University of Maine Fluorescence, Reflectance, Raman Microscopy design and applications.
2014 – 2015	Laboratory Automation | Dr. Paul Millard, University of Maine Instrumentation design for automating zebrafish experimental preparation
Summer 2014	NSF REU Sensors Program | Dr. Paul Millard, University of Maine Instrumentation design for automating zebrafish experimental preparation
2012 – 2013	R&D Internship | Dr. John Brogan & Dr. Eugene Chan, IDEXX Laboratories Benchtop analyzer and rapid diagnostic development of colloidal gold ELISA
2011 – 2013	Chemical Engineering Research | Dr. David Neivandt, University of Maine Mass production of carbon nanofiber. Lobster shell gold ball R&D.

Teaching Experience

2018 - 2019	Vanderbilt Biophotonics Center Laboratory Tour Coordinator Distilling research information to young scientists and general public
2017	Vanderbilt CIRTL Associate Instruction Certification Training in effective evidence-based teaching strategies in STEM.
2015	Graduate Teaching Asst – Senior Design Lab | Vanderbilt University Developed lessons and experimental exercises in biomedical magnetic resonance
2015	Summer Camp Instructor | Mad Science of Maine Lead instruction in hands-on STEM activities for children's day camps
2015	Teaching Asst. – Intro to Bioengineering | Dr. Paul J Millard, Univ. of Maine

	Guided and helped develop class exercises for LabView, Mathcad, Excel.
2014	Lab Instructor – Bioengineering Design | Dr. Michael Mason, Univ. of Maine *Created & instructed* laboratory module in CAD, prototyping, image analysis.
2012	Teaching Asst. – Intro to Bioengineering | Dr. Paul Millard, Univ. of Maine Guided and helped develop class exercises for LabView, Mathcad, Excel.
2012	Teaching Asst. – Statistical Process Control | Dr. Sara Walton, Univ. of Maine Grading course materials. Applications of statistical for chemical engineering.

Publications:

Wilson R Adams, Manqing Wang, Brian Mehl, Jeff Brooker, E Duco Jansen, Anita Mahadevan-Jansen. *A Combined Multimodal Nonlinear Microscopy and Thermal Imaging System to study fast photothermal perturbation of biological tissue*. [In Preparation]

Ana I Borrachero-Conejo*, **Wilson R Adams***, Emanuela Saracino, Manqing Wang, Tamara Posati, Roberto Zamboni, E Duco Jansen, Marco Caprini, Grazia Paola Nicchia, Valentina Benfenati, Anita Mahadevan-Jansen. *Astrocyte sensitivity to pulsed infrared light.* [In Submission]
*Shared first authorship

John Quan Minh Nguyen, Giju Thomas, Melanie McWade, **Wilson R Adams**, Isaac J Pence, Anita Mahadevan-Jansen. *Endogenous protoporphyrin-IX responsible near-infrared-excited autofluorescence in somatic tissues.* [In Review]

Lauren E. Himmel, Troy A. Hackett, Jessica L. Moore, **Wilson R. Adams**, Giju Thomas Tatiana Novitskaya, Richard M. Caprioli, Andries Zijlstra, Anita Mahadevan-Jansen, Kelli L. Boyd. *Beyond the H&E: advanced technologies for in situ tissue biomarker imaging*. ILAR Journal. [Accepted. May 2018]

Conference Presentations

***Oral Presentations**:*

Wilson R Adams, Ana I Borrachero-Conejo, Emanuela Saracino, Tamara Posati, Graham A Throckmorton, J Logan Jenkins, Jeremy B Ford, Roberto Zamboni, Marco Caprini, Grazia Paola Nicchia, E Duco Jansen, Valentina Benfenati, Anita Mahadevan-Jansen. *Astrocytic sensitivity to pulsed infrared light: Molecular, physiological, and mechanistic insights.* SPIE Photonics West: Optogenetics & Optical Manipulation 2020. Feb 2020 [Submitted]

Wilson R Adams, Rekha Gautam, Graham Throckmorton, Laura Masson, Jeremy B Ford, J Logan Jenkins, E Duco Jansen, Anita Mahadevan-Jansen. *Probing the mechanisms of infrared neural stimulation with stimulated Raman scattering microscopy.* SPIE Photonics West: Advanced Chemical Microscopy for Life Sciences. Feb 2020 [Submitted]

Graham A. Throckmortona, **Wilson R. Adams**, Jonathan Cayce, E. Duco Jansen, and Anita Mahadevan-Jansen. *Comparing the efficacy of infrared diode and Ho:YAG lasers for infrared neural stimulation.* SPIE Photonics West: Optogenetics and Optical Manipulation 2020. Feb 2020 [Submitted]

Wilson R Adams, Manqing Wang, Roberto Zamboni, Valentina Benfenati, Anita Mahadevan-Jansen. *Excitability of Astrocytes in vitro with infrared neural stimulation.* OSA Biophotonics Congress 2019: Optics in the Brain.

Wilson R Adams, Manqing Wang, Roberto Zamboni, Valentina Benfenati, Anita Mahadevan-Jansen. *Excitability of Astrocytes in vitro with infrared neural stimulation.* SPIE BIOS 2018

F Chen, G Thomas, **W Adams**, A Mahadevan-Jansen. *Evaluating breast cancer risk factors using Raman spectroscopy in live cells*. ASLMS 2017 Annual Meeting

Wilson R Adams, Anita Mahadevan-Jansen. *Exploring Infrared Neural Stimulation with Multimodal Nonlinear Imaging.* SPIE BIOS 2017

***Poster Presentations**:*
W.R. Adams, I. Borrachero-Conejo, E. Saracino, G.P. Nicchia, M.G. Mola, F. Formaggio, M. Caprini, T. Posati, R. Zamboni, M. Muccini, A. Mahadaven-Jansen, V. Benfenati. *Infrared laser photostimulation elicits calcium signaling and water transport involving trpv4 and aqp4 in primary and differentiated rodent astrocytes*. GLIA 2019.

Wilson R Adams, Manqing Wang, Rekha Gautam, Jansen ED, Mahadevan-Jansen A. *Probing the biophysical mechanisms of infrared neural stimulation with nonlinear Raman imaging.* Biophysics 2019.
Ana I Borrachero-Conejo, **Wilson R Adams**, Emanuela Saracino, Tamara Posati, Roberto Zamboni, Anita Mahadevan-Jansen, Valentina Benfenati. Excitability of astrocytes with pulsed infrared light. Neuroscience 2018.

Ana I Borrachero-Conejo, **Wilson R Adams**, Emanuela Saracino, Tamara Posati, Roberto Zamboni, Anita Mahadevan-Jansen, Valentina Benfenati. Excitability of astrocytes with pulsed infrared light. Materials 2018.

Wilson R. Adams, Ana I Borrachero-Conejo, Manqing Wang, Emanuela Saracino, E. Duco Jansen, Valentina Benfenati, Anita Mahadevan-Jansen. *Excitability of Astrocytes by Pulsed Infrared Light*. Gordon Research Conference: Lasers in medicine and Biology 2018.

Ana I Borrachero-Conejo, **Wilson R Adams**, Emanuela Saracino, Grazia Paola Nicchia, Maria Grazia Mola, Francesco Formaggio, Marco Caprini, Tamara Posati, Roberto Zamboni, Anita Mahadevan-Jansen, Valentina Benfenati. *Pulsed infrared laser photostimulation elicits calcium signalling and modulate ion channel conductance in primary differentiated rodent astrocytes*. FENS 2018

Wilson R Adams, Jansen ED, Mahadevan-Jansen A. *Coherent Raman imaging to study infrared neural stimulation.* SPIE BIOS 2018

Wilson R. Adams, Anita Mahadevan-Jansen. *Multimodal Nonlinear Imaging to Explore Infrared Neural Stimulation.* Society for Neuroscience 2016

Research Interests

Biomedical Optics	Applications of novel techniques *in vitro* and *in vivo*
Microscopy	Instrumentation design, development, integration. Fluorescence, nonlinear, coherent Raman imaging. Applications of microscopy technology towards scientific research.
Neuroscience	Large-scale cellular and network dynamics, multiscale imaging of live cell populations, subcellular biophysics, glial influence on neural physiology.
Image Analysis	Development of targeted and simplified image analysis workflows to increase experimental throughput and analysis efficiency.

Professional Membership

2012 – 2014	American Institute for Chemical Engineering (AIChE)
2015 – Present	Society for Photo-optical Instrumentation Engineers (SPIE)
2017 – Present	Optical Society of America (OSA)
2016	Society for Neuroscience (SfN)
2018 – Present	Biophysical Society (BPS)

Service

2018 – Present	Co-Editor-in-Chief, Peeriodicals: Label-free Microscopy
2017 – Present	Social Media (Twitter) Coordinator – Vanderbilt Biophotonics Center
2017	Contributor, Interstellate – Artistic exhibition in Neuroscience
2017 – 2018	SPIE Vanderbilt Student Chapter President
2017	Seminar Series Coordinator - Vanderbilt Biophotonics Center
2017	Social Event Coordinator – Vanderbilt Biophotonics Center
2016 – 2017	Research Critique Panel Coordinator - Vanderbilt Biophotonics Center
2016 – 2017	SPIE Vanderbilt Student Chapter Secretary

Honors and Awards

2019	Biophysical Society Graduate Travel Scholarship
2016 – 2019	National Defense Science and Engineering Graduate (NDSEG) Fellowship
2014 – 2015	University of Maine Center for Undergraduate Research Grant
2015	America East Man-of-the-Year Nominee (NCAA Athletic Conference)
2015	Dean Smith Award – M Club / University of Maine Athletics
2015	Co-Captain – University of Maine NCAA Div. I Men's Track and Field Team
2014	NSF REU Sensors Fellowship
2011 – 2015	America-East All-Academic Team (5x)
2011 – 2015	Dean's List (x6) , University of Maine
2011 – 2015	Scholar Athlete Award (x5). University of Maine Athletics
2014	University of Maine School Record – Hammer and Weight Throw
2012	Durst Scholarship Recipient
2012	ICAAAA All-Eastern Team, Hammer Throw
2010	NSSF Nike All-America, Weight Throw
2009	Eagle Scout, Bronze Palm

Technical Skills

Laboratory: General laser safety, experience with Class IV lasers, optical alignment, imaging system design and construction, spectroscopy, cell culture (primary cells, immortalized lines, human derived), live cell imaging, live animal handling (IACUC protocols, husbandry, surgeries, imaging), pharmacology, electrophysiology, instrumentation design and integration, rapid prototyping (additive and deductive), soldering, custom computer hardware and construction.

Programming: MATLAB, LabVIEW, ImageJ, Python

Software: Autodesk Inventor (CAD), Inkscape (Adobe Illustrator), GIMP (Adobe Photoshop), Endnote, Digital Audio Workstations and Audio Recording, basic Zemax. Blender (3D Animation). MS Office.

Outreach

2016 – 2018	Optics Outreach | Vanderbilt SPIE & Nashville Adventure Science Center
2015 – 2017	Elementary Engineering | Vanderbilt Graduate Student Association / SPIE
2015	Glencliff High School Engineering Outreach | Vanderbilt Graduate Student Assn.

2015 Engineering and Athletic Outreach | Boy Scouts of America, Orrington, Maine