**CURRICULUM VITAE**

**The Johns Hopkins University School of Medicine**

Jeff Mumm April 25, 2019

## DEMOGRAPHIC INFORMATION

### Current Appointments

| | |
|---|---|
| 2014-present | Associate Professor, Department of Ophthalmology (Primary), McKusick-Nathans Institute of Genetic Medicine (Secondary), Solomon H. Snyder Department of Neuroscience (Secondary) |
| 2016-present | Associate Professor, Center for Nanomedicine (Secondary appt.) |
| 2017-present | Helen Larson and Charles Glenn Grover Professor of Ophthalmology |

### Personal Data

Department of Ophthalmology
Wilmer Eye Institute
Smith Bldg, Rm 4015
400 North Broadway
Baltimore, MD 21231
Office: 410-502-2210
Lab: 410-502-2105
jmumm3@jhmi.edu

### Education and Training

*Undergraduate*

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|---|---|
| 1991-1994 | B.S., Biology, University of Iowa, Iowa City, IA |

*Doctoral*

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| 1995-2000 | Ph.D., Neuroscience, Washington University, St. Louis, MO |

*Postdoctoral*

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| 2001-2004 | Fellowship, Anatomy & Neurobiology, Washington University, St. Louis, MO |

### Professional Experience

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|---|---|
| 2004-2008 | President/Research Director, Luminomics Inc., St. Louis, MO |
| 2008-2013 | Assistant Professor, Augusta University, Augusta, GA (formerly Medical College of Georgia) |
| 2014-present | Associate Professor, Johns Hopkins University, Baltimore, MD |
| 2017-present | Helen Larson and Charles Glenn Grover Professor of Ophthalmology, Johns Hopkins University |
| 2018-present | Co-director, Functional INvestigation in Zebrafish (FINZ) Core Center, Johns Hopkins University |

## RESEARCH ACTIVITIES

### Peer-reviewed Original Science Publications

1. Gordon M, **Mumm J**, Davis R, Holcomb J, Calof A. Dynamics of MASH1 expression in vitro and in vivo suggest a non-stem cell site of MASH1 action in the olfactory receptor neuron lineage. Molecular and Cellular Neuroscience, 1995; 6: 363-379.
2. Holcomb J, **Mumm J**, Calof A. Apoptosis in the neuronal lineage of the mouse olfactory epithelium: regulation *in vitro* and *in vivo*. Developmental Biology, 1995; 172: 307-323.
3. Calof A, Holcomb J, **Mumm J**, Haglwara N, Tran P, Smith K, Shelton D. Factors affecting neuronal birth and death in the mammalian olfactory epithelium. Ciba Found Symp, 1996; 196: 188-210.
4. Calof A, Hagiwara N, Holcomb J, **Mumm J**, Shou J. Neurogenesis and cell death in olfactory epithelium. Journal of Neurobiology, 1996; 30: 67-81.
5. **Mumm J**, Shou J, Calof A. Colony-forming progenitors from mouse olfactory epithelium: Evidence for feedback regulation of neuron production. Proceedings of the National Academy of Sciences USA, 1996; 93: 11167-11172.
6. Calof A, **Mumm J**, Rim P, Shou J. The neuronal stem cell of the olfactory epithelium. Journal of Neurobiology, 1998; 36: 190-205.
7. Calof A, Rim P, Askins K, **Mumm J**, Gordon M, Iannuzzelli P, Shou J. Factors regulating neurogenesis and programmed cell death in mouse olfactory epithelium. Ann N Y Acad Sci, 1998; 855: 226-229.
8. Ray W, Yao M, Nowotny P, **Mumm J**, Zhang W, Wu J, Kopan R, Goate A. Evidence for a physical interaction between presenilin and Notch. Proceedings of the National Academy of Sciences USA, 1999; 96: 3263-3268.
9. De Strooper B, Annaert W, Cupers P, Saftig P, Craessaerts K, **Mumm J**, Schroeter E, Schrijvers V, Wolfe M, Ray W, Goate A, Kopan R. A presenilin-1-dependent gamma-secretase-like protease mediates release of Notch intracellular domain. Nature, 1999; 398: 518-522.
10. Ray W, Yao M, **Mumm J**, Schroeter E, Saftig P, Wolfe M, Selkoe D, Kopan R Goate A. Cell surface presenilin-1 participates in the gamma-secretase-like proteolysis of Notch. Journal of Biological Chemistry, 1999; 274: 36801-36807.
11. **Mumm J**, Schroeter E, Saxena M, Griesemer A, Tian X, Pan D, Ray W, Kopan R. A ligand-induced extracellular cleavage regulates gamma-secretase-like proteolytic activation of Notch1. Molecular Cell, 2000; 5: 197-206.
12. Huppert S, Le A, Schroeter E, **Mumm J**, Saxena M, Milner L, Kopan R. Embryonic lethality in mice homozygous for a processing deficient Notch1 allele. Nature, 2000; 405: 966-970.
13. Saxena M, Schroeter E, **Mumm J**, Kopan R. Murine Notch homologs (N1-4) undergo presenilin-dependent proteolysis. Journal of Biological Chemistry, 2001; 276: 40268-40273.
14. Kay J*, Roeser T*, **Mumm J***, Godinho L*, Mrejeru A, Wong R, Baier H. Transient requirement for ganglion cells during assembly of retinal synaptic layers. Development, 2004; 131: 1331-1342, (*equal contribution).
15. **Mumm J**, Godinho L, Morgan J, Oakley D, Schroeter E, Wong R. Laminar circuit formation in the vertebrate retina. Progress in Brain Research, 2005; 147: 155-169.
16. Godinho L, **Mumm J**, Williams P, Schroeter E, Koerber A, Seung W, Park S, Leach S, Wong R. Targeting of amacrine cell neurites to appropriate synaptic laminae in the developing zebrafish retina. Development, 2005; 132: 5069-5079.
17. **Mumm J**, Williams P, Godinho L, Koerber A, Pittman A, Roeser T, Chien C-B, Baier H, Wong R. In vivo imaging reveals dendritic targeting of laminated afferents by zebrafish retinal ganglion cells. Neuron, 2006; 52: 609-621.
18. Curado S, Anderson R, Jungblut B, **Mumm J**, Schroeter E, Stainier D. Conditional targeted cell ablation in zebrafish: A new tool for regeneration studies. Developmental Dynamics, 2007; 236: 1025-1035.
19. Ariga J*, Walker S*, **Mumm J**. Multicolor time-lapse imaging of transgenic zebrafish: visualizing retinal stem cells activated by targeted neuronal cell ablation. Journal of Visualized Experiments, 2010; Sep 20;(43). pii: 2093. doi: 10.3791/2093 (*denotes equal contribution). http://www.jove.com/index/details.stp?id=2093.
20. Teng Y, Xie X, Walker S, Rempala G, Kozlowski D, **Mumm J**, Cowell J. Knockdown of zebrafish Lgi1a results in developmental delay, brain defects and a seizure-like behavioral phenotype. Human Molecular Genetics, 2010; 9(22):4409-4420.
21. Teng Y, Xie X, Walker S, Rempala G, Kozlowski D, **Mumm J**, Cowell J. Loss of zebrafish *lgi1b* leads to hydrocephalus and sensitization to pentylenetetrazol induced seizure-like behavior. PLoS ONE, 2011; 6:e24596.

22. Walker S*, Ariga J*, Mathias J, Coothankandaswamy V, Xie X, Distel M, Koster R, Parsons M, Bhalla K, Saxena M, **Mumm J**. Automated reporter quantification in vivo: high-throughput screening method for reporter-based assays in zebrafish. PLoS ONE, 2012; 7:e29916. (*equal contribution).
23. Kok F, Taibi A, Wanner S, Xie X, Moravec C, Love C, Prince V, **Mumm J**, Sirotkin H. Zebrafish rest regulates developmental gene expression but not neurogenesis. Development, 2012; 139:3838-3848.
24. Xie X, Mathias J, Walker S, Smith M-A, Teng Y, Distel M, Köster R, Saxena M, Sirotkin H, **Mumm J**. Silencer-delimited transgenesis: NRSE sequences promote neural-specific transgene expression in a REST-dependent manner. BMC Biology, 2012; 10:93. doi: 10.1186/1741-7007-10-93.
25. White D, **Mumm J**. The nitroreductase system of inducible targeted cell ablation facilitates cell-specific regenerative studies in zebrafish. Methods, 2013; 62: 232-40.
26. Shao J, Teng Y, Padia R, Hong S, Noh H, Xie X, **Mumm J**, Dong Z, Ding H-F, Cowell J, Kim J, Han J, Huang S. COP1 and GSK3β cooperate to promote c-Jun degradation and inhibit breast cancer cell tumorigenesis. Neoplasia, 2013; 15: 1075-85.
27. Teng Y, Xie X, Walker S, White D, **Mumm J**, Cowell J. Evaluating human cancer cell metastasis in zebrafish. BMC Cancer. 2013; 13: 453.
28. Mathias J, Zhang Z, Saxena M, **Mumm J**. Enhanced cell-specific ablation in zebrafish using a triple mutant of *E. coli* nitroreductase. Zebrafish, 2014; 11: 85-97.
29. Wang K, Milkie D, Saxena A, Engerer P, Misgeld T, Bronner M, **Mumm J**, Betzig E*. Rapid adaptive optical recovery of optimal resolution over large multicellular volumes. Nature Methods, 2014; 11: 625–628. **2014 Nobel Prize Laureate in Chemistry; Image from this study used for cover of Science, 24 Oct, 2014.*
30. Wang G, Rajpurohit S, Delaspre F, Walker F, White D, Ceasrine A, Kuruvilla R, Li R, Shim J, Liu J, Parsons M[#], **Mumm J**[#]. First quantitative high-throughput screen in zebrafish identifies novel pathways for increasing pancreatic β-cell mass. eLife, 2015; 4:e08261. *[#]Co-corresponding authors.*
31. Chan X, Black R, Dickermann K, Federico J, Levesque M, **Mumm J**, Gerecht S. Three-dimensional vascular network assembly from diabetic patient-derived induced pluripotent stem cells. Arteriosclerosis, Thrombosis, and Vascular Biology, 2015; 35:2677-85.
32. Johnson K, Bashiruddin S, Barragan J, Smith C, Tyrrell C, Parsons M, Doris R, Kucenas S, Downes G, Stein R, Vélez C, Devoto S, **Mumm J**, Barresi M. Gfap-positive radial glial cells are an essential progenitor population for later-born neurons and glia in the zebrafish spinal cord. Glia, 2016; 64: 1170–1189.
33. Fiskus W, Coothankandaswmy V, Chen J, Ma H, Ha K, Saenz D, Krieger S, Sun B, Huang P, **Mumm J**, Melnick A, Bhalla K. SIRT2 deacetylates and inhibits the peroxidase activity of peroxiredoxin-1 to sensitize breast cancer cells to oxidant stress inducing agents. Cancer Research, 2016, 76(18):5467-78.
34. White D*, Eroglu A*, Wang G*, Zhang L, Sengupta S, Ding D, Rajpurohit S, Walker S, Ji H, Qian J, **Mumm J**. ARQiv-HTS, a versatile whole-organism screening platform enabling in vivo drug discovery at high-throughput rates. Nature Protocols, 2016, 11: 2432–2453. **equal contribution*.
35. White D, Sengupta S, Saxena M, Xu Q, Hanes J, Ding D, Ji H, **Mumm J**. Immunomodulation-accelerated neuronal regeneration following selective rod photoreceptor cell ablation in the zebrafish retina. Proceedings of the National Academy of Sciences USA, 2017; 114, E3719–E3728.
36. Vergara N, Flores-Bellver M, Aparicio-Domingo S, McNally M, Wahlin K, Saxena M, **Mumm J**, Canto-Soler V. Three-dimensional automated reporter quantification (3D-ARQ) technology enables quantitative screening in retinal organoids. Development, 2017; 144:3698-3705.
37. Unal Eroglu A*, Mulligan T*, Zhang L*, White D, Sengupta S, Nie C, Lu N, Qian J, Xu L, Pei W, Burgess S, Saxena M, **Mumm J**. Multiplexed CRISPR/Cas9 Targeting of Genes Implicated in Retinal Regeneration and Degeneration.. Frontiers in Cell and Developmental Biology, 2018; 6:88. **equal contribution*
38. Asnaghi L, White DT, Key N, Choi J, Mahale A, Alkatan H, Edward DP, Elkhamary SM, Mesfer SA, Maktabi A, Hurtado CG, Lee GY, Carcaboso AM, Mumm JS, Safieh LA, and Eberhart CG. ACVR1C/SMAD2 signaling promotes invasion and growth in retinoblastoma. Oncogene. 2018; doi: 10.1038/s41388-018-0543-2. [Epub ahead of print}.

**Peer-reviewed Review Articles and Book Chapters**

1. **Mumm J**, Kopan R. Notch signaling: From the outside in. Developmental Biology. 2000; 228: 151-165.
2. Saxena M, **Mumm J**. Systematic serendipity: in vivo HTS approaches to drug discovery. Biotech International. 2012; 24: 22-24.
3. Mathias J, Saxena M, **Mumm J**. Advances in zebrafish chemical screening technologies. Future Medicinal Chemistry. 2012; 4: 1811-1822.
4. Sengupta S, Zhang L, **Mumm J**. Chemical genetics and regeneration. Future Medicinal Chemistry – Special Issue, Chemical Biology. 2015; 16: 2263-83.
5. White D, Saxena M, **Mumm J**. Let's Get Small and Smaller: Combining Zebrafish and Nanomedicine to Advance Neuro-regenerative Therapeutics. Advanced Drug Delivery Reviews. 2018; *under review*.

**Impact Metrics** (source: Google Scholar)

| Citation indices | All | Since 2014 |
|---|---|---|
| **Citations** | 7495 | 1870 |
| **h-index** | 30 | 20 |
| **i10-index** | 38 | 35 |

**Inventions, Patents, Copyrights:**

04/07/09 **Mumm J**, Schroeter E. Targeted and regional cellular ablation in zebrafish. #7,514,595.

12/06/11 **Mumm J**, Schroeter E. Targeted and regional cellular ablation in zebrafish (divisional). #8,071,838.

04/13/13 **Mumm J**, Schroeter E. Targeted and regional cellular ablation in zebrafish (divisional). #8,431,768.

04/27/18 **Mumm J**, Zhang, L. Drugs promoting retinal rod photoreceptor survival (provisional).

**Extramural Sponsorship (current, pending, previous)**

**Current:**

09/01/13 - 08/31/19
Genetic and chemical screens for factors regulating retinal regeneration (in NCE)
R01 EY022810
NIH, NEI
$1,250,000
Role: PI - 30%

07/01/14 - 10/31/18
Discovering compounds promoting rod photoreceptor survival (In NCE)
TA-NMT-0614-0643-JHU-WG
Foundation Fighting Blindness / Wynn-Gund TRAP Award
$450,000
Role: PI - 10%

01/01/16 - 12/31/20
Improved Animal Models for Cell-Specific Regenerative Medicine Paradigms
R01 OD020376
NIH, Office of the Director
$1,250,000
Role: PI - 30%

07/01/17 – 06/30/19
In vivo high throughput screen for novel modulators of Apolipoprotein B
NA
Mathers Foundation
$275,000
PI: Farber
Role: Collaborator – 5% (subaward)

07/03/18 – 07/02/20 Nodal/TGF-β pathway – new therapeutic target for retinoblastoma metastasis
R21
NIH, NCI
$275,000
PI: Asnaghi
Role: Co-Inv 5%

08/01/18 – 01/31/19 Using zebrafish to accelerate DIPG drug development
The Cure Starts Now - Snapgrant
$50,000
PI: Eric Raabe
Role:Co-investigator

11/03/18 – 11/02/19 Targeting extracellular DNA to inhibit growth and invasion in retinoblastoma
Children's Cancer Foundation
$75,000
PI: Charles Eberhart
Role:Co-investigator

11/03/18 – 11/02/19 Novel approaches to targeting the minor groove of DNA to kill DIPG tumors
Children's Cancer Foundation
$75,000
PI: Eric Raabe
Role:Co-investigator

09/30/18 – 07/31/23 High-throughput in-vivo chemical Screen for Modulators of Apolipoprotein-B
R01 DK116079
NIH/NIDDK
$1,400,000
PI: Farber
Role: Site PI/Collaborator 20%

2019 – 2021 Rapid and Agile Multi-Photon Optical Imaging Over Large Neural Volumes
R21EY030011
NIH
$300,000
PI: Mark Foster
Role: Co-investigator

07/14/17 – ongoing Maryland E-Nnovation Initiative Program
Helen Larson and Charles Glenn Grover Professor of Ophthalmology
Helen Larson and Charles Glenn Grover Estate
$80,000 (approximate annual revenue)
Role: PI – 20%

**Pending:**

2019 - 2023 Investigating the Role of the Innate Immune System in Retinal Regeneration
R01EY026580
NIH, NEI
$1,250,000
Role: PI 30%

2019 – 2023 Evaluation of a pan-disease immune-targeted therapeutic strategy for promoting neuroprotective and regenerative outcomes in the diseased retina.
N/A
Foundation Fighting Blindness / Program Project Grant
$3,000,000
Role: Project leader/PI

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| 2019 | ARQivAST, an integrated instrument system enabling large-scale organoid/whole-organism phenotypic screening at high-throughput rates<br>S10OD026909<br>NIH, Office of the Director<br>$1,820,983<br>Role: PI |
| 2019 – 2023 | Stimulating Retina Regeneration from Muller Cells in Progressive Retinal Degenerations<br>R01EY030574<br>NIH, NEI<br>$1,250,000<br>PI: Brian Perkins<br>Role: Co-investigator |

**Previous:**

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| 04/01/02 - 03/31/04 | In vivo time-lapse imaging of retinal synaptogenesis<br>F32 EY14084<br>NIH/NEI<br>$93,000<br>Role: PI 100% |
| 07/01/04 - 12/31/05 | Targeted cellular ablation in transgenic zebrafish<br>R43 HD047089<br>NIH/NICHD<br>$71,429<br>Role: PI 75% |
| 04/01/07 - 03/31/10 | Transgenic models for degenerative & regenerative research in zebrafish<br>R44 HD047089<br>NIH/NICHD<br>$1,138,108<br>Role: PI 67% (*Grant transferred to Dr. M. Saxena upon assuming position at GRU*) |
| 09/01/08 - 05/31/11 | New transgenic tools for studying neural circuit formation<br>R21 MH083614<br>NIH/NIMH<br>$275,000<br>Role: PI 40% |
| 02/01/10 - 01/31/12 | Neuronal regeneration mechanisms in the retina<br>5-FY10-7<br>March of Dimes, Basil O'Connor Starter Scholar Research Award<br>$136,364<br>Role: PI 5% |
| 04/01/10 - 03/31/12 | Motor neuron disease modeling in zebrafish<br>R43 NS067916<br>NIH/NINDS<br>$153,870<br>PI: Mathias JR<br>Role: Co-PI 5% |
| 04/01/10 - 03/31/12 | Novel model system for monitoring multiple diabetic complications in tandem<br>12GHSU209<br>NIH/NIDDK, Diabetic Complication Consortium<br>$55,000<br>Role: PI 20% |
| 08/31/10 - 08/30/13 | High-throughput screen for FDA-approved drugs increasing β-cell mass in vivo<br>RC4 DK090816 |

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| | NIH/NIDDK<br>$1,858,678<br>PI: Parsons MJ<br>Role: Co-I 10% |
| 12/01/11 - 06/30/14 | Genetic circuitry of photoreceptor regeneration in the zebrafish retina<br>F31 EY021713<br>NIH, NEI<br>$82,000<br>PI: Walker ST<br>Role: Mentor 0% |
| 08/01/14 - 08/01/16 | Robotic whole organism HTS platform for drug discovery and development<br>R41 TR000945<br>NIH/NCATS<br>$225,000<br>Role: PI 5% |
| 03/01/15 - 02/28/16 | Optimized Human iPS Cell-Derived Mini-Retina System for Improved Degenerative Disease Modeling, Biomarker Discovery and HTS Drug Development<br>NA<br>Falk Medical Research Trust – 2015 Catalyst Research Program<br>$500,000<br>Role: Co-I 20% |
| 07/01/15 - 06/30/17 | Novel drug discovery platform for identifying choroideremia therapeutics<br>NA<br>Choroideremia Research Foundation<br>$300,000<br>Role: PI - 20% |
| 01/01/16 - 12/31/17 | Autophagy phenotypic screen<br>NA<br>Bayer HealthCare Pharmaceuticals<br>$331,395<br>Role: PI - 10% |
| 07/01/17 – 06/30/18 | Postdoctoral Fellowship<br>T32 EY7143-22<br>NEI – Vision Science Training Program<br>$45,444 (salary support for Dr. David White)<br>PI: Donald Zack (Program Director)<br>Role: Mentor |
| 09/15/14 - 09/14/18 | Discovery of FDA-approved drugs that promote retinal cell survival or regeneration (in NCE)<br>MR 130301 / GRANT11576494 / PD52904<br>DoD, Clinical and Rehabilitative Medicine Research Program (VRP-TRA)<br>$617,000<br>Role: PI - 10% |

**Research Program Building / Leadership**

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| 07/04 - 10/07 | President/Research Director, Luminomics Inc. Founder of a biotechnology start-up company focused on creating HTS-ready degenerative disease models facilitating whole-organism HTS drug discovery. I invented and patented the core technologies of Luminomics; a system that extends regenerative biology research to cell-specific paradigms, thus to a variety of degenerative disease models. |
| 01/18 – pres. | Co-director, Functional INvestigation in Zebrafish (FINZ) Core Center, Johns Hopkins University |

## EDUCATIONAL ACTIVITIES

### Educational Publications

Book Chapters, Monographs

1. Calof, A.L., M.D. Adusumalli, M.K. DeHamer, J.L. Guevara, J.S. Mumm, S.J. Whitehead and A.D. Lander (1994). Generation, differentiation and maturation of olfactory receptor neurons in vitro. In: Olfaction and Taste XI. K. Kurihara, N. Suzuki and H. Ogawa, Eds., Springer Verlag, Tokyo. pp. 36-40.
2. Calof A, **Mumm J**, Rim P, Shou J. In vitro analysis of neuronal progenitors from mouse olfactory epithelium. In: The Neuron in Tissue Culture (IBRO Handbook Series: Methods in the Neurosciences). 1999; 18: 23-44. L.W. Haynes, Ed. (Wiley).
3. Kopan R, Huppert S, **Mumm J**, Saxena M, Schroeter E, Ray W, Goate A (2001). The NEXT step in Notch processing and its relevance to Amyloid Precursor Protein. In: Research and Perspectives in Alzheimer's Disease, Neurodegenerative Disorders: Loss of Function Through Gain of Function. 2001; 119-128. K. Beyreuther, Y. Christen, and C.L. Masters, Eds. (Springer-Verlag).
4. Lohmann C, **Mumm J**, Godinho L, Schroeter E, Stacy R, Wong W, Oakley D, Wong R. Imaging the Developing Retina. In: Imaging in Neuroscience and Development, A Laboratory Manual. 2005; Ch. 21: 171-183. R. Yuste, and A. Konnerth, Eds. (Cold Spring Harbor Laboratory Press).
5. **Mumm J**, Lohmann C. Dendritic growth. In: Retinal Development. 2006; Ch. 12: 242-264. E. Sernagor, S. Eglen, W. Harris, and R. Wong, Eds. (Cambridge University Press).

Other media (films, videos, CD-ROMS, slide sets, etc)

1. Bird J, and **Mumm J**. Developmental Origins of the Eye. 2011: Digital animation of the major steps in vertebrate eye formation. 2011 © Joshua C. Bird.

### Teaching

Course Co-Director

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|---|---|
| 2017 - | Cellular and Molecular Biology of Photoreceptors in Health and Disease Course<br>Taught yearly to ~15 graduate students, postdoctoral fellows, and trainees, Ophthalmology Dept., Johns Hopkins University |
| 2017 - | Principles of Developmental Biology, course lecturer |
| 2018 - | CMM Core Discussions, course preceptor |
| 2019 - | Molecular Mechanisms, course preceptor |

Classroom instruction

*Science Outreach*

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| 2008- | Project BioEYES, Coordinator and Instructor, K/12 Science outreach program , weeklong course in basic genetic principles. |

*School of Medicine*

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| 2008-2013 | First year medical student lectures series - Nervous system module, lecturer, "Genetics and Diseases of Eye Development," "Genetics and Diseases of Ear Development," given yearly to ~150 first year medical students, Augusta University |

*Graduate Studies*

2008-2013 Molecular Cell Biology Course, lecturer, "Stem Cells," given yearly to ~35 graduate students, Augusta University

2008-2013 Integrative Systems Biology Course, lecturer, "Sensory Systems," given yearly to ~35 graduate students, Augusta University

2011-2013 Current Topics in Vision Science Course, Co-course Director & lecturer, "Regenerative Therapeutics," given yearly to ~15 graduate students, postdoctoral fellows, and trainees, Augusta University

2011-2013 Fundamentals of Vision Science Course, lecturer, "Genetics of Eye Development," given yearly to ~15 graduate students, postdoctoral fellows, and trainees, Augusta University

2012-2013 Regenerative Medicine Advanced Seminar Course, lecturer, "Cell-specific Regeneration" given yearly to ~15 graduate students, postdoctoral fellows, and trainees, Augusta University

2012-2013 Development and Disease Course, lecturer, "Developmental Models," "Regenerative Biology Models," given yearly to ~15 graduate students, postdoctoral fellows, and trainees, GRU

2014- Cellular and Molecular Biology of Photoreceptors in Health and Disease Course, lecturer, "The zebrafish as a model for retinal degenerative disease," given yearly to ~15 graduate students, postdoctoral fellows, and trainees, Ophthalmology Dept., Johns Hopkins University

2016- Developmental Biology Course, lecturer, "Development of the Eye and Ear" graduate school elective given every 1-2 years, Johns Hopkins University

Workshops / seminars (JHU)

Wilmer FARM Seminar Series (Jan 2014)

BALZEE Seminar Series (Carnegie Institute, Feb 2014)

IGM Seminar Series (Sept 2014)

Cell Biology Seminar Series (Mar 2015)

**Mentoring**

Advisees

*Postdoctoral Fellows*

2008-2013 Jonathan Mathias, Ph.D., (co-mentor, Dr. Meera Saxena), currently Medical Writer at Cambridge BioMarketing , Boston, MA.

2009-2011 Wendy Kuhne, Ph.D., (co-mentor, Dr. William Dynan), currently, Senior Scientist, DOE - Savannah River National Laboratory, Aiken, SC.

2009-2013 Yong Teng, Ph.D., (co-mentor, Dr. John Cowell), currently Assistant Professor, Biochemistry, Augusta University, Augusta, GA (formerly Medical College of Georgia)

2010-2012 Lahcen Jaafar, Ph.D., (co-mentor, Dr. William Dynan), currently Research Associate, Radiation Oncology, Emory School of Medicine, Atlanta, GA.

2012-2013 Surendra Rajpurohit, Ph.D., currently Postdoctoral Fellow, Cancer Research Center, Augusta University, Augusta, GA (formerly Medical College of Georgia)

2014-2015 Mathieu Levesque, Ph.D., (co-mentor, Dr. Steven Leach), currently Postdoctoral Fellow, CHU Saint-Justine, Montreal, Canada.

2014- Sumitra Sengupta, Ph.D., Wilmer Eye Institute, Johns Hopkins University

2014- Liyun Zhang, Ph.D., Wilmer Eye Institute, Johns Hopkins University

2014- Arife Unal Eroglu, Ph.D., Wilmer Eye Institute, Johns Hopkins University

2015-16 Guangliang Wang, Ph.D., (co-mentor, Dr. Michael Parsons), currently Investigator at Novartis Institute for Biology Research, Boston, MA.

2015-16 Guohua Wang, Ph.D., (co-mentor, Dr. Jiang Qian), Wilmer Eye Institute, Johns Hopkins University, currently Professor at Harbin Institute of Technology, China.

2015- David White, Ph.D., Wilmer Eye Institute, Johns Hopkins University

2016- Timothy Mulligan, Ph.D., Wilmer Eye Institute, Johns Hopkins University

*Graduate Students*

2007-12 Junko Ariga, Ph.D., currently drug representative Glaxo Smith Kline, Japan. Awarded Excellence in Research Award - Neuroscience Program (2012).

2007-14 Steven Walker, Ph.D., currently postdoctoral fellow at the Chinese University of Hong Kong, Department of Neurodegeneration, Development and Repair. Awarded NRSA Predoctoral Training Fellowship (2011-2014), Excellence in Research Award – CB&A Program (2013), 6th Asia Oceana Zebrafish Conference Poster Award (2014).

2010-15 David White, Ph.D., currently postdoctoral fellow at Johns Hopkins University. Awarded Best Poster, Spring 2015 Mid-Atlantic Zebrafish Meeting (MARZ).

2017-18 Hannah Edelman, Ph.D. candidate, Human Genetics, Committee member, JHU (Co-mentor)

*Thesis Committees*

2007-2012 Junko Ariga, Ph.D., Neuroscience, Advisor, Augusta Univ.

2007-2014 Steven L. Walker, Ph.D., Cellular Biology & Anatomy, Advisor, Augusta Univ.
*Postdoctoral Fellow, Chinese University of Hong Kong, School of Biomedical Sciences*

2008-2011 Preethi Ganapathy, Ph.D., Cellular Biology and Anatomy, Committee member, Augusta Univ.

2008-2011 Michael Dinkins, Ph.D., Cellular Biology & Anatomy, Committee member, Augusta Univ.

2010-2015 David White, Ph.D., Neuroscience, Advisor, Augusta Univ.
*Postdoctoral Fellow, Johns Hopkins Univeristy*

2010-2011 Joshua Bird, M.S., Medical Illustration, Co-advisor, Augusta Univ.

2010-2013 Mallikarjun Patil, Ph.D., Cellular Biology & Anatomy, Committee member, Augusta Univ.

2010-2014 Arnab Barik, Ph.D., Neuroscience, Committee member, Augusta Univ.

2011-2013 Daniel Linder, Ph.D., Biostatistics, Committee member, Augusta Univ.

2012-2015 Wenting Du, Ph.D., Physiology, Committee member, Augusta Univ.

2012-2015 Jeonifer Garren, Ph.D., Biostatistics, Committee member, Augusta Univ.

2015-2018 Hannah Edelman, Ph.D. candidate, Human Genetics, Committee member, JHU

2015-2018 Jay Thierer, Ph.D. candidate, Neuroscience, Committee member, JHU

*Medical Students - Summer Research Mentor*

2008 summer Scott Berl, M.D., currently private practice, Lexington, KY.

2010 summer Padraic Chisholm, M.D., currently M.D., Ob. Gyn., Edinburg, TX.

2012 summer Amir Makhmalbaf, M.D.,; currently private pratice, Mineola, NY.

2013 summer Benjamin Harper, M.D., currently Resident, Augusta University, Augusta, GA.

*Undergraduate Students*

2014-16 Katherine Le, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Attending Dental School, University of California, San Francisco*

2014-15 Maria Wang, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Program Specialist at Cystic Fibrosis Foundation*

2014-15 Aurel Malapani, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.

2014-17 Conan Chen, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Currently attending University of Colorado Medical School, Aschutz Campus, Denver, CO.*

2015-16 Jeffrey Nelson, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Legal intern at Fordham University School of Law*

2015-17 Christopher Hurtado, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Obtained MHS, now a Research Analyst at Bloomberg School of Public Health*

2015-16 Alberto Rodriguez, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Attending Icahn School of Medicine, Mount Sinai*

2015-16 Morgan McCarthy, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Research Intern at National Oceanic Atmospheric Administration*

2015-16 Alexander Koo, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.

2015-16 Carolina Chu, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Research Assistant at Johns Hopkins*

2016-18 Noela Lu, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2017-18 Cathy Nie, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2017-18 Karen Sun, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2017-19 Zakiya Carter, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2017- Grace Lee, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Admitted to Master of Biomedical Sciences (MBS) program, Duke University School of Medicine*
2017- Naveena Murugan, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2017- Robert Kim, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2017- Ben Bich, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2017- Sarah Baghdadi, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
*Awarded Woodrow Wilson Fellowship 2019-2020*
2018- Lily Chen, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.
2018- Emilie Cheng, Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD.

*Summer Science Outreach Programs & High School Student Volunteers*
2008 Project BIOEYEs, A.R. Johnson Health Science and Engineering Magnet School, Augusta, GA.
2009 Jillian Carter, currently graduate student, Georgia Regents University, Augusta, GA.
2011 Weiqing Wang, currently graduate student, Mount Sinai, New York, NY.
2015 Matthew Shou, Johns Hopkins Center for Talented Youth (CTY), Baltimore, MD.
2015 William Brown, Johns Hopkins Summer Jobs Program, Baltimore, MD.
2015 Stephaney Wilson, Volunteer, Baltimore, MD.
2016 Tiana Thompson, Diversity and Academic Advancement Summer Institute (DAASI), Baltimore, MD.
2016 Erica Duh, Volunteer, Baltimore, MD.
2016 Matthew Shou, Volunteer, Baltimore, MD.
2016 &17 Brianna Leith, Volunteer, Baltimore, MD.
2017 Neha Damaraju, Volunteer, Alexandria, VA.
2017 Zarkia Key, Building STEPs Program, Baltimore, MD.
2018 Bryant Williams, Building STEPs Program, Baltimore, MD.
2018 Makeila Williams, BioSTART and Lab Associates Program, BioTechnical Institute of Maryland, Inc

Training grant participation
2014- Wilmer Eye Institute, Johns Hopkins University
2014- Institute of Genetic Medicine, Johns Hopkins University
2014- Neuroscience Program, Johns Hopkins University
2016- Cellular & Molecular Medicine, Johns Hopkins University

**Educational Program Building/Leadership -** None

**Educational Extramural Funding** (current, pending, previous) **-** None

**CLINICAL ACTIVITIES -** None
**SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES -** None

## ORGANIZATIONAL ACTIVITIES

**Institutional Administrative Appointments**
2008-13 Coordinator, Vision Discovery Institute Group Meeting Series (Medical College of Georgia, MCG)
2008-13 Internal Review Board Member, Vision Discovery Institute (MCG)
2009 Member, Search committee, Faculty, Developmental Neurobiology Program (MCG)
2011 Member, Search committee, Associate Vice President for Technology Transfer (MCG)
2011 Member, Search committee, Faculty, Department of Cellular Biology & Anatomy (MCG)
2012 Co-Chair, Young Research Faculty Roundtable (MCG)

2013-14 Cellular Biology & Anatomy Graduate Student Council (MCG)
2014-ongoing Wilmer Science Seminar Series Board
2015- ongoing Wilmer Pooled Professors Fund Study Section Member
2016 Deans Basic Science Investigation Task Force
2017-ongoing Wilmer Microscopy and Imaging Core Advisory Committee
2017- ongoing Wilmer Trainee Advisory Council
2018- ongoing Wilmer Faculty Recognition Committee
2018- ongoing Director, Center for Functional INvestigation in Zebrafish (FINZ)
2018- ongoing Member, M.D./Ph.D. Admission Committee
2018- ongoing Member, Wilmer Annual Research Meeting Organizing Committee
2018- ongoing Member, Wilmer K08 Review Committee

**Editorial Activities**

Editorial Board appointments - None
Journal Reviewer (in chronological order from first instance):
Journal of Neuroscience, Proceedings National Academy of Sciences, Investigative Ophthalmology and Visual Science, Zebrafish, Gene Expression Patterns, Journal of Neurochemistry, PLoS ONE, Journal of Visualized Experiments, Future Medicinal Chemistry, Cellular & Molecular Neurobiology, Nature - Scientific Reports, Neural Development, JSN Neurosurgery & Spine, Journal of Neurogenetics, Cell

**Advisory Committees, Review Groups/Study Sections**

2010 NIH, ad hoc: Molecular, Cellular and Developmental Neurobiological (SBIR/STTR)
2011 NIH, ad hoc: Special Emphasis Panel/SRG
2012 NIH, ad hoc: Sensory Technologies (ETTN-12)
2012 NIH, ad hoc: Molecular and Cellular Neuroscience (ETTN-13)
2014 NIH, ad hoc: Special Emphasis Panel/BRAIN (ZMH1 ERB-L)
2014 NIH, ad hoc: Special Emphasis Panel/Aging Cell Biology (ZRG1 CB-C)
2014-ongoing JHU, Wilmer Eye Institute, Pooled Professor's Fund Review Panel
2015 JHU, KKESH, Wilmer Eye Institute
2016 NIH, ad hoc: Special Emphasis Panel /MIRA Early Investigators (ZRG1 CB L 50)
2016 NIH, NEI, Retina Organoid Challenge Competition Focus Group
2016 JHU, Discovery Award
2016 Mitacs Accelerate Research Program (Canada)
2016 Velux Stiftung Award (Switzerland)
2017 NIH, ad hoc: Special Emphasis Panel /MIRA Early Investigators
2018 NIH, ad hoc: P30 panel
2019 NIH, ad hoc, NIH Director's Transformative Research Award

**Professional Societies**

1995-2004 Member, Society for Neuroscience (SfN)
2007- Member, Association for Research in Vision and Ophthalmology (ARVO)
2007- Member, American Association for the Advancement of Science
2015- Member, Genetics Society of America
2016- Member, International Zebrafish Society

**Conference Organizer, Session Chair**

2015 Organizer, Mid-Atlantic Regional Zebrafish Meeting (MARZ), Fall 2015, Baltimore, MD
2016- Organizer, Baltimore Zebrafish Enthusiasts Meetings (BALZEE)

**Consultant**

2007- Luminomics Inc., Board of Directors, Chief Scientific Consultant
2009-2011 Physical Sciences Inc., Consultant SBIR/STTR awarded grant application

## RECOGNITION

### Awards, Honors

| | |
|---|---|
| 1997-1998 | Predoctoral Fellowship, Lucille P. Markey Pathway in Human Pathobiology, Washington University, St. Louis |
| 1999 | Viktor Hamburger Award for Excellence in Developmental Biology Research, Washington University, St. Louis |
| 2000 | James L. O'Leary Prize for Research in Neuroscience, Washington University, St. Louis |
| 2001 | Harold M. Weintraub Award for Outstanding Achievement during Graduate Studies, University of Washington, Seattle |
| 2002 | Olin Cup for Excellence in Entrepreneurial Business Development, Washington University, St. Louis |
| 2002-2004 | NRSA Postdoctoral Research Fellowship Award, National Eye Institute |
| 2004 | Olin Cup for Excellence in Entrepreneurial Business Development, Washington University, St. Louis |
| 2010 | Basil O'Conner Starter Scholar Research Award, March of Dimes Foundation |
| 2011 | Tecan Award for Innovation and Ingenuity, Tecan Inc., Switzerland |
| 2014-18 | Wynn-Gund TRAP Award, Foundation Fighting Blindness, Baltimore. |
| 2015 | Discovery Award, Johns Hopkins University, Baltimore |
| 2017 | Maryland E-Nnovation Initiative Fund (MEIF) Endowed Professorship Award, Baltimore |
| 2017 | Helen Larson and Charles Glenn Grover Professorship in Ophthalmology |

### Invited Lectures, Panels, Workshops

2001 Harold M. Weintraub Graduate Student Award, *"Biochemistry of Notch Signaling: regulation by proteolysis and oligomerization state."* University of Washington, Seattle, WA.

2003 23rd Summer School of Brain Research: Development, Dynamics, and Pathology of Neuronal Networks, *"Forming neuronal circuits: in vivo imaging of a synaptic partnership in the zebrafish retina."* Royal Netherlands Academy of Arts and Sciences, Amsterdam, Netherlands.

2006 Vision Training Grant Series, Wilmer Eye Institute, Johns Hopkins, *"In vivo imaging of neuronal circuit formation in the zebrafish retina: dendritic targeting."* Baltimore, MD.

2007 Pacific Ocular Regenerative Biology Conference XII, *"High throughput in vivo models for the genetic dissection of retinal regeneration."* Laguna Beach, CA.

2009 Department of Biological Sciences, *"Cell-type specific regeneration in the zebrafish retina."* Purdue University, Indianapolis, IN.

2009 Institute of Developmental Genetics, GSF, *"Regulation of neuronal regeneration in the retina: targeted cell ablation studies in zebrafish."* Neuherberg-Munich, Germany.

2013 Vision Research Seminar at the Kellogg Eye Center, *"Reciprocal modulations of Wnt signaling enhance regeneration kinetics in the zebrafish retina."* University of Michigan, Ann Arbor, MI.

2013 Wynn-Gund TRAP Meeting - Foundation Fighting Blindness, *"Novel drug discovery platform for identifying compounds promoting rod photoreceptor survival – systematic serendipity."* Las Vegas, NV

2013 Department of Pharmacology, *"Quantitative high-throughput screening in zebrafish: drug discovery for regenerative biology."* Emory University, Atlanta, GA.

2013 Keynote Lecture, Annual Conference of German Genetics Society, *"Classical and chemical genetic investigations of cell-specific regeneration in the retina."* Braunschweig, Germany.

2014 Wynn-Gund TRAP Meeting - Foundation Fighting Blindness, *"Novel drug discovery platform for identifying compounds promoting rod photoreceptor survival."* Las Vegas, NV

2015 Wilmer/Bayer HealthCare Partnership Meeting, *"Zebrafish-ing Expeditions: Whole-organism HTS for Drug Discovery".* Wutterpal, Germany

2016 University of Maryland, Baltimore County, Department of Biological Sciences *"Neuroimmune modulation of retinal regeneration"*. Baltimore, MD.

2016 Wynn-Gund TRAP Meeting - Foundation Fighting Blindness, *"Novel drug discovery platform for identifying compounds promoting rod photoreceptor survival."* Baltimore, MD.

2016 University of Pittsburgh, 6th Annual International Conference on Vision Restoration: Regenerative Medicine in Ophthalmology, *"Innate immune system regulation of retinal regeneration"*. Pittsburgh, PA.

2016 University of Macau, School of Health Sciences. "Whole-organism high-throughput drug screening: fishing for new therapies". Taipa, Macau SAR.
2016 The Chinese University of Hong Kong, School of Biomedical Sciences, *"Whole-organism high-throughput drug screening: fishing for new therapies"*. Hong Kong, China.
2017 Wynn-Gund TRAP Meeting - Foundation Fighting Blindness, "*Novel drug discovery platform for identifying compounds promoting rod photoreceptor survival*." Atlanta, GA.
2017 20th Anniversary MBL Zebrafish Course Symposium, "*Innate immune system regulation of neuronal regeneration*." Marine Biological Laboratory, Woods Hole, MA.
2018 University of Colorado, Dept. of Ophthalmology, Vision Science Seminar, "*Big Science" in a tiny fish: large-scale chemical and genetic screens for regulators of retinal degeneration and regeneration*" Denver, CO
2018 University of Pittsburgh, Louis J Fox Center for Vision Restoration Workshop, "*Large-scale Chemical & Genetic Dissection of Retinal Degeneration and Regeneration.*" Pittsburgh, PA.
2018 Victoria University, School of Biological Science, *"Big Science" in a tiny fish: large-scale chemical and genetic dissection of cellular degeneration and regeneration in the zebrafish retina"* Wellington, New Zealand.
2019 11th Annual the Ryan Initiative for Macular Research (RIMR) Conference, *"Cellular and Molecular Therapeutics (for AMD)"* Workshop, Doheny Eye Institute, Newport Beach, CA.
2019 2nd Retina, Neural Stem Cells, and Photoreceptor Degeneration Workshop. *"Title tbd"* Okinawa Institute of Science and Technology Gradate University, Okinawa, Japan.
2019 4th Zebrafish for Personalized and Precision Medicine (ZPPM) Conference. *"HTS-ready Degenerative Disease Modeling in Zebrafish."* Toronto, Canada.

**Oral Presentations - Conferences**

2004 6th International Conference on Zebrafish Development & Genetics, *"Imaging synaptic layer formation in the zebrafish retina."* Madison, WI.
2008 EMBO Series: Regeneration and Tissue Repair. *"Cell-type specific regeneration in zebrafish."* Palma de Mallorca, Spain.
2009 3rd Strategic Conference of Zebrafish Investigators, *"Cell-type specific neuronal regeneration in the zebrafish retina."* Asilomar, CA.
2009 Mechanisms of Organ Regeneration in Model Systems, *"Molecular regulation of retinal neuron regeneration in zebrafish."* Baeza, Spain.
2010 9th International Conference on Zebrafish Development & Genetics, *"'Silencer' delimited trapping: neuronal-specific transgene expression via NRSE sequences."* Madison, WI.
2011 4th Strategic Conference of Zebrafish Investigators, *"NRSE delimited transgenesis promotes dissection of neural circuit function and regeneration."* Asilomar, CA.
2012 10th International Conference on Zebrafish Development & Genetics, *"Reciprocal Wnt modulations improve cell-specific regeneration kinetics in the zebrafish retina."* Madison, WI.
2013 5th Strategic Conference of Zebrafish Investigators, *"Extent of cell loss informs the regenerative response inducing cell-specific or developmental repair."* Asilomar, CA.
2014 2nd International Scientific Symposium - Choroideremia Research Foundation, *"Quantitative HTS in zebrafish: a whole-organism screening approach to drug discovery."* Denver, CO.
2016 Tissue Niches & Resident Stem Cells in Adult Epithelia, Gordon Research Conference, *"Innate immune system regulation of retinal regeneration".* Hong Kong, China.
2016 XXII Biennial Meeting of the International Society for Eye Research, "Neuroimmune regulation of retinal regeneration". Tokyo, Japan.
2017 7th Strategic Conference of Zebrafish Investigators, "*Immunomodulation-accelerated retinal regeneration: innate immune system regulation of photoreceptor replacement kinetics in zebrafish*." Asilomar, CA.
2017 ARVO Mini-Symposium on Anterior Eye Research, "*Intravital imaging of the zebrafish cornea*." Baltimore, MD.
2019 Plenary Speaker, 4th Zebrafish for Personalized & Precision Medicine Conference, "*HTS-ready Degenerative Disease Modeling in Zebrafish*." Toronto, Canada.
2019 Plenary Speaker, 8th Strategic Conference of Zebrafish Investigators, "*Improved Nitroreductase Cell Ablation System.*" Asilomar, CA.

**OTHER PROFESSIONAL ACCOMPLISHMENTS**

| | |
|---|---|
| 2011 | Friends of Vision/Vision Discovery Institute Fundraiser - Keynote Presentation<br>"Restoring Vision, Restoring Hope."<br>Resulted in $500,000 donation to VDI |

Press Coverage

| | |
|---|---|
| 02/16/11 | Augusta Chronicle, "Fish eyes might hold cures to blindness". |
| 02/11/11 | Tecan Journal , "A plate of live fish". |
| 01/04/12 | ScientistLive, "Drug screening assays in living zebrafish disease models". |
| 01/17/12 | European Pharm. Rev., "Tecan's Infinite® M1000 and a plate of live fish!" |
| 01/17/12 | Bio-Medicine, "Zebrafish may help speed drug discovery". |
| 01/19/12 | WRDW-TV Channel 12, "Zebrafish helping GHSU scientist make quicker drug discoveries". |
| 01/17/12 | LabSpaces, "Zebrafish may help speed drug discovery". |
| 01/18/12 | Scicasts, "Zebrafish Speeding Drug Discovery". |
| 01/25/12 | Augusta Chronicle, "Tiny fish could speed up drug development". |
| 10/24/14 | Cover of Science, Innovations in imaging (collaboration with Dr. Eric Betzig). |
| 08/18/15 | ScienceDaily, FirstWord Pharma, MDLinx, EurekAlert, Inomics, Home Care News, BrightSurf, Today Topics, One Day to Health, Digital News World, etc., "Scientists report success using zebrafish embryos to identify potential new diabetes drugs" – source, Johns Hopkins Medicine. |
| 08/19/15 | Fierce Biotech Research, "Johns Hopkins team uses zebrafish to develop a new drug screening tech". |
| 08/20/15 | The Latest News, "Zebrafish Embryos Testing Used to Identify Potential New Diabetes Drugs". |
| 08/20/15 | Yahoo News, "Zebrafish embryos used to identify potential new diabetes drugs". |
| 07/17/17 | ScienceDaily, "Immune system found to control eye tissue renewal in zebrafish". |
| 07/17/17 | Life Extension Advocacy Foundation, "Altering Microglia Types to Combat Degenerative Eye Diseases". |
| 11/12/18 | ScienceDaily, Newsroom "Spread of Deadly Eye Cancer Halted in Cells and Animals" – source, Johns Hopkins Medicine. *By comparing genetic sequences in the eye tumors of children whose cancers spread with tumors that didn't spread, researchers report new evidence that a domino effect in cells is responsible for the cancer spreading.* |