

## CURRICULUM VITAE

**Joseph J. Carroll PhD**

**Director, Professor**  
**Department of Ophthalmology and Visual Sciences**

### OFFICE ADDRESS:

Medical Education Building  
8701 Watertown Plank Rd  
Milwaukee, WI 53226

### EDUCATION:

08/1993 - 05/1997 B.S., Human Biology, University of Wisconsin, Green Bay  
07/1998 - 05/2002 Ph.D., The Medical College of Wisconsin, Milwaukee, WI

### POSTGRADUATE TRAINING AND FELLOWSHIP APPOINTMENTS:

06/2002 - 12/2002 Postdoctoral Fellow, Cell & Developmental Biology, The Medical College of Wisconsin, Milwaukee, WI  
06/2002 - 12/2002 Postdoctoral Fellow, Cell & Developmental Biology, The Medical College of Wisconsin, Milwaukee, WI  
06/2002 - 12/2002 Postdoctoral Fellow, Cell & Developmental Biology, The Medical College of Wisconsin, Milwaukee, WI  
01/2003 - 03/2006 Postdoctoral Fellow, Center for Visual Science, University of Rochester, Rochester, NY  
01/2003 - 03/2006 Postdoctoral Fellow, Center for Visual Science, University of Rochester, Rochester, NY  
01/2003 - 03/2006 Postdoctoral Fellow, Center for Visual Science, University of Rochester, Rochester, NY

### FACULTY APPOINTMENTS:

04/2006 - 07/2010 Assistant Professor, Department of Biophysics, The Medical College of Wisconsin, Milwaukee, WI  
04/2006 - 07/2010 Assistant Professor, Department of Ophthalmology, The Medical College of Wisconsin, Milwaukee, WI  
06/2008 - 07/2011 Assistant Professor, Department of Cell Biology, Neurobiology, & Anatomy, The Medical College of Wisconsin, Milwaukee, WI  
07/2010 - 07/2015 Associate Professor, Departments of Ophthalmology and Biophysics, The Medical College of Wisconsin, Milwaukee, WI  
07/2011 - 07/2015 Associate Professor, Department of Cell Biology, Neurobiology, & Anatomy, The Medical College of Wisconsin, Milwaukee, WI  
07/2011 - 07/2015 Adjunct Associate Professor, Department of Biomedical Engineering, Marquette University, Milwaukee, WI  
10/2013 - Present Richard O. Schultz / Ruth Works Professor of Ophthalmology, The Medical College of Wisconsin, Milwaukee, WI  
10/2013 - Present Honorary Professor of University College London, Institute of Ophthalmology, UCL, London, ENGLAND  
07/2015 - 12/2016 Adjunct Professor, Department of Biomedical Engineering, Marquette University, Milwaukee, WI  
07/2015 - Present Professor, Departments of Ophthalmology, Biophysics, and Cell Biology, Neurobiology, & Anatomy, The Medical College of Wisconsin, Milwaukee, WI  
12/2016 - Present Professor, Department of Biomedical Engineering, The Medical College of Wisconsin / Marquette University, Milwaukee, WI

### ADMINISTRATIVE APPOINTMENTS:

01/2009 - Present Director, Core Image Analysis Module, Department of Ophthalmology, Medical College of Wisconsin, Milwaukee, WI  
07/2009 - 11/2016 co-Director, Advanced Ocular Imaging Program, Department of Ophthalmology, Medical College of Wisconsin, Milwaukee, WI  
01/2014 - Present Director, Core Grant for Vision Research, Department of Ophthalmology, Medical College of Wisconsin, Milwaukee, WI  
11/2016 - Present Director, Advanced Ocular Imaging Program, Department of Ophthalmology, Medical College of Wisconsin, Milwaukee, WI

#### **RESEARCH ADMINISTRATIVE APPOINTMENTS:**

01/2009 - Present Director, Department of Ophthalmology, Core Image Analysis Module, Medical College of Wisconsin, Milwaukee, WI  
07/2009 - Present co-Director, Department of Ophthalmology, Advanced Ocular Imaging Program, Medical College of Wisconsin, Milwaukee, WI

#### **AWARDS AND HONORS:**

05/2001 Retina Research Foundation Travel Award, 2001 ARVO Annual Meeting  
06/2001 Course Participant & Scholarship Recipient, Structure, Function and Development of the Visual System, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY  
08/2004 Pfizer Travel Fellowship, 2004 International Congress of Eye Research  
10/2005 Optical Society of America Young Investigator Award, 2005 OSA Fall Vision Meeting, Tucson, AZ  
04/2006 Wisconsin Association of Educational Opportunity Program Personnel - TRIO Achiever Award, TRIO is a US federal programs to increase access to higher education for economically disadvantaged students  
01/2007 Vision Research Award, Karl Kirchgessner Foundation  
04/2007 University of Wisconsin Green Bay Outstanding Recent Alumni Award  
12/2007 Vision Research Award, – E. Matilda Ziegler Foundation  
12/2007 E. Matilda Ziegler Foundation Vision Research Award  
01/2008 Career Development Award, Research to Prevent Blindness  
01/2008 Research to Prevent Blindness Career Development Award  
09/2008 Foundation Fighting Blindness Travel Award, Retinal Degeneration Meeting 2008, Emeishan, China  
09/2008 Foundation Fighting Blindness Travel Award, Retinal Degeneration Meeting 2008, Emeishan, China  
10/2010 Outstanding Medical School Teacher, MCW Curriculum & Evaluation Committee  
12/2011 Outstanding Medical School Teacher, Physician Scientist Pathway and Medical Neurosciences, MCW Curriculum & Evaluation Committee  
02/2012 ALCON Research Institute, Young Investigator Award  
02/2012 Young Investigator Award, ALCON Research Institute  
09/2014 Outstanding Teacher Award, MCW Graduate School of Biomedical Sciences  
11/2014 ARVO Fellow, Silver  
05/2015 Alumnus of the Year, MCW Graduate School of Biomedical Sciences  
12/2015 ARVO Fellow, Gold

#### **MEMBERSHIPS IN HONORARY AND PROFESSIONAL SOCIETIES:**

10/1998 - Present Association for Research in Vision and Ophthalmology (ARVO)  
03/1999 - Present Optical Society of America (OSA)  
07/1999 - Present International Colour Vision Society (ICVS)  
06/2004 - Present International Society for Eye Research (ISER)  
06/2014 - Present Associate Member, McPherson Eye Research Institute, University of Wisconsin, Madison (WI)

#### **EDITORSHIPS/EDITORIAL BOARDS/JOURNAL REVIEWS:**

Editorship  
05/2006 - 05/2007 Journal of the Optical Society of America  
10/2010 - 03/2011 Biomedical Optics Express  
Journal Review  
2008 - Present Retina  
2008 - Present Nature Neuroscience

2008 - Present Archives of Ophthalmology  
 2008 - Present Journal of the Optical Society of America A  
 2008 - Present Journal of Vision  
 2008 - Present Visual Neuroscience  
 2008 - Present Optics Express  
 2008 - Present Investigative Ophthalmology & Visual Science  
 2008 - Present Journal of Comparative Psychology  
 2008 - Present Ophthalmology  
 2008 - Present Vision Research

#### **LOCAL/REGIONAL APPOINTED LEADERSHIP AND COMMITTEE POSITIONS:**

05/2004 - 05/2007 Member, ARVO Advocacy Committee  
 10/2004 - 10/2006 Vice-chair, OSA Applications of Visual Science Technical Group  
 05/2006 - 05/2010 Member, ARVO Members-in-Training Committee  
 05/2006 - 05/2009 Member, ARVO Program Committee, VI Section  
 10/2006 - 10/2008 Chair, OSA Applications of Visual Science Technical Group  
 05/2007 - 05/2010 Member, ARVO Commercial Relationships Committee  
 10/2007 - 12/2010 Chair-elect, OSA Vision & Color Division  
 10/2007 - Present Participant, ARVO Strategic Planning Retreat  
 01/2008 - 09/2008 Session Organizer, XVIII International Congress for Eye Research  
 03/2008 - Present Member, Verriest Medal Selection Committee, ICVS  
 05/2008 - 05/2013 ARVO Strategic Planning Working Group (MIT)  
 10/2008 - 10/2009 OSA Frontiers in Optics Subcommittee Chair, Division 7  
 10/2008 - Present Member, OSA Board of Meetings  
 10/2008 - Present Member, Advisory Committee for the ARVO Multidisciplinary Ophthalmic Imaging Group  
 10/2008 - Present Member, International Society of Imaging the Eye Program Committee  
 01/2009 - Present Member, OSA Edgar D. Tillyer Award Committee  
 01/2009 - Present Member, Fight for Sight Scientific Review Committee  
 05/2009 - 05/2010 Chair, ARVO Program Committee, VI Section  
 05/2010 - Present Chair, ARVO Members-in-Training Committee  
 10/2010 - Present Ad Hoc member, BMIT study section (NIH CSR)

#### **NATIONAL ELECTED/APPOINTED LEADERSHIP AND COMMITTEE POSITIONS:**

05/2004 - 05/2007 Member, ARVO Advocacy Committee  
 10/2004 - 10/2006 Vice-chair, OSA Applications of Visual Science Technical Group  
 05/2006 - 05/2010 Member, ARVO Members-in-Training Committee  
 05/2006 - 05/2009 Member, ARVO Program Committee, VI Section  
 10/2006 - 10/2008 Chair, OSA Applications of Visual Science Technical Group  
 05/2007 - 05/2010 Member, ARVO Commercial Relationships Committee  
 10/2007 - 12/2010 Chair-elect, OSA Vision & Color Division  
 10/2007 - Present Participant, ARVO Strategic Planning Retreat  
 10/2007 - 12/2010 Chair-elect, OSA Vision & Color Division  
 01/2008 - 09/2008 Session Organizer, XVIII International Congress for Eye Research  
 03/2008 - Present Member, Verriest Medal Selection Committee, ICVS  
 05/2008 - 05/2013 ARVO Strategic Planning Working Group (MIT)  
 10/2008 - Present Member, International Society of Imaging the Eye Program Committee  
 10/2008 - 10/2010 OSA Frontiers in Optics Subcommittee Chair, Division 7  
 10/2008 - Present Member, OSA Board of Meetings  
 10/2008 - Present Member, Advisory Committee for the ARVO Multidisciplinary Ophthalmic Imaging Group  
 10/2008 - 12/2014 Member, OSA Board of Meetings  
 01/2009 - 05/2013 Member, Fight for Sight Scientific Review Committee  
 01/2009 - 12/2012 Member, OSA Edgar D. Tillyer Award Committee (Chair in 2011)  
 05/2009 - 05/2010 Chair, ARVO Program Committee, VI Section  
 05/2010 - 05/2013 Chair, ARVO Members-in-Training Committee  
 10/2010 - 02/2011 Ad Hoc member, BMIT study section (NIH CSR)  
 10/2010 - 02/2011 Ad Hoc member, BMIT study section (NIH CSR)  
 12/2010 - 12/2014 Chair, OSA Vision & Color Division

05/2011 Mail reviewer, ZRG1 ETTN-E (12) B study section (NIH)  
 05/2011 - Present Mail reviewer, ZRG1 ETTN-E (12) B study section (NIH)  
 06/2011 - 06/2012 ARVO Annual Meeting Site Selection Working Group  
 11/2011 - Present Mail reviewer, Collaborative Health Research Projects Selection Panel (Canada)  
 12/2012 - Present Reviewer for Medical Research Council (UK)  
 02/2013 - 06/2013 Ad Hoc member, ZRG1 ETTN-G (12) study section (NIH)  
 10/2013 - Present Grant Reviewer for Science Foundation Ireland  
 11/2013 - Present Member, Dept of Veterans Affairs NURF SRG (VA)  
 04/2014 - Present Grant Reviewer for NHMRC Australia  
 04/2014 - Present Grant Reviewer for German Science Foundation, DFG  
 06/2014 - Present Ad Hoc member, ZDK1 GRB-9 (O3) study section (NIDDK)

## RESEARCH GRANTS/AWARDS/CONTRACTS/PROJECTS:

### Active

#### Peer Review

Title:	Core Grant for Vision Research
Source:	National Eye Institute (NIH) (P30EY01931)
Role:	Image Analysis Module Director
PI:	Joseph Carroll, PhD
Dates:	04/01/2003 - 03/31/2017
Title:	Research Training Program in Vision Science
Source:	National Eye Institute (NIH) (T32EY014537)
Role:	Graduate Student Mentor
PI:	Joseph C. Besharse, Ph.D.
Dates:	09/01/2008 - 08/31/2013
Title:	Assessing Photoreceptor Structure & Function in Normal and Diseased Retinae
Source:	National Eye Institute (NIH) (R01EY017607)
Role:	Principal Investigator
PI:	Joseph Carroll, PhD
Dates:	09/15/2008 - 06/30/2013
Title:	Development of a Predictive Algorithm for Age-related Macular Degeneration
Source:	Wisconsin Genomics Initiative
Role:	Co-Principal Investigator
PI:	Murray Brilliant, Ph.D.
Dates:	08/01/2010 - 06/30/2012

#### Non-Peer Review

Title:	Assessing Foveal Anatomy in Albinism and Aniridia Using High Resolution Retinal Imaging
Source:	Vision for Tomorrow Foundation
Role:	Principal Investigator
Dates:	05/01/2010 - 04/30/2011

### Prior

**Peer Review**

Title: Organization of the Trichromatic Cone Mosaic  
Source: National Eye Institute (NIH) (F32EY014749)  
Role: Principal Investigator  
Dates: 04/01/2003 - 03/31/2006

Title: Imaging the Effects of Cone Opsin Mutations on the Integrity of the Cone Photoreceptor Mosaic  
Source: Fight for Sight  
Role: Principal Investigator  
Dates: 06/01/2007 - 06/30/2008

Title: Uncovering Mechanisms of Retinal Disease with High-Resolution Retinal Imaging  
Source: E. Matilda Ziegler Foundation for the Blind, Inc.  
Role: Principal Investigator  
Dates: 12/31/2007 - 12/31/2010

Title: Career Development Award  
Source: Research to Prevent Blindness  
Role: Principal Investigator  
Dates: 01/2008 - 01/2012

**Non-Peer Review**

Title: Relationship Between Cone Density and Cortical Magnification Assessed with fMRI  
Source: Rochester Center for Brain Imaging  
Role: Principal Investigator  
Dates: 03/01/2005 - 12/31/2005

Title: Visualizing the Effects of Disruptions in Cone Opsin Expression on the Topography of the Human Cone Mosaic  
Source: Karl Kirchgeßner Foundation (unsolicited)  
Role: Principal Investigator  
Dates: 01/01/2007 - 12/31/2007

Title: Advanced Retinal Imaging and Improving the Success of Gene Therapy  
Source: Hope for Vision  
Role: Principal Investigator  
Dates: 01/14/2009 - 12/31/2011

**INVITED LECTURES/WORKSHOPS/PRESENTATIONS:****Local**

Carroll, J., "Applications of high-resolution retinal imaging with adaptive optics", presented at the Department of Biophysics, Medical College of Wisconsin (September, 2005).

Carroll, J., "Applications of high-resolution retinal imaging with adaptive optics", presented at The Brotz Lecture Series, Department of Biomedical Engineering, Marquette University (September, 2005).

Carroll, J., "Clinical applications of adaptive-optics ophthalmoscopy, " presented at the Wisconsin Eye MD Meeting, Waukesha, WI (June, 2006).

Carroll, J., "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic", presented at the Department of Cell Biology, Neurobiology, & Anatomy, Medical College of Wisconsin, Milwaukee, WI (January, 2008).

Carroll, J., "High-resolution imaging of the human retina: A progress report", presented at The Brotz Lecture Series, Department of Biomedical Engineering, Marquette University (September, 2008).

Carroll, J., "Imaging retinal development in albinism", presented at The Eye Institute Fall Symposium, Department of Ophthalmology, Medical College of Wisconsin (November, 2010).

Carroll, J., "Imaging the human retina: Development and disruption", presented at the Neuroscience Research Center Inaugural Event, Medical College of Wisconsin (November, 2010).

Carroll, J., "High-resolution retinal imaging", presented to the Society for Women in Engineering, Marquette University (October, 2011).

Carroll, J. & Costakos, D., "Imaging the human retina: Development and disruption", presented at the Children's Research Institute, Children's Hospital of Wisconsin (December, 2011).

Carroll, J., "High resolution imaging of the living human retina", presented at the Department of Biophysics, Medical College of Wisconsin (September, 2013).

Carroll, J., "Applications of high-resolution retinal imaging with adaptive optics", presented at the Department of Biophysics, Medical College of Wisconsin (September, 2005).

Carroll, J., "Applications of high-resolution retinal imaging with adaptive optics", presented at The Brotz Lecture Series, Department of Biomedical Engineering, Marquette University (September, 2005).

Carroll, J., "Clinical applications of adaptive-optics ophthalmoscopy, " presented at the Wisconsin Eye MD Meeting, Waukesha, WI (June, 2006).

Carroll, J., "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic", presented at the Department of Cell Biology, Neurobiology, & Anatomy, Medical College of Wisconsin, Milwaukee, WI (January, 2008).

Carroll, J., "High-resolution Imaging of the Human Retina: A Progress Report", presented at The Brotz Lecture Series, Department of Biomedical Engineering, Marquette University (September, 2008).

Carroll, J. "Applications of high-resolution retinal imaging with adaptive optics, " presented at the Department of Biophysics, Medical College of Wisconsin (September, 2005).

Carroll, J. "Applications of high-resolution retinal imaging with adaptive optics, " presented at The Brotz Lecture Series, Department of Biomedical Engineering, Marquette University (September, 2005).

Carroll, J. "Clinical applications of adaptive-optics ophthalmoscopy, " presented at the Wisconsin Eye MD Meeting, Waukesha, WI (June, 2006).

Carroll, J. "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic, " presented at the Department of Cell Biology, Neurobiology, & Anatomy, Medical College of Wisconsin, Milwaukee, WI (January, 2008).

Carroll, J. "High-resolution imaging of the human retina: A progress report, " presented at The Brotz Lecture Series, Department of Biomedical Engineering, Marquette University (September, 2008).

Carroll, J. "Imaging retinal development in albinism, " presented at The Eye Institute Fall Symposium, Department of Ophthalmology, Medical College of Wisconsin (November, 2010).

Carroll, J. "Imaging the human retina: Development and disruption, " presented at the Neuroscience Research Center Inaugural Event, Medical College of Wisconsin (November, 2010).

Carroll, J. "High-resolution retinal imaging, " presented to the Society for Women in Engineering, Marquette University (October, 2011).

Carroll, J. & Costakos, D. "Imaging the human retina: Development and disruption, " presented at the Children's Research Institute, Children's Hospital of Wisconsin (December, 2011).

Carroll, J. "High resolution imaging of the living human retina, " presented at the Department of Biophysics, Medical College of Wisconsin (September, 2013).

Carroll, J. "Advances in non-invasive retinal imaging, " presented at the Integrated Neuroscience Research Center, Marquette University (March, 2015).

Carroll, J. "Clinical applications of high-resolution retinal imaging, " presented at the Joint Biomedical Engineering Seminar Series (MU, MCW, UWM), Medical College of Wisconsin (April, 2015).

Carroll, J. "Applications of high-resolution retinal imaging, " presented at the Department of Radiology Grand Rounds, Medical College of Wisconsin (April, 2016).

Carroll, J. "Applications of high-resolution retinal imaging, " presented at the Cardiovascular Center Seminar Series, Medical College of Wisconsin (September, 2016).

Carroll, J. "Applications of high-resolution imaging of the living human retina, " presented at the CTSI Seminar Series, Medical College of Wisconsin (October, 2016).

### **Regional**

Carroll, J., "Adaptive optics: How it works, retinal rod/cone imaging, & possible clinical applications, " presented at the 49th Annual Ophthalmology Conference, Rochester, NY (June, 2004).

Carroll, J., "Color coding in the human retina and implications for disease, " presented at the 49th Annual Ophthalmology Conference, Rochester, NY (June, 2004).

Carroll, J., "Electro-diagnostic testing: ERG, Multifocal ERG, " presented at the 50th Annual Ophthalmology Conference, Rochester, NY (May, 2005).

Carroll J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at The Gerald A. Fishman, MD Lecture Series in Vision Science, University of Illinois at Chicago, Chicago, IL (June, 2007).

Carroll, J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at the Department of Ophthalmology, Northwestern University, Chicago, IL (March, 2008).

Carroll, J., "Adaptive optics: How it works, retinal rod/cone imaging, & possible clinical applications, " presented at the 49th Annual Ophthalmology Conference, Rochester, NY (June, 2004).

Carroll, J., "Color coding in the human retina and implications for disease, " presented at the 49th Annual Ophthalmology Conference, Rochester, NY (June, 2004).

Carroll, J., "Electro-diagnostic testing: ERG, Multifocal ERG, " presented at the 50th Annual Ophthalmology Conference, Rochester, NY (May, 2005).

Carroll J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at The Gerald A. Fishman, MD Lecture Series in Vision Science, University of Illinois at Chicago, Chicago, IL (June, 2007).

Carroll, J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at the Department of Ophthalmology, Northwestern University, Chicago, IL (March, 2008).

Carroll, J. "Adaptive optics: How it works, retinal rod/cone imaging, & possible clinical applications, " presented at the 49th Annual Ophthalmology Conference, Rochester, NY (June, 2004).

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Carroll, J. "Electro-diagnostic testing: ERG, Multifocal ERG, " presented at the 50th Annual Ophthalmology Conference, Rochester, NY (May, 2005).

Carroll J. "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic, " presented at The Gerald A. Fishman, MD Lecture Series in Vision Science, University of Illinois at Chicago, Chicago, IL (June, 2007).

Carroll, J. "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic, " presented at the Department of Ophthalmology, Northwestern University, Chicago, IL (March, 2008).

Carroll, J. "Applications of high-resolution retinal imaging, " presented at the Department of Ophthalmology & Visual Sciences Grand Rounds, University of Wisconsin-Madison, Madison, WI (June, 2016).

### **National**

Carroll, J., "Retinal imaging with adaptive optics reveals novel disease mechanisms in color blindness", presented at SUNY College of Optometry, New York, NY (December, 2006).

Carroll, J., "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic", presented at the Periopia Seminar Series, University of Houston College of Optometry, Houston, TX (February, 2007).

Carroll, J., "High-resolution retinal imaging reveals unusual cone mosaics in color vision defects, " presented at the 24th Annual Houston Conference on Biomedical Engineering Research, Houston, TX (February, 2007).

Carroll, J., "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic", Invited Plenary talk - Center for Adaptive Optics Spring Retreat, University of California-Santa Cruz, Santa Cruz, CA (March, 2007).

Carroll, J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at the Molecular, Cellular, and Integrated Neurosciences Seminar Series, Colorado

- State University, Fort Collins, CO (November, 2007).
- Carroll, J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at the Oxyopia Seminar Series, University of California-Berkeley, Berkeley, CA (March, 2008).
- Carroll, J., "Using adaptive optics to understand cone degeneration: A progress report", presented at the Adaptive Optics Interest Group, University of California-Berkeley, Berkeley, CA (May, 2008).
- Carroll, J., "Investigating preclinical phenotypes using adaptive optics retinal imaging", presented at the Smith-Kettlewell Eye Research Institute, San Francisco, CA (May, 2008).
- Carroll, J., "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic", presented at the Third Annual Berkeley Conference on Translational Research, Berkeley, CA (June, 2009).
- Carroll, J., "Visualizing the effect of disruptions in the cone pigment genes on the retinal cone mosaic", presented at Vanderbilt University, Nashville, TN (November, 2009).
- Carroll, J., "Applications of adaptive optics and OCT retinal imaging", presented at UCSF Department of Ophthalmology Grand Rounds, San Francisco, CA (April, 2010).
- Carroll, J., "SD-OCT image segmentation in retinal pathology assessed with adaptive optics", presented at the Society for Imaging and Applied Mathematics, Imaging Science Meeting, Chicago, IL (April, 2010).
- Carroll, J., "Imaging the human retina: Development and disruption", presented at the 27th Center for Visual Science Symposium: Photons and Neurons, Rochester, NY (June, 2010).
- Carroll, J., "OCT imaging of the human retina: Pearls and pitfalls", presented at Casey Eye Institute, Portland, OR (June, 2010).
- Carroll, J., "Disruptions in foveal morphology and cone topography visualized with high-resolution retinal imaging", presented at The Ohio State University, College of Optometry, Columbus, OH (August, 2010).
- Carroll, J., "Subclinical photoreceptor phenotypes assessed using high-resolution retinal imaging", presented at Emory University, Department of Ophthalmology, Atlanta, GA (January, 2011).
- Carroll, J., "Imaging the photoreceptor mosaic in normal and diseased eyes", presented at Duke University, Fitzpatrick Institute for Photonics, Durham, NC (April, 2011).
- Carroll, J., "Clinical applications of adaptive optics retinal imaging", presented at Duke University, Department of Ophthalmology, Durham, NC (April, 2011).
- Carroll, J., "Understanding the normal and diseased retina using adaptive optics imaging", presented at the 95th Annual Meeting of the Optical Society of America, San Jose, CA (October, 2011).
- Carroll, J., "Do you know where your cones are? Efforts in deriving repeatable cone density estimates from AO images", Invited talk - Center for Adaptive Optics Fall Retreat, Lake Arrowhead, CA (November, 2011).
- Carroll, J., "High-resolution imaging of the human retina: Development and disruption", presented at University of Pennsylvania, Department of Ophthalmology, Philadelphia, PA (December, 2011).
- Carroll, J., "Interpretation of adaptive optics images of the photoreceptor mosaic", presented at International Retinal Imaging Symposium (IRIS-II), New York, NY (June, 2014).
- \*Carroll, J., "High-resolution imaging of photoreceptor structure in retinal disease", to be presented at the 3rd Biennial Symposium on Age Related Macular Degeneration, Harvard Medical School, Boston, MA (October, 2014).
- \*Carroll, J., "Advances in adaptive optics retinal imaging", to be presented at the Ross Eye Institute, SUNY Buffalo, Buffalo, NY (January, 2015).
- Carroll, J., "High-resolution imaging of human photoreceptor disease with adaptive-optics ophthalmoscopy", presented at the New England College of Optometry (January, 2006).
- Carroll, J., "High-resolution imaging of human photoreceptor disease with adaptive-optics ophthalmoscopy", presented at the New England College of Optometry (January, 2006).
- Carroll, J., "Retinal imaging with adaptive optics reveals novel disease mechanisms in color blindness", presented at SUNY College of Optometry, New York, NY (December, 2006).
- Carroll, J., "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic", presented at the Periopia Seminar Series, University of Houston College of Optometry, Houston, TX (February, 2007).
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- Carroll, J., "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic",



- Invited Plenary talk - Center for Adaptive Optics Spring Retreat, University of California-Santa Cruz, Santa Cruz, CA (March, 2007).
- Carroll, J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at the Molecular, Cellular, and Integrated Neurosciences Seminar Series, Colorado State University, Fort Collins, CO (November, 2007).
- Carroll, J., "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic", presented at the Oxyopia Seminar Series, University of California-Berkeley, Berkeley, CA (March, 2008).
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- Carroll, J., "Imaging the human retina: Development and disruption", presented at the 27th Center for Visual Science Symposium: Photons and Neurons, Rochester, NY (June, 2010).
- Carroll, J., "OCT imaging of the human retina: Pearls and pitfalls", presented at Casey Eye Institute, Portland, OR (June, 2010).
- Carroll, J., "Disruptions in foveal morphology and cone topography visualized with high-resolution retinal imaging", presented at The Ohio State University, College of Optometry, Columbus, OH (August, 2010).
- Carroll, J. "High-resolution imaging of human photoreceptor disease with adaptive-optics ophthalmoscopy, " presented at the New England College of Optometry (January, 2006).
- Carroll, J. "Retinal imaging with adaptive optics reveals novel disease mechanisms in color blindness, " presented at SUNY College of Optometry, New York, NY (December, 2006).
- Carroll, J. "Imaging the effects of cone opsin mutations on the organization of the human cone mosaic, " presented at the Periopsia Seminar Series, University of Houston College of Optometry, Houston, TX (February, 2007).
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- Carroll, J. "SD-OCT image segmentation in retinal pathology assessed with adaptive optics, " presented at the Society for Imaging and Applied Mathematics, Imaging Science Meeting, Chicago, IL (April, 2010).
- Carroll, J. "Imaging the human retina: Development and disruption, " presented at the 27th Center for Visual Science Symposium: Photons and Neurons, Rochester, NY (June, 2010).
- Carroll, J. "OCT imaging of the human retina: Pearls and pitfalls, " presented at Casey Eye Institute, Portland,

- OR (June, 2010).
- Carroll, J. "Disruptions in foveal morphology and cone topography visualized with high-resolution retinal imaging, " presented at The Ohio State University, College of Optometry, Columbus, OH (August, 2010).
- Carroll, J. "Subclinical photoreceptor phenotypes assessed using high-resolution retinal imaging, " presented at Emory University, Department of Ophthalmology, Atlanta, GA (January, 2011).
- Carroll, J. "Imaging the photoreceptor mosaic in normal and diseased eyes, " presented at Duke University, Fitzpatrick Institute for Photonics, Durham, NC (April, 2011).
- Carroll, J. "Clinical applications of adaptive optics retinal imaging, " presented at Duke University, Department of Ophthalmology, Durham, NC (April, 2011).
- Carroll, J. "Understanding the normal and diseased retina using adaptive optics imaging, " presented at the 95th Annual Meeting of the Optical Society of America, San Jose, CA (October, 2011).
- Carroll, J. "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic, " presented at the Molecular, Cellular, and Integrated Neurosciences Seminar Series, Colorado State University, Fort Collins, CO (November, 2007).
- Carroll, J. "Visualizing the effect of disruptions in the cone pigment genes on the organization of the cone mosaic, " presented at the Oxyopia Seminar Series, University of California-Berkeley, Berkeley, CA (March, 2008).
- Carroll, J. "Do you know where your cones are? Efforts in deriving repeatable cone density estimates from AO images, " Invited talk - Center for Adaptive Optics Fall Retreat, Lake Arrowhead, CA (November, 2011).
- Carroll, J. "High-resolution imaging of the human retina: Development and disruption, " presented at University of Pennsylvania, Department of Ophthalmology, Philadelphia, PA (December, 2011).
- Carroll, J. "Adaptive Optics in Ophthalmic Imaging, " presented at the 43rd Annual Education Program of the Ophthalmic Photographers Society, Chicago, IL (November, 2012).
- Carroll, J. "Interpretation of adaptive optics images of the photoreceptor mosaic, " presented at International Retinal Imaging Symposium (IRIS-II), New York, NY (June, 2014).
- Carroll, J. "Adaptive Optics in Ophthalmic Imaging: Photoreceptor Disruption, " presented at Indiana Optometric Association Fall Seminar, Bloomington, IN (October, 2014).
- Carroll, J. "Imaging Photoreceptor Disruption in the Human Retina, " presented at Indiana University School of Optometry, Bloomington, IN (October, 2014).
- Carroll, J. "Advances in adaptive optics retinal imaging, " presented at the Ross Eye Institute, SUNY Buffalo, Buffalo, NY (January, 2015).
- Carroll, J. "Advances in adaptive optics retinal imaging, " presented at the Department of Ophthalmology, University of Florida, Gainesville, FL (January, 2015).
- Carroll, J. "Advances in adaptive optics retinal imaging, " presented at the Joan & Gordon Bergy Lecture Series in Vision Science, University of Washington, Seattle, WA (April, 2015).
- Carroll, J. "Applications of adaptive optics retinal imaging, " presented at Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD (May, 2015).
- Carroll, J. "Imaging photoreceptor structure in the living retina: Recent advances, " presented at Cole Eye Institute Distinguished Lecture Series, Cleveland Clinic, Cleveland, OH (November, 2015).
- Carroll, J. "Applications of adaptive optics retinal imaging, " presented at the Loris & David Rich Lecture Series in Vision Science, University of Alabama-Birmingham, Birmingham, AL (January, 2016).
- Carroll, J. "Applications of adaptive optics retinal imaging, " Charles Dwight Townes Lecturer, University of Louisville, Louisville, KY (June, 2016).
- Carroll, J. "High resolution imaging in inherited retinal degenerations, " Louis J. Fox Center for Vision Restoration Conference, University of Pittsburgh, Pittsburgh, PA (June, 2016).

### **International**

- Carroll, J. & Williams, D. R., "Retinal imaging with adaptive optics reveals a novel disease mechanism for dichromacy, " presented at the 2004 FASEB Summer Research Conference - Retinal Neurobiology & Visual Processing, Saxtons River, VT (July, 2004).
- Carroll, J., Choi, S., Gray, D., Wolfing, J., Williams, D. R., "Mechanisms of color blindness revealed with adaptive optics retinal imaging, " presented at the XVIth International Congress of Eye Research, Sydney, Australia (August, 2004).
- Carroll, J., "Inferences about photoreceptor degeneration from high-resolution retinal imaging", presented at the Department of Physics, National University of Ireland, Galway, Ireland (March, 2005).

- Carroll, J., "In vivo imaging of human photoreceptor disease with adaptive optics, " presented at the 9th Annual Vision Research Conference: Neuroimaging the Retina, Fort Lauderdale, FL (May, 2005).
- Carroll, J., "Organization of the human cone mosaic: Implications for red-green color vision", presented at the 2006 ARVO Annual Meeting, Ft. Lauderdale, FL (April, 2006).
- Carroll, J., "High-resolution imaging of human photoreceptor disease with adaptive-optics ophthalmoscopy", presented at the 2006 ARVO Annual Meeting, Ft. Lauderdale, FL (April, 2006).
- Carroll, J., Porter, J., Neitz, J., Williams, D. R., Neitz, M., "The effects of cone opsin gene disruption on the human photoreceptor mosaic", presented at the Engineering the Eye Conference, National University of Ireland, Galway, Ireland (June, 2006).
- Carroll, J., Roorda, A., Williams, D. R., "Applications of retinal imaging with adaptive-optics ophthalmoscopy", presented at the XVIIth International Congress of Eye Research, Buenos Aires, Argentina (November, 2006).
- Carroll, J., "High-resolution retinal imaging in inherited colour vision defects", presented at the Summer Colour Conference, University of Melbourne, Australia (February, 2007).
- Carroll, J. "High-resolution measurement of visual function using adaptive optics", presented at the 8th International Congress of Wavefront Sensing and Optimized Refractive Corrections, Santa Fe, NM (February, 2007).
- Carroll, J. "Organization of the human cone mosaic: implications for red-green colour vision", presented at the World Congress of the International Brain Research Organization, Melbourne, Australia (July, 2007).
- Carroll, J. "Disruption of the human cone mosaic caused by cone opsin mutations", presented at The Australian National University, Canberra, Australia (July, 2007).
- Carroll, J., "Assessing the healthy and diseased retina with imaging approaches, " presented at the 2008 FASEB Summer Research Conference - Retinal Neurobiology & Visual Processing, Snowmass Village, CO (July, 2008).
- Carroll, J., "Clinical applications of high-resolution retinal imaging", presented to the Applied Optics group in the Department of Physics, National University of Ireland, Galway, Ireland (July, 2009).
- Carroll, J., "Resolving drusen-associated photoreceptor disruption in vivo with adaptive optics", presented at the Macula of Paris, Paris, France (January 2010).
- Carroll, J., "Imaging the human retina: Development and disruption", presented at the 3rd Annual Kongsberg Vision Meeting, Buskerud University College, Kongsberg, Norway (October, 2010).
- Carroll, J., "Imaging the human retina with adaptive optics: Assessing development and disruption", presented at the AAAS Annual Meeting, Washington, DC (February, 2011).
- Carroll, J. & Dubra, A., "Imaging the cone mosaic in retinal disease, " presented at the 2011 FASEB Summer Research Conference - Biology & Chemistry of Vision, Carefree, AZ (June, 2011).
- Carroll, J., "Imaging the human retina: Development and disruption", presented at the Department of Genetics, Institute of Ophthalmology, London, England (July, 2011).
- Carroll, J., "Imaging photoreceptor disruption in the human retina", presented at the Bosch Institute Annual Scientific Meeting, University of Sydney, Sydney, Australia (June, 2013).
- Carroll, J., "Adaptive optics imaging of the human retina", presented at the Retina 2013 Meeting, Dublin, Ireland (November, 2013).
- \*Carroll, J., "Imaging photoreceptor structure with AOSLO: Recent advances", to be presented at the 7th Annual Kongsberg Vision Meeting, Buskerud University College, Kongsberg, Norway (October, 2014).
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- \*Carroll, J., "In vivo imaging of human cone photoreceptor inner segments", to be presented at the IRCCS Fondazione G.B. Bietti, Rome, Italy (December, 2014).
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- Carroll, J. "High-resolution imaging of photoreceptor structure in retinal disease, " presented at the 3rd Biennial International Symposium on Age Related Macular Degeneration, Harvard Medical School, Boston, MA (October, 2014).
- Carroll, J. "In vivo imaging of human cone photoreceptor inner segments, " presented at the IRCCS Fondazione G.B. Bietti, Rome, Italy (December, 2014).
- Carroll, J. "Adaptive optics imaging in inherited retinal degenerations, " presented at the Casey Eye Institute's 2nd Retinal Gene Therapy Conference, Denver, CO (May, 2015).
- Carroll, J. "Split-detector AOSLO imaging of photoreceptor inner segments, " presented at the 10th Annual Lowy Medical Research Institute Annual Meeting, New York, NY (June, 2015).
- Carroll, J. "High-resolution retinal imaging in animal eyes, " presented at the 2015 FASEB Scientific Research Conference - Biology & Chemistry of Vision, Big Sky, MT (June, 2015).
- Carroll, J. "Adaptive optics imaging biomarkers, " presented at the IX International Meeting of the IRCCS Fondazione G.B. Bietti, "New Diagnostic and Therapeutic Frontiers in Ophthalmology, " Rome, Italy (October, 2015).
- Carroll, J. "Adaptive optics imaging in inherited retinal degenerations, " presented at the 13th Macula Vision Research Foundation (MVRF) International Scientific Conference, Boston, MA (October, 2015).
- Carroll, J. "Clinical applications of adaptive optics retinal imaging, " presented at Queen's University Postgraduate Class, Belfast, Ireland (October, 2015).
- Carroll, J. "High-resolution retinal imaging and clinical trials - What's next?, " presented at Retina 2015, Dublin, Ireland (November, 2015).
- Carroll, J. "Towards a normative database for the human retinal vasculature" presented at Third International Congress on En Face OCT Imaging, Rome, Italy (December, 2015).
- Carroll, J. "High resolution retinal imaging in color blindness" presented at XXII Biennial Meeting of the International Society for Eye Research, Tokyo, Japan (September, 2016).
- Carroll, J. "Imaging the spectrum of foveal anatomy in the human retina: Lessons from albinism" presented at 9th World Symposium on Ocular Albinism, San Diego, CA (November, 2016).

#### **PEER REVIEWED WORKSHOPS/PRESENTATIONS:**

##### **National**

- Carroll, J., Ver Hoeve, J. N., Murphy, C. J., Summerfelt, P. M., Neitz, J. "Cone photopigment spectral sensitivities in the horse, " presented at the 30th Annual meeting of the American College of Veterinary Ophthalmologists, Chicago, IL (November, 1999).

- Carroll, J., Neitz, J., Neitz, M. "Evaluation of the flicker photometric electroretinogram as a method for estimating L:M cone ratios in human eyes, " presented at the 2000 OSA Annual Meeting, Providence, RI (October, 2000).
- Carroll, J., Hofer, H., Neitz, M., Williams, D. R., Neitz, J. "Correlation of electroretinogram and adaptive optics derived L:M cone ratio estimates, " presented at the 2002 FASEB Summer Research Conference - Retinal Neurobiology & Visual Processing, Saxtons River, VT (July, 2002).
- Carroll, J., Lin, J., Wolfing, J. I., Christie, N., Williams, D. R., Makous, W. "Retinal microscotomas revealed with adaptive-optics microflashes, and a model, " presented at the 2005 OSA Fall Vision Meeting, Tucson, AZ (October, 2005).
- Carroll, J., Neitz, J., Neitz, M., Williams, D. R. "High-resolution imaging of the living retina in congenital cone disorders", presented at the Novel Approaches to Bio-Imaging Conference, Janelia Farm (HHMI Campus) Ashburn, VA (March, 2008).
- Torti, C., Považay, B., Hofer, B., Herman, B., Kajic, V., Unterhuber, A., Fernandez, E. J., Carroll, J., Ahnelt, P. K., Drexler, W. "In vivo genotype-phenotype correlation using ultra-high speed and resolution retinal OCT with pancorrection, " presented at SPIE Photonics West, San Jose, CA (January, 2009).
- Torti, C., Považay, B., Hofer, B., Herman, B., Kajic, V., Unterhuber, A., Fernandez, E. J., Carroll, J., Ahnelt, P. K., Drexler, W. "Revealing cellular structure in the living human retina using ultra-high speed and resolution OCT with pancorrection, " presented at SPIE Photonics West, San Jose, CA (January, 2009).
- Wagner Schuman, M. L., Dubis, A., Rha, J., Schroeder, B., Godara, P., Stepien, K., Carroll, J., Ahnelt, P. K., Drexler, W. "Photoreceptor mosaic phenotype associated with opsin-gene disruptions: A 6-year follow-up, " presented at ARVO-ISIE, Fort Lauderdale, FL (May, 2009).
- Godara, P., Rha, J., Schroeder, B., Carroll, J., Weinberg, D. V. "Unusual adaptive optics findings in a patient with unexplained vision loss, " presented at ARVO-ISIE, Fort Lauderdale, FL (May, 2009).
- Han, D. P., Stepien, K. E., Carroll, J., Schell, J., Godara, P., Rha, J. "Spectral-domain OCT and adaptive optics may detect Hydroxychloroquine retinal toxicity before symptomatic vision loss, " presented at American Society of Retina Specialists, New York, NY (October, 2009).
- Summers, C. G., Ostler, S., McAllister, J. T., Tait, D. M., Dubis, A., Rha, J., Stepien, K. E., Carroll, J. "Insight into the spectrum of foveal immaturity in albinism, " presented at 36th Annual AAPOS Meeting, Orlando, FL (April, 2010).
- Dubis, A.M., Wagner-Schuman, M.L., Weh, E., Odell, D.W., Chiao, H., Summerfelt, P., Carroll, J. "Variation in foveal pit morphology in Caucasians, " presented at ARVO-ISIE, Fort Lauderdale, FL (May, 2010).
- Kapur, R., Nordgren, R., Dubis, A., Rha, J., Carroll, J., Holtebeck, A., Han, D. P., Stepien, K. E. "Imaging outer retinal structure in hydroxychloroquine patients, " presented at ASRS, Vancouver, BC (August, 2010).
- Eells, J.T., Gopalakrishnan, S., Schmitt, H., Dubis, A.M., Carroll, J. "Photobiomodulation protects against retinal degeneration in a rodent model of retinitis pigmentosa, " presented at SPIE Photonics West, San Francisco, CA (February, 2013).
- Chiu, S.J., Dubis, A.M., Cooper, R.F., Dubra, A., Carroll, J., Izatt, J.A., Farsiu, S. "Validated automatic segmentation of photoreceptors in adaptive optics scanning ophthalmoscope images, " presented at SPIE Photonics West, San Francisco, CA (February, 2013).
- Rosen, R., Weitz, R., Carroll, J., Dubow, M., Pinhas, A., Shah, N., Chui, T., Sulai, Y., Sripesema, N., Dubra, A. "Fluoro microangiography - First clinical studies of fluorescein angiography using adaptive optics scanning light ophthalmoscopy, " presented at ARVO-ISIE, Seattle, WA (May, 2013).
- Stepien, K.E., Sulai, Y., Langlo, C., Cooper, R., Flatter, J., Kay, D., Robison, S., Weinberg, D., Dubra, A., Carroll, J. "Alterations in cone photoreceptor reflectivity as a biomarker of photoreceptor health, " presented at ARVO-ISIE, Seattle, WA (May, 2013).
- Rosen, R., Pinhas, A., Razeen, M., Shah, N., Gan, A., Bavier, R., Weitz, R., Carroll, J., Dubra, A., Chui, T.Y.P. "Quantitative insights into macular microvasculature using adaptive optics scanning light ophthalmoscopy fluorescein angiography, " presented at ARVO-ISIE, Orlando, FL (May, 2014).
- Sajdak, B., Cooper, R.F., Bazan, K., Higgins, B., Scoles, D.H., Wilk, M., Dubra, A., Carroll, J. "Improving the processing and analysis workflow of adaptive optics retinal imaging, " presented at ARVO-ISIE, Orlando, FL (May, 2014).
- Severn, P., Dubis, A.M., Cooper, R.F., Carroll, J., Dubra, A., Fitzke, F., Rubin, G., Egan, C., Michaelides, M. "Clinical assessment and single cell imaging in unexplained vision loss, " presented at ARVO-ISIE, Orlando, FL (May, 2014).
- Eells, J.T., Gopalakrishnan, S., Abroe, B., Schmitt, H., Summerfelt, P., Dubis, A., Carroll, J. "Different

- photobiomodulation treatment protocols are retinoprotective in the P23H rat, " presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Collison, F.T., Fishman, G.A., Weleber, R.G., Carroll, J., Langlo, C.S., Chulay, J.D. "Prospective cohort study in achromatopsia, " presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Dubis, A.M., Aboshiha, J., BaAbbad, R., Pack, A., Samra, R.S., Ramsamy, G., Sulai, Y., Dubra, A., Webster, W., Carroll, J., Michaelides, M. "Photoreceptor mosaic variability in RPGR-associated retinal dystrophy, " presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Stepien, K.E., Zakka, F.R., Scoles, D.H., Liu, B.S., Cooper, R.F., Langlo, C.S., Connor, T.B., Dubra, A., Carroll, J. "Correlation of photoreceptor structure with autofluorescence in retinal degeneration associated with ABCA4 mutations, " presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Langlo, C.S., Scoles, D.H., Fishman, G.A., Gamm, D.M., Struck, M., Chiang, J., Dubra, A., Carroll, J. "Imaging cone inner segment structure in achromatopsia using split detector AOSLO, " presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Carroll, J., Ver Hoeve, J. N., Murphy, C. J., Summerfelt, P. M., Neitz, J. "Cone photopigment spectral sensitivities in the horse, " presented at the 30th Annual meeting of the American College of Veterinary Ophthalmologists, Chicago, IL (November, 1999).
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- Torti, C., Považay, B., Hofer, B., Herman, B., Kajic, V., Unterhuber, A., Fernandez, E. J., Carroll, J., Ahnelt, P. K., Drexler, W. "Revealing cellular structure in the living human retina using ultra-high speed and resolution OCT with pancorrection" presented at SPIE Photonics West, San Jose, CA (January, 2009).
- Wagner Schuman, M. L., Dubis, A., Rha, J., Schroeder, B., Godara, P., Stepien, K., Carroll, J., Ahnelt, P. K., Drexler, W. "Photoreceptor mosaic phenotype associated with opsin-gene disruptions: A 6-year follow-up" presented at ARVO-ISIE, Fort Lauderdale, FL (May, 2009).
- Godara, P., Rha, J., Schroeder, B., Carroll, J., Weinberg, D. V. "Unusual adaptive optics findings in a patient with unexplained vision loss" presented at ARVO-ISIE, Fort Lauderdale, FL (May, 2009).
- Han, D. P., Stepien, K. E., Carroll, J., Schell, J., Godara, P., Rha, J. "Spectral-domain OCT and adaptive optics may detect Hydroxychloroquine retinal toxicity before symptomatic vision loss" presented at American Society of Retina Specialists, New York, NY (October, 2009).
- Summers, C. G., Ostler, S., McAllister, J. T., Tait, D. M., Dubis, A., Rha, J., Stepien, K. E., Carroll, J. "Insight into the spectrum of foveal immaturity in albinism" presented at 36th Annual AAPOS Meeting, Orlando, FL (April, 2010).
- Dubis, A.M., Wagner-Schuman, M.L., Weh, E., Odell, D.W., Chiao, H., Summerfelt, P., Carroll, J. "Variation in foveal pit morphology in Caucasians" presented at ARVO-ISIE, Fort Lauderdale, FL (May, 2010).
- Kapur, R., Nordgren, R., Dubis, A., Rha, J., Carroll, J., Holtebeck, A., Han, D. P., Stepien, K. E. "Imaging outer retinal structure in hydroxychloroquine patients" presented at ASRS, Vancouver, BC (August, 2010).
- Eells, J.T., Gopalakrishnan, S., Schmitt, H., Dubis, A.M., Carroll, J. "Photobiomodulation protects against retinal degeneration in a rodent model of retinitis pigmentosa" presented at SPIE Photonics West, San Francisco, CA (February, 2013).
- Chiu, S.J., Dubis, A.M., Cooper, R.F., Dubra, A., Carroll, J., Izatt, J.A., Farsiu, S. "Validated automatic segmentation of photoreceptors in adaptive optics scanning ophthalmoscope images" presented at SPIE Photonics West, San Francisco, CA (February, 2013).
- Rosen, R., Weitz, R., Carroll, J., Dubow, M., Pinhas, A., Shah, N., Chui, T., Sulai, Y., Sripesema, N., Dubra, A. "Fluoro microangiography - First clinical studies of fluorescein angiography using adaptive optics scanning light ophthalmoscopy" presented at ARVO-ISIE, Seattle, WA (May, 2013).
- Stepien, K.E., Sulai, Y., Langlo, C., Cooper, R., Flatter, J., Kay, D., Robison, S., Weinberg, D., Dubra, A., Carroll, J. "Alterations in cone photoreceptor reflectivity as a biomarker of photoreceptor health" presented at ARVO-ISIE, Seattle, WA (May, 2013).
- Rosen, R., Pinhas, A., Razeen, M., Shah, N., Gan, A., Bavier, R., Weitz, R., Carroll, J., Dubra, A., Chui, T.Y.P. "Quantitative insights into macular microvasculature using adaptive optics scanning light ophthalmoscopy fluorescein angiography" presented at ARVO-ISIE, Orlando, FL (May, 2014).
- Sajdak, B., Cooper, R.F., Bazan, K., Higgins, B., Scoles, D.H., Wilk, M., Dubra, A., Carroll, J. "Improving the processing and analysis workflow of adaptive optics retinal imaging" presented at ARVO-ISIE, Orlando, FL (May, 2014).
- Severn, P., Dubis, A.M., Cooper, R.F., Carroll, J., Dubra, A., Fitzke, F., Rubin, G., Egan, C., Michaelides, M. "Clinical assessment and single cell imaging in unexplained vision loss" presented at ARVO-ISIE, Orlando, FL (May, 2014).
- Eells, J.T., Carroll, J., Ranji, M., Gopalakrishnan, S. "Unblinded by the light: Photobiomodulation in retinal



- injury and disease" presented at the American Society for Photobiology Annual Meeting, San Diego, CA (June, 2014).
- Collison, F.T., Fishman, G.A., Weleber, R.G., Carroll, J., Langlo, C.S., Chulay, J.D. "Prospective cohort study in achromatopsia" presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Dubis, A.M., Aboshiha, J., BaAbbad, R., Pack, A., Samra, R.S., Ramsamy, G., Sulai, Y., Dubra, A., Webster, W., Carroll, J., Michaelides, M. "Photoreceptor mosaic variability in RPGR-associated retinal dystrophy" presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Stepien, K.E., Zakka, F.R., Scoles, D.H., Liu, B.S., Cooper, R.F., Langlo, C.S., Connor, T.B., Dubra, A., Carroll, J. "Correlation of photoreceptor structure with autofluorescence in retinal degeneration associated with ABCA4 mutations" presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Langlo, C.S., Scoles, D.H., Fishman, G.A., Gamm, D.M., Struck, M., Chiang, J., Dubra, A., Carroll, J. "Imaging cone inner segment structure in achromatopsia using split detector AOSLO" presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Eells, J.T., Abroe, B., Schmitt, H., Summerfelt, P., Dubis, A., Carroll, J., Gopalakrishnan, S. "830nm photobiomodulation is retinoprotective in a rodent model of retinitis pigmentosa" presented at the XVIth Symposium on Retinal Degeneration, Pacific Grove, CA (July, 2014).
- Kim, J.E., Scoles, D.H., Blodi, B.A., Langlo, C.S., Stepien, K.E., Weinberg, D.V., Carroll, J., Dubra, A., "Inner retina and vascular imaging in macular telangiectasia using adaptive optics" presented at the 47th Annual Scientific Meeting of The Retina Society, Philadelphia, PA (September, 2014).
- Trotter, A.D., Langlo, C., Carroll, J., Connor, T.B. "High resolution imaging in juvenile pigmentary retinopathy" presented at the American Medical Association Annual Meeting, Atlanta, GA (November, 2015).
- Rosen, R.B., Mo, S., Krawitz, B., Geyman, L., Efstathiadis, E., Weitz, R., Carroll, J., Dubra, A., Chui, T.Y. "Optical coherence tomography angiography (OCTA) and adaptive optics scanning light ophthalmoscope fluorescein angiography (AOSLO FA): A quantitative and qualitative comparison" presented at ARV, Seattle, WA (May, 2016).
- Mo, S., Krawitz, B., Phillips, E., Garg, R., Geyman, L.S., Efstathiadis, E., Chui, T.Y., Carroll, J., Rosen, R.B. "Visualization of radial peripapillary capillaries in optical coherence tomography angiography: The effect of image averaging" presented at ARVO-ISIE, Seattle, WA (May, 2016).

### **International**

- Carroll, J., Neitz, M., Neitz, J. "Testing hypotheses about deutan color vision defects, " presented at the XVth Symposium of the International Colour Vision Society, Göttingen, Germany (July, 1999).
- Yamauchi, Y., Williams, D. R., Brainard, D. H., Roorda, A., Carroll, J., Neitz, M., Neitz, J., Calderone, J. B., Jacobs, G. H. "What determines unique yellow, L/M cone ratio or visual experience?, " presented at the 9th congress of the International Colour Association, Rochester, NY (June, 2001).
- Carroll, J., Neitz, M., Neitz, J. "Variation in ERG-derived L/M cone ratio among trichromats is linked to the X-chromosome photopigment gene array, " presented at the XVIth Symposium of the International Colour Vision Society, Cambridge, England (July, 2001).
- Carroll, J., Hofer, H., Neitz, J., Neitz, M., Williams, D. R. "Variation in the cone mosaics of dichromats revealed with adaptive optics, " presented at the XVIIth Symposium of the International Colour Vision Society, Seattle, WA (July, 2003).
- Neitz, M., Carroll, J., Renner, A., Knau, H., Werner, J. S., Neitz, J. "The genetic causes of red-green dichromacy, " presented at the XVIIth Symposium of the International Colour Vision Society, Seattle, WA (July, 2003).
- Carroll, J., Choi, S., Wolfing, J., Hofer, H., Williams, D. R. "Imaging retinal disease with adaptive optics, " presented at the IInd European Optical Society Topical Meeting on Physiological Optics, Granada, Spain (September, 2004).
- Carroll, J., Lin, J., Wolfing, J. I., Christie, N., Williams, D. R., Makous, W. "Retinal microscotomas revealed with adaptive-optics microflashes, " presented at the XXVIIIth Symposium of the International Colour Vision Society, Lyon, France (July, 2005).
- Chen, L., Carroll, J., Williams, D. R. "A new method for classifying human cones in vivo, " presented at the 5th International Workshop on Adaptive Optics, Beijing, China (September, 2005).
- Baraas, R. C., Carroll, J., Gunther, K. L., Wolfing, J. I., Gray, D., Dubra, A., Williams, D. R., Neitz, M.,

- Foster, D. H. "A progressive form of Tritanopia revealed with adaptive optics retinal imaging, " presented at the Engineering the Eye II Conference, Galway, Ireland (June, 2006).
- Carroll, J., Tait, D., Neitz, J., Neitz, M. "Normality of color vision in compound heterozygous females carrying a protan and a deutan defect, " presented at the XIXth Symposium of the International Colour Vision Society, Belem, Brazil (July, 2007).
- Carroll, J., Tait, D., Neitz, J., Neitz, M. "Normality of color vision in compound heterozygous females carrying a protan and a deutan defect, " presented at Vision Down Under 2007, Cairns, Australia (July, 2007).
- Krauskopf, J., & Carroll, J. "Numerical L:M cone ratio estimated by color appearance, ERG, and adaptive optics methods, " presented at the 30th European Conference on Visual Perception, Arrezo, Italy (August, 2007).
- Carroll, J. "Variation in temporal properties of cone degeneration imparted by various cone opsin mutations, " presented at the XIIIth Symposium on Retinal Degeneration, Emeishan, China (September, 2008).
- Neitz, M., Carroll, J., Gunther, K. L., Neitz, J. "Evolutionary origin of high frequency deleterious mutations in the human cone opsins and their role in the most common eye disorders, " presented at the XXth Symposium of the International Colour Vision Society, Braga, Portugal (July, 2009).
- Carroll, J., Dubra, A., Wagner-Schuman, M., Neitz, J., McClements, M., Hunt, D.M., Mollon, J.D., Moore, A.T., Neitz, M., Michaelides, M "Genetic mutations within the L/M array account for both cone dysfunction and the color vision phenotype in Bornholm eye disease, " presented at the XIVth Symposium on Retinal Degeneration, Mont-Treblant, Canada (July, 2010).
- Carroll, J., Dubis, A.M., Genead, M., Cooper, R. F., Williams, V., Sommer, P., Stepien, K.E., Connor, T., Fishman, G.A., Dubra, A., Neitz, J., Neitz, M. "A mutant opsin allele associated with cone-type specific degeneration, " presented at the XXIst Symposium of the International Colour Vision Society, Kongsberg, Norway (July, 2011).
- Rosen, R., Weitz, R., Carroll, J., Dubra, A., Stepien, K. E. "Clinical applications of single cell retinal imaging using adaptive optics scanning laser ophthalmoscopy - an update, " presented at the 35th Annual Macula Society Meeting, Jerusalem, Israel (June, 2012).
- Eells, J., Gopalakrishnan, S., Schmitt, H., Maleki, S., Ranji, M., Dubis, A., Carroll, J. "Photobiomodulation protects retinal mitochondria and retinal function in a rodent model of retinitis pigmentosa, " presented at Asia ARVO, New Delhi, India (October, 2013).
- \*Carroll, J., Scoles, D., Abozaid, M., Han, D.P., Cooper, R.F., Dubra, A. "Interpreting photoreceptor ellipsoid zone lesions visualized with en face SD-OCT, " to be presented at Second International Congress on En Face OCT Imaging, Rome, Italy (December, 2014).
- Carroll, J., Neitz, M., Neitz, J. "Testing hypotheses about deutan color vision defects, " presented at the XVth Symposium of the International Colour Vision Society, Göttingen, Germany (July, 1999).
- Yamauchi, Y., Williams, D. R., Brainard, D. H., Roorda, A., Carroll, J., Neitz, M., Neitz, J., Calderone, J. B., Jacobs, G. H. "What determines unique yellow, L/M cone ratio or visual experience?, " presented at the 9th congress of the International Colour Association, Rochester, NY (June, 2001).
- Carroll, J., Neitz, M., Neitz, J. "Variation in ERG-derived L/M cone ratio among trichromats is linked to the X-chromosome photopigment gene array, " presented at the XVIth Symposium of the International Colour Vision Society, Cambridge, England (July, 2001).
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- Baraas, R. C., Carroll, J., Gunther, K. L., Wolfing, J. I., Gray, D., Dubra, A., Williams, D. R., Neitz, M., Foster, D. H. "A progressive form of Tritanopia revealed with adaptive optics retinal imaging, "

- presented at the Engineering the Eye II Conference, Galway, Ireland (June, 2006).
- Carroll, J., Tait, D., Neitz, J., Neitz, M. "Normality of color vision in compound heterozygous females carrying a protan and a deutan defect, " presented at the XIXth Symposium of the International Colour Vision Society, Belem, Brazil (July, 2007).
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- Krauskopf, J., & Carroll, J. "Numerical L:M cone ratio estimated by color appearance, ERG, and adaptive optics methods, " presented at the 30th European Conference on Visual Perception, Arrezo, Italy (August, 2007).
- Carroll, J. "Variation in temporal properties of cone degeneration imparted by various cone opsin mutations, " presented at the XIIIth Symposium on Retinal Degeneration, Emeishan, China (September, 2008).
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- Carroll, J., Neitz, M., Neitz, J. "Variation in ERG-derived L/M cone ratio among trichromats is linked to the X-chromosome photopigment gene array" presented at the XVIth Symposium of the International Colour Vision Society, Cambridge, England (July, 2001).
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- Baraas, R.C., Carroll, J., Gunther, K.L., Wolfing, J.I., Gray, D., Dubra, A., Williams, D.R., Neitz, M., Foster, D.H. "A progressive form of tritanopia revealed with adaptive optics retinal imaging" presented at the Engineering the Eye II Conference, Galway, Ireland (June, 2006).
- Carroll, J., Tait, D., Neitz, J., Neitz, M. "Normality of color vision in compound heterozygous females carrying a protan and a deutan defect" presented at the XIXth Symposium of the International Colour Vision Society, Belem, Brazil (July, 2007).
- Carroll, J., Tait, D., Neitz, J., Neitz, M. "Normality of color vision in compound heterozygous females carrying a protan and a deutan defect" presented at Vision Down Under 2007, Cairns, Australia (July, 2007).
- Krauskopf, J., & Carroll, J. "Numerical L:M cone ratio estimated by color appearance, ERG, and adaptive optics methods" presented at the 30th European Conference on Visual Perception, Arrezo, Italy (August, 2007).
- Carroll, J. "Variation in temporal properties of cone degeneration imparted by various cone opsin mutations" presented at the XIIIth Symposium on Retinal Degeneration, Emeishan, China (September, 2008).
- Neitz, M., Carroll, J., Gunther, K.L., Neitz, J. "Evolutionary origin of high frequency deleterious mutations in the human cone opsins and their role in the most common eye disorders" presented at the XXth Symposium of the International Colour Vi, Braga, Portugal (July, 2009).
- Rosen, R., Weitz, R., Carroll, J., Dubra, A., Stepien, K.E., Sripsema, N., Garcia, P., Shah, N., Scoles, D., Burns, S., Landa, G. "Clinical applications of single cell retinal imaging using adaptive optics scanning laser ophthalmoscopy - an update" presented at the 35th Annual Macula Society Meeting, Jerusalem,

- Israel (June, 2012).
- Eells, J., Gopalakrishnan, S., Schmitt, H., Maleki, S., Ranji, M., Dubis, A., Carroll, J. "Photobiomodulation protects retinal mitochondria and retinal function in a rodent model of retinitis pigmentosa" presented at Asia ARVO, New Delhi, India (October, 2013).
- Rosen, R., Razeen, M., Gan, A., Shah, N., Pinhas, A., Cheang, E., Liu, L., Chui, T.Y., Weitz, R., Carroll, J., Dubra, A. "New insights in macular microvasculature using quantitative adaptive optics scanning light ophthalmoscopy" presented at the 37th Annual Macula Society Meeting, Key Largo, FL (February, 2014).
- Carroll, J., Scoles, D., Abozaid, M., Han, D.P., Cooper, R.F., Dubra, A. "Interpreting photoreceptor ellipsoid zone lesions visualized with en face SD-OCT" presented at Second International Congress on En Face OCT Imaging, Rome, Italy (December, 2014).
- Schwartz, S., Connor, Jr., T.B., Vaziri, K., Moshfeghi, A., Moshfeghi, D., Carroll, J., Brilliant, M., McKay, B. "Inverse association between L-DOPA and age-related macular degeneration" presented at the 38th Annual Macula Society Meeting, Scottsdale, AZ (January, 2015).
- Rosen, R., Weitz, R., Pinhas, A., Dubow, M., Gentile, R., Gan, A., Razeen, M., Shah, N., Cheang, E., Liu, C., Carroll, J., Sulai, Y., Dubra, A., Chui, T. "Dynamic histopathology studies of retinal vascular disease using adaptive optics imaging" presented at the 38th Annual Macula Society Meeting, Scottsdale, AZ (January, 2015).
- Langlo, C.S., Collison, F., Summerfelt, P., White, C., Dubra, A., Hauswirth, W., Fishman, G., Carroll, J. "Longitudinal measurement of cone density in congenital achromatopsia" presented at the XXIIIrd Symposium of the International Colour Vision Society, Sendai, Japan (July, 2015).
- Patterson, E.J., Langlo, C.S., Carroll, J. "The use of the Colour Assessment and Diagnosis (CAD) test in congenital achromatopsia" presented at the XXIIIrd Symposium of the International Colour Vision Society, Sendai, Japan (July, 2015).
- Li, Z., Carroll, J. "An analytical model of the influence of cone sensitivity and numerosity on the Rayleigh match" presented at the XXIIIrd Symposium of the International Colour Vision Society, Sendai, Japan (July, 2015).
- Carroll, J., Dubra, A., Wagner-Schuman, M., Neitz, J., McClements, M., Hunt, D.M., Mollon, J.D., Moore, A.T., Neitz, M., Michaelides, M. "Genetic mutations within the L/M array account for both cone dysfunction and the color vision phenotype in Bornholm eye disease" presented at the XIVth Symposium on Retinal Degeneration, Mont-Treblant, Canada (July, 2010).
- Carroll, J., Dubis, A.M., Genead, M., Cooper, R.F., Williams, V., Sommer, P., Stepien, K.E., Connor, T., Fishman, G.A., Dubra, A., Neitz, J., Neitz, M. "A mutant opsin allele associated with cone-type specific degeneration" presented at the XXIst Symposium of the International Colour Vision Society, Kongsberg, Norway (July, 2011).

#### **COMMITTEE SERVICE:**

##### **Medical College of Wisconsin**

- 07/2000 - 06/2001 President, Graduate Student Association, The Medical College of Wisconsin
- 07/2008 - Present Member, MCW IRB Review Committee (#2)
- 07/2008 - 07/2009 Member, Faculty Council Curriculum & Evaluation Committee, M3/M4 Subcommittee
- 09/2008 - Present Co-chair, Basic Science Faculty Search Committee, Department of Ophthalmology
- 10/2008 - Present Member, MSTP Admissions Committee
- 01/2009 Member, Advancing Healthier Wisconsin Grant Review Committee
- 07/2009 Board Member, MCW/Marquette Medical Alumni Association
- 07/2009 Member, Research Affairs Grant Review Committee
- 07/2009 - Present Member, GSC Course Evaluation Committee
- 07/2009 - Present Member, Physician Scientist Pathway Council
- 03/2010 - Present Member, MCW Internship Program Committee

#### **MEDICAL COLLEGE TEACHING ACTIVITIES:**

##### **Community/Lay Public**

- 11/2006 - Present "Retinal Imaging"; Eye Opener seminar series
- 11/2006 - Present "Retinal Imaging"; Eye Opener seminar series
- 11/2006 - Present "Retinal Imaging"; Eye Opener seminar series

03/2007 - Present "Vision Research"; Oconomowoc High School  
 03/2007 - Present "Vision Research"; Oconomowoc High School  
 05/2008 - Present "Envisioning the Future: Emerging Technologies for the Restoration and Preservation of Sight"; MCW Science Café  
 05/2008 - Present "Envisioning the Future: Emerging Technologies for the Restoration and Preservation of Sight"; MCW Science Café  
 05/2008 - Present "Envisioning the Future: Emerging Technologies for the Restoration and Preservation of Sight"; MCW Science Café  
 05/2009 - Present Mentor, The Prairie School Interim Program  
 05/2009 - Present Mentor, The Prairie School Interim Program  
 05/2009 - Present Mentor, The Prairie School Interim Program  
 07/2010 - Present Lecturer, Apprenticeship in Medicine Program (MCW)  
 07/2010 Lecturer, MCW Apprenticeship in Medicine Program (AIM)  
 07/2010 - Present Lecturer, MCW Apprenticeship in Medicine Program (AIM)  
 08/2011 - Present "Advances in Retinal Imaging in Achromatopsia" - Achromatopsia Convention, The Chicago Lighthouse for People who Are Blind or Visually Impaired  
 08/2011 - Present "Advances in Retinal Imaging in Achromatopsia" - Achromatopsia Convention, The Chicago Lighthouse for People who Are Blind or Visually Impaired  
 12/2011 - Present "Advances in high-resolution imaging of the human retina", presented at the Milwaukee Chapter Meeting of the Foundation Fighting Blindness  
 12/2011 - Present "Advances in high-resolution imaging of the human retina, " presented at the Milwaukee Chapter Meeting of the Foundation Fighting Blindness  
 01/2013 - Present "Retinal Disease Research Breakthroughs: An Imaging Story, " presented at the Milwaukee Chapter Meeting of the Foundation Fighting Blindness  
 01/2013 - Present "Retinal Disease Research Breakthroughs: An Imaging Story", presented at the Milwaukee Chapter Meeting of the Foundation Fighting Blindness  
 11/2013 - Present Fighting Blindness Public Engagement Day, presented at Retina 2013, Dublin, Ireland  
 11/2013 - Present Fighting Blindness Public Engagement Day, presented at Retina 2013, Dublin, Ireland  
 02/2014 - Present "Adaptive Optics Imaging: From the Stars to Our Eyes", presented at the Milwaukee Ophthalmological Society monthly meeting  
 02/2014 - Present "Adaptive Optics Imaging: From the Stars to Our Eyes, " presented at the Milwaukee Ophthalmological Society monthly meeting  
 11/2014 - Present Fighting Blindness Public Engagement Day, presented at Retina 2014, Dublin, Ireland  
 01/2015 - Present "Retinal Disease Research Breakthroughs, " presented at the Wisconsin Vision Seminar for the Foundation Fighting Blindness  
 02/2015 - Present "Retinal Disease Research & Advanced Ocular Imaging, " presented at the Wisconsin Vision Professionals Conference  
 04/2015 - Present "Applications of High Resolution Retinal Imaging, " presented at the Neuroscience Research Center Advisory Board Meeting  
 06/2015 - Present "Advances in Research and Treatment on Macular Degeneration, " presented at the Summer Meeting of the Froedtert & the Medical College of Wisconsin Presidents' Advisory Council  
 11/2015 - Present Fighting Blindness Public Engagement Day, presented at Retina 2015, Dublin, Ireland

### **Medical Student Education**

01/2000 - 05/2002 Teaching Assistant, Integrated Medical Neuroscience Lab  
 01/2000 - 05/2002 Teaching Assistant, Integrated Medical Neuroscience Lab  
 01/2000 - 05/2002 Teaching Assistant, Integrated Medical Neuroscience Lab  
 01/2008 - Present Lecturer, Integrated Medical Neuroscience  
 01/2008 - Present Lecturer, Integrated Medical Neuroscience  
 01/2008 - Present Lab Staff, Integrated Medical Neuroscience  
 01/2008 - Present Lecturer, Integrated Medical Neuroscience  
 01/2010 - 06/2013 Small Group Leader, Physician Scientist Pathway  
 01/2010 - 06/2013 Small Group Leader, Physician Scientist Pathway  
 01/2010 - Present Small Group Leader, Physician Scientist Pathway  
 12/2010 - Present Core Session Presenter, Physician Scientist Pathway  
 12/2010 - Present Core Session Presenter, Physician Scientist Pathway

### **Resident and Fellow Education**

02/2007 - Present Basic Science Lecturer, Ophthalmology Residency Program  
02/2007 - Present Basic Science Lecturer, Ophthalmology Residency Program  
02/2007 - 06/2016 Basic Science Lecturer, Ophthalmology Residency Program  
08/2008 - 08/2009 OCT Workshop, Ophthalmology Residency Program  
08/2008 - Present OCT Workshop, Ophthalmology Residency Program  
08/2008 - Present OCT Workshop, Ophthalmology Residency Program  
10/2009 - Present Retina Lectures (Color Vision, Congenital Cone Disorders, Ophthalmology Residency Program)  
10/2009 - Present Retina Lectures (Color Vision, Congenital Cone Disorders; Ophthalmology Residency Program)  
10/2009 - 06/2016 Retina Lectures (Color Vision, Congenital Cone Disorders; Ophthalmology Residency Program)

### **Graduate Student Education**

01/2008 - Present Lecturer, Integrated Graduate Neuroscience  
01/2008 - Present Lecturer, The Biology of Vision  
01/2008 - Present Lecturer, The Biology of Vision  
01/2008 - Present Lecturer, Integrated Graduate Neuroscience (continued as Fundamentals of Neuroscience)  
01/2008 - Present Lecturer, The Biology of Vision  
01/2008 - Present Lecturer, Integrated Graduate Neuroscience (continued as Fundamentals of Neuroscience)  
10/2008 - Present Lecturer, Molecular & Cellular Neurobiology  
10/2008 - Present Lecturer, Molecular & Cellular Neurobiology  
10/2008 - Present Lecturer, Molecular & Cellular Neurobiology  
01/2009 - Present Course Director, Integrated Graduate Neuroscience (continued as Fundamentals of Neuroscience)  
01/2009 - Present Course Director, Integrated Graduate Neuroscience (continued as Fundamentals of Neuroscience)  
01/2009 - Present Course co-Director, Integrated Graduate Neuroscience  
03/2009 - Present Lecturer, Research Ethics Discussion Series  
03/2009 - Present Lecturer, Research Ethics Discussion Series  
03/2009 - Present Lecturer, Mechanisms of Cellular Signaling  
03/2009 - Present Lecturer, Mechanisms of Cellular Signaling  
03/2009 - Present Lecturer, Research Ethics Discussion Series  
03/2013 - Present Lecturer, PhD program in Basic and Translational Sciences  
03/2013 - Present Lecturer, PhD program in Basic and Translational Sciences  
07/2013 - Present Course Director, Advanced Systems Neuroscience  
07/2013 - 07/2016 Course Director, Advanced Systems Neuroscience

## **PROGRAMMATIC DEVELOPMENTS:**

### **Educational Programs**

#### **Resident**

2008 Implemented Cirrus OCT imaging capabilities for Ophthalmology clinic, provided formal training of technicians, optometrists, and provide continued technical support.

#### **Faculty**

2007 - Present Initiated the organization of a departmental seminar series (Ophthalmology); coordinated speaker invitations with fellow faculty and assisted in development of promotional materials  
2010 co-organizer, Department of Ophthalmology Annual Fall Symposium, CME approved, "Advances in Ocular Imaging"

### **Clinical Programs**

2008 - Present Operate the Eye Institute's comprehensive color vision testing service  
2009 - Present Created and co-direct the Eye Institute Advanced Ocular Imaging Program

## PH.D ROTATION STUDENTS:

Teresa Patitucci Summer/Fall 2010 IDP Program  
Kate Engerer Summer 2009 MSTP Program  
Danielle Reitsma Spring 2009 Neuroscience Program  
Nathan Schuld Spring 2010 IDP Program  
Anthony Prisco Summer 2009 MSTP Program  
Eric Weh Winter 2009 IDP Program

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