

Y. Albert Pan

Associate Professor
Virginia Tech Carilion Research Institute
2 Riverside Circle, R-2006, Roanoke, VA 24016
email: yapan@vtc.vt.edu

Education

Washington University School of Medicine, St. Louis, MO

Ph.D. Neural Development, 2005

National Taiwan University, Taipei, Taiwan

B.S. Zoology, 2000

Dean's list graduate

Positions and Employment

Virginia Tech Carilion School of Medicine and Research Institute, Roanoke, VA (2017-present)

Associate Professor, Developmental and Translational Neurobiology Center, Virginia Tech Carilion Research Institute

Associate Professor, Department of Biomedical Research, Virginia Tech Carilion School of Medicine

Commonwealth Center for Innovative Technology Eminent Research Scholar in Developmental Neuroscience, Virginia Tech Carilion Research Institute

Medical College of Georgia, Augusta University, Augusta, GA (2013-2017)

Assistant Professor, Department of Neuroscience and Regenerative Medicine, Department of Neurology

Co-Director, Department of Neuroscience and Regenerative Medicine Microscopy Facility

Co-Director, Transgenic Zebrafish Core Laboratory

Affiliate, James & Jean Culver Vision Discovery Institute

Research Training

Harvard University, Cambridge, MA

Postdoctoral Fellow, Department of Molecular and Cellular Biology, Supervisor: Dr. Alexander Schier. 2006-2013

Postdoctoral Fellow, Center for Brain Science, Supervisor: Dr. Joshua Sanes. 2005

Washington University School of Medicine, St. Louis, MO

Graduate Student, Department of Anatomy and Neurobiology, Supervisor: Dr. Joshua Sanes. 2000-2005

Teaching Experience

Augusta University, Augusta, GA

Supervisor, Undergraduate Research (BIOL2990C, Spring 2016)

Small Group Facilitator and Faculty Lead, MEDI-Phase-1 Medical Neuroscience Module (MEDI5174, Spring 2015, 2016)

Small Group Facilitator, MEDI-Phase-1 Head Neck and Special Senses Module (MEDI5169, Spring 2016)

Lecturer, Fundamentals of Vision Science (ANAT8030, Spring 2014, 2016)

Lecturer, Molecular Medicine Journal Club (MOL9040, Spring 2014)

Lecturer, Intro to Faculty Research (COGS8040, Fall 2013, 2014)

Harvard University, Cambridge, MA

Teaching Assistant, Microbial Sciences Initiative (MSI) Microscopy Workshop, 2011

Marine Biological Laboratory, Woods Hole, MA.

Teaching Assistant, Zebrafish Development and Genetics Course, 2009

Washington University, St. Louis, MO

Teaching Assistant, Principles of Neuroscience (BIO 3411), 2001

Students Mentored

Caroline Smith – Mercer University, undergraduate student, 2016

Natalie Dixon – Augusta University, M.D. student, 2016

Avirale Sharma – Augusta University, undergraduate student, 2015-2016

Christopher Kuang – Augusta University, M.D. student, 2015

Kristin Ates – Augusta University, M.D./Ph.D student, 2015-present

Rachel Roberts – Augusta University, M.S. student, 2015-2017

David White - Augusta University, Ph.D student, 2013-2015 (co-mentor with Jeff Mumm, Ph.D)

Tom Freundlich – Harvard University, M.D./Ph.D student from Paris-Descartes Medical School, 2010-2011

Cindy Wang – Harvard University, undergraduate student, 2009-2010 (currently Ph.D. student at University of California, Berkeley)

Postdoctoral Fellow Mentored

Stanislav Kler, Ph.D – Augusta University, 2014-present

Manxiu “Michelle” Ma, Ph.D – Augusta University, 2014-present

Tong Wang, Ph.D– Augusta University, 2014-2017

Ongoing Research Support

R01 EY024844 (Pan)

08/14-06/19

NEI/NIH

Mapping Neural Circuits with Transsynaptic Virus

The goal of this project is to develop virus-based tools to identify and investigate zebrafish neural circuitry important for visual perception. These tools will enable rapid and systematic characterization of neural circuits underlying essential visual behaviors and provide insights to how circuit structure and function affect human disease.

Role: PI

Award Amount: \$250,000 direct cost/year

R21 GM119016 (Pan, Gonsalvez)

05/16-04/18

Office of the Director/NIH

Using Cell, Fly, and Zebrafish Models to Understand FAM109A Gene Function in Undiagnosed Disease

The goal of this project is to develop cell and animal models of an undiagnosed human disease caused by mutation in the FAM109A gene. This project is in support of the NIH Undiagnosed Disease Network.

Role: Co-PI

Award Amount: \$150,000 direct cost/year

ER14S-001-LS (Pan)

07/17 – 06/18

Center for Innovative Technology

Recruitment of an Eminent Researcher in Translational Neurobiology

This extramural research support will be used to purchase equipment, renovate lab space, and support laboratory personnel and start-up operations for Dr. Pan at Virginia Tech.

Role: PI

Award Amount: \$250,000 direct cost/year

Honors

- 2010 First place, Marine Biological Laboratory (MBL) Photomicrography Contest
- 2009 Image of Distinction, Nikon Small World Photomicrography Competition
- 2008 Fourth place, Olympus Bioscapes Digital Imaging Competition
- 2007 Ruth L. Kirschstein National Research Service Awards for Individual Postdoctoral Fellow
- 2005 Finalist, Upstate Young Cell Signaler Award
- 2004 Ruth L. Kirschstein National Research Service Awards for Individual Predoctoral Fellow
- 2001 Honorable Mention, National Science Foundation Graduate Fellowship

Conference Talks

“Neuronal connectivity analysis of wild-type and mutant zebrafish with transsynaptic virus and 3D brain mapping” The 4th Imaging Structure and Function in the Zebrafish Brain Conference, Max Planck Institute of Neurobiology, Martinsried, Germany, 2016

“Structural and functional mapping of zebrafish visual circuits with transsynaptic virus and calcium imaging.” 6th Strategic Conference of Zebrafish Investigators, Pacific Grove, CA, 2015

“Brainbow: Tools and Applications.” Recombinase-Based Genome Editing and Lineage Tracing Workshop, 11th International Conference on Zebrafish Development and Genetics, Madison, WI, 2014

“Viral tools for mapping the zebrafish brain” Emerging Techniques in Neural Circuit Analysis Workshop, 11th International Conference on Zebrafish Development and Genetics, Madison, WI, 2014

“Multicolor and viral tools for mapping the zebrafish brain” UGA DevBio Fall Symposium, Athens, GA, USA, 2013

“ZebraBOW: multispectral cell labeling for lineage analysis and neural circuit tracing in zebrafish.” 1st Zebrafish for Personalized/Precision Medicine Conference, Toronto, Canada, 2013

“ZebraBOW: multispectral cell labeling for lineage analysis and neural circuit tracing in zebrafish.” Plenary session, 10th International Conference on Zebrafish Development and Genetics, Madison, WI, 2012

“Potential for Brainbow imaging in elucidating connectivity changes in neurodegenerative diseases,” Workshop on Connectivity Changes in Early Huntington's Disease, The CHDI (Cure Huntington's Disease Initiative) Foundation, New York, NY, 2012

“Specific Axon Arborization Patterns of Trpa1 Sensory Neurons in Zebrafish,” The 18th CDB Meeting: Common Themes and New Concepts in Sensory Formation, RIKEN Center for Developmental Biology (CDB), Kobe, Japan, 2009

“SAD kinases, targets of LKB1, are required for neuronal migration and polarization,” Annual Cell Signaling Symposium on “Implications of the LKB1 and AMPK Systems”, Dundee, Scotland, 2005

Invited Seminars

“Development of visuomotor behaviors and brain-wide connectivity in zebrafish” Research Institute of Molecular Pathology (IMP), Vienna, Austria, December 1, 2016I

“Development of visuomotor behaviors and brain-wide connectivity in zebrafish” Virginia Tech Carilion Research Institute, Roanoke, VA, 2016

“Neuronal connectivity analysis of wild-type and mutant zebrafish with transsynaptic virus and 3D brain mapping” HHMI Janelia Farm Research Campus, Ashburn, VA, 2016

“Understanding brain functions and neuronal connectivity disorders in a tiny fish.” Albert Einstein School of Medicine, Department of Developmental & Molecular Biology, New York, NY, 2015

“Understanding brain functions and neuronal connectivity disorders in a tiny fish.” University of South Carolina, Aiken, Department of Biology and Geology, Aiken, SC, 2015

“Understanding brain functions and human disorders in a tiny fish.” Georgia State University, Department of Biology, Atlanta, GA, 2014

“Understanding brain functions and human disorders in a tiny fish.” Georgia Southern University, Department of Biology, Statesboro, GA, 2014

“Zebrabow: multispectral cell labeling for lineage analysis and neural circuit tracing in zebrafish.” Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, 2013

Service

Professional Membership

American Association for the Advancement of Science (AAAS) (since 1999), Society for Neuroscience (since 2002), Genetics Society of America (since 2014)

Journal Review

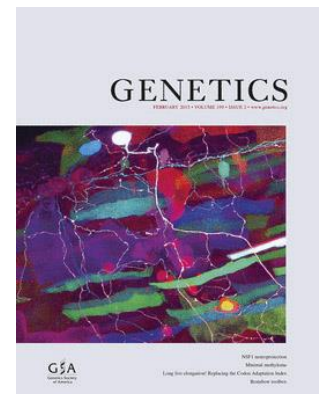
Cell and Molecular Life Sciences, Development, Frontiers in Neural Circuits, Neuroscience Letters, JoVE, Scientific Reports, Proceedings of the Royal Society of London B, Investigative Ophthalmology and Visual Science

Grant Review

- 2017 Friedrich Wilhelm Bessel Research Award, Alexander von Humboldt Foundation
 2016 NIH Neural Differentiation, Plasticity, Regeneration, and Rhythmicity (NDPR) study section (*ad hoc*)
 2014 Murdoch Charitable Trust College Research Program for Life Sciences (*ad hoc*)
 2013 National Science Foundation (*ad hoc*)

Publications

1. Wang, T., Ma, M., Sharma, A., Kuang, C., Roberts, R., Gagnon, J. A., Pauli, A., Zimmerman, S., Tsai, S. Q., Reyon, D., Joung, J. K., Schier, A. F., **Pan, Y. A.** Loss of *Down Syndrome Cell Adhesion Molecule-Like 1* Results in Abnormal Retinal Patterning and Saccade Failure in Zebrafish. (*in revision*)
2. Khayrullin, A., Smith, L., Mistry, D., Dukes, A., **Pan, Y. A.**, Hamrick, M. W. (2016). Chronic alcohol exposure induces muscle atrophy (myopathy) in zebrafish and alters the expression of microRNAs targeting the Notch pathway in skeletal muscle. *Biochemical and Biophysical Research Communications*. 2016 Oct 21;479(3): 590–595. <https://www.ncbi.nlm.nih.gov/pubmed/27671199>
3. Beier, K. T.*, Mundell, N. A.*, **Pan, Y. A.***, Cepko, C. L. (2015). Anterograde or Retrograde Transsynaptic Circuit Tracing in Vertebrates with Vesicular Stomatitis Virus Vectors. *Current Protocols in Neuroscience*. 2016 Jan 4;74:1.26.1-1.26.27. (*equal contributions) <http://www.ncbi.nlm.nih.gov/pubmed/26729030>
4. Mundell, N. A.*, Beier, K. T.*, **Pan, Y. A.***, Lapan, S. W., Aytürk, A. G., Berezovskii, V. K., Wark, A. R., Drokhlyansky, E., Bielecki, J., Born, R. T., Schier, A. F., and Cepko, C.L. (2015) Vesicular stomatitis virus enables gene transfer and transsynaptic tracing in a wide range of organisms. *Journal of Comparative Neurology*, doi: 10.1002/cne.23761. (*co-first authors) <http://www.ncbi.nlm.nih.gov/pubmed/25688551>
5. Weissman, T. A.* and **Pan, Y. A.*** (2015) Brainbow: New resources and emerging biological applications for multicolor genetic labeling and analysis. *Genetics*, 199(2):293-306. (cover article) (co-corresponding authors) (review) <http://www.genetics.org/content/199/2/293.short>
6. Nie, J., Liu, X., Lilley, B. N., Zhang, H., **Pan, Y. A.**, Kimball, S. R., Zhang, J., Zhang, W., Wang, L., Jefferson, L. S., Sanes, J. R., Han, X. and Shi, Y. (2013). SAD-A Kinase Controls Islet β -Cell Size and Function as a Mediator of mTORC1 Signaling. *PNAS*, 110(34):13857-62. <http://www.pnas.org/cgi/pmidlookup?view=long&pmid=23922392>
7. Lilley, B. N., **Pan, Y. A.**, and Sanes, J. R. (2013). SAD kinases sculpt axonal arbors of sensory neurons through long and short-term responses to neurotrophin signals. *Neuron*, 79, 39-53. <http://www.sciencedirect.com/science/article/pii/S0896627313004376>



8. **Pan, Y. A.***, Freundlich, T., Weissman, T. A., Schoppik, D., Wang, X. C., Zimmerman, S., Ciruna, B., Sanes, J. R., Lichtman, J. W. and Schier, A. F.* (2013). Zebrafish: multispectral cell labeling for cell tracing and lineage analysis in zebrafish. *Development* 140, 2835-46. (cover article) (co-corresponding authors) <http://dev.biologists.org/content/140/13/2835.abstract>
9. Nie, J., Lilley, B. N., **Pan, Y. A.**, Faruque, O., Liu, X., Zhang, W., Sanes, J. R., Han, X. and Shi, Y. (2013). SAD-A Potentiates Glucose-Stimulated Insulin Secretion as a Mediator of Glucagon-Like Peptide 1 Response in Pancreatic beta Cells. *Mol Cell Biol* 33, 2527-34. <http://mcb.asm.org/content/33/13/2527.abstract>
10. **Pan, Y. A.**, Caron, S. J., and Schier, A. F. (2012). BAPTI and BAPTISM birthdating of neurons in zebrafish. *Cold Spring Harb Protoc* 2012 Jan 1;2012(1). pii: pdb.prot067520. <http://cshprotocols.cshlp.org/content/2012/1/pdb.prot067520.long>
11. **Pan, Y.A.***, Choy, M., Prober, D. A., and Schier, A. F.* (2012). Robo2 determines subtype-specific axonal projections of trigeminal sensory neurons. *Development* 139, 591-600. (co-corresponding authors) <http://dev.biologists.org/content/139/3/591.long>
12. **Pan, Y. A.**, Livet, J., Sanes, J. R., Lichtman, J. W. and Schier, A. F. (2011). Multicolor Brainbow imaging in zebrafish. *Cold Spring Harb Protoc* 2011 Jan 1;2011(1):pdb.prot5546. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3082469/?tool=pubmed>
13. Barnes, A. P., Lilley, B. N., **Pan, Y. A.**, Plummer, L. J., Powell, A. W., Raines, A. N., Sanes, J. R. and Polleux, F. (2007). LKB1 and SAD kinases define a pathway required for the polarization of cortical neurons. *Cell* 129, 549-63. <http://www.cell.com/retrieve/pii/S0092867407003911>
14. Kishi, M.* , **Pan, Y. A.***, Crump, J. G. and Sanes, J. R. (2005). Mammalian SAD kinases are required for neuronal polarization. *Science* 307, 929-32. (*co-first authors) <http://www.sciencemag.org/content/307/5711/929.abstract>
15. **Pan, Y. A.** and Sanes, J. R. (2004). Non-invasive visualization of epidermal responses to injury using a fluorescent transgenic reporter. *J Invest Dermatol* 123, 888-91. <http://www.nature.com/jid/journal/v123/n5/full/5602542a.html>
16. **Pan, Y. A.**, Misgeld, T., Lichtman, J. W. and Sanes, J. R. (2003). Effects of neurotoxic and neuroprotective agents on peripheral nerve regeneration assayed by time-lapse imaging in vivo. *J Neurosci* 23, 11479-88. (cover article) <http://www.jneurosci.org/content/23/36/11479.long>

