

## Yuchen Wang

The University of Alabama at Birmingham  
Department of Optometry and Vision Science  
1670 University Blvd., Birmingham, AL, 35294  
[wangyc@uab.edu](mailto:wangyc@uab.edu) 205-975-0743

### EDUCATION

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<b>Purdue University</b> Ph.D., Molecular Pharmacology	Aug 2010- Jul 2015
<b>China Pharmaceutical University</b> B.Sc., Biological Sciences	Sep 2006-Jul 2010

### ACADEMIC POSITIONS

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<b>Assistant Professor</b> , Dept. of Optometry and Vision Science, The University of Alabama at Birmingham, AL	Jul 2022- Present
<b>Postdoctoral Fellow</b> , The Scripps Research Institute, FL Advisor: Dr. Kirill Martemyanov Research area: G protein signaling in nervous system Close collaborator: Dr. Alapakkam Sampath, UCLA Research area: Physiological function of retinal neurons Major research accomplishment: identified novel trans-synaptic mechanisms critical for the structural and functional wiring of different photoreceptor neurons	Aug 2015- Jun 2022
<b>Graduate Research</b> , Purdue University, IN Advisory committee: Drs. Gregory Hockerman (Chair), Val Watts, Robert Geahlen, Peter Hollenbeck Dissertation title: The L-type voltage-gated calcium channels (VGCCs): the role of Cav1.2 in pancreatic $\beta$ cells and new perspective on the molecular pharmacology of Cav1.3 Major research accomplishment: identified molecular mechanism for the efficient $Ca^{2+}$ -secretion coupling in $\beta$ cells and the molecular determinants accounting for the different pharmacological profiles of Cav1.2 and Cav1.3.	Aug 2010- Jul 2015

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**Research Assistant**, China Pharmaceutical University, Nanjing, China  
Mar 2008-Sep 2009  
Advisor: Dr. Yijun Chen  
Research area: Biocatalytic routes for chiral drug intermediates

## HONORS & AWARDS

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UAB IMPACT Award	Jul 2022
Best presentation award, Scripps Research Fest Scientific Symposium	Nov 2020
NIH Pathway to Independence Award (K99/R00), NIH/NEI	Sep 2019
Best poster awards, Scripps Research Fest Scientific Symposium	2017-2018
Travel award, FASEB-The Biology and Chemistry of Vision Conference	Jun 2017
Best poster award, FASEB-The Biology and Chemistry of Vision Conference	Jun 2017
Travel award, FASEB-Retinal Neurobiology and Visual Processing Conference	Jul 2016
Koo Travel Award, the Department of Medicinal Chemistry and Molecular Pharmacology, Purdue	2015
Travel Award, ASPET Annual Meeting at Experimental Biology	2015
Best Poster Award, Sigma Xi Life Science Competition, Purdue University	2014
Scholarship for outstanding academic performance, China Pharmaceutical University	2006-2009

## RESEARCH FUNDING

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NIH/NEI R00 EY030554 (PI) Sep 2022- Aug 2025  
“Trans-synaptic mechanism of retinal synapse formation and function”  
Major goal: To understand the molecular mechanisms regulating retinal synapse formation and function with a focus on trans-synaptic mechanisms mediated by cell adhesion molecules.

## PUBLICATIONS

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### Manuscripts Accepted

Christie Campla, Ulisse Bocchero, Ryan Strickland, Jacob Nellissery, Jayshree Advani, Irina Ignatova, Dhiraj Srivastava, Angel Aponte, **Yuchen Wang**, Jessica Gumerson, Kirill Martemyanov, Nikolai Artemyev, Johan Pahlberg, Anand Swaroop. Frmpd1 facilitates trafficking of G-protein transducin and modulates synaptic function in rod photoreceptors of mammalian retina. (2022). *eNeuro* 9(5):ENEURO.0348-22.2022. doi: 10.1523/ENEURO.0348-22.2022.

**Yuchen Wang**, Yan Cao, Cassandra Hays, Thibaut Laboute, Tom Ray, Debbie Guerrero-Given, Abhimanyu Ahuja, Dipak Patil, Olga Rivero Martín, Naomi Kamasawa, Jeremy Kay, Wallace Thoreson, Kirill Martemyanov. Adhesion GPCR Latrophilin3 regulates synaptic function of cone photoreceptors in a trans-synaptic manner. (2021). *Proceedings of the National Academy of Sciences* 118 (45) e2106694118

Yan Cao, **Yuchen Wang**, Henry Dunn, Cesare Orlandi, Naomi Kamasawa, David Fitzpatrick, Wei Li, Christina Zeits, William Hauswirth, Kirill A. Martemyanov. Interplay between cell adhesion molecules governs synaptic wiring of cone photoreceptors. (2020). *Proceedings of the National Academy of Sciences* 117(38):23914-23924

Lei Xu, Susan Bolch, Clayton P. Santiago, Frank Dyka, Omar Akil, Ekaterina Lobanova, Yuchen Wang, Kirill Martemyanov, William W. Hauswirth, W. Clay Smith, James T. Handa, Seth Blackshaw, John D. Ash, Astra Dinculescu (2019). Clarin-1 Expression in Adult Mouse and Human Retina Highlights a Role of Müller Glia in Usher Syndrome. *Journal of Pathology* 250(2):195-204

Tatsuo Itakura, Andrew Webster, Shravan K. Chintala, Nitin Patel, **Yuchen Wang**, Jose M. Gonzalez, Jr., James C.H. Tan, Janice A. Vranka, Ted Acott, Cheryl M. Craft, Maria E. Sibug Saber, Shinwu Jeong, W. Daniel Stamer, Kirill A. Martemyanov, M. Elizabeth Fini (2019). Homeostatic Role for GPR158 in Regulation of Intraocular Pressure. *Journal of Ocular Pharmacology and Therapeutics* 35(4):203-215

Cesare Orlandi, Yoshihiro Omori, **Yuchen Wang**, Akiko Ueno, Michael J Roux, Giuseppe Condomitti, Joris de Wit, Takahisa Furukawa and Kirill A. Martemyanov (2018). Trans-synaptic Interaction of Orphan Receptor GPR179 with Dystroglycan-Pikachurin Complex Is Essential for the Synaptic Organization of Photoreceptors. *Cell Reports* 25(1): 130-145.e5

**Yuchen Wang\***, Shiqi Tang\*, Kyle E. Harvey, T. August Li, Amy E. Salyer, Gregory H. Hockerman (2018). Molecular determinants of the differential modulation of Ca<sub>v</sub>1.2 and Ca<sub>v</sub>1.3 by nifedipine and FPL64176. *Molecular Pharmacology* 94(3):973-983 (\*contribute equally to the work)

Ignacio Sarria\*, Yan Cao\*, **Yuchen Wang\***, Norianne T. Ingram, Cesare Orlandi, Naomi Kamasawa, Alexander V. Kolesnikov, Vladimir J. Kefalov, Alapakkam P. Sampath, Kirill A. Martemyanov (2018). LRIT1 modulates adaptive changes in synaptic communication of cone photoreceptors. *Cell Reports* 22: 3562–3573 (\* contribute equally to the work)

**Yuchen Wang**, Katherine Fehlhaber, Ignacio Sarria, Yan Cao, Alapakkam P. Sampath, Kirill A. Martemyanov (2017). Auxiliary calcium channel subunit  $\alpha 2\delta 4$  is selectively required for axonal elaboration, synaptic transmission and wiring of rod photoreceptors (2017). *Neuron*

93: 1359-1374 (**Previewed:** Aligning a Synapse, Daniel Kerschensteiner (2017), *Neuron* 93: 1241-1243)

**Yuchen Wang**, Rachel E. Jarrard, Evan P.S. Pratt, Marcy L. Guerra, Amy E Salyer, Allison M. Lange, Ian M. Soderling, and Gregory H. Hockerman (2014). Uncoupling of  $Ca_v1.2$  from  $Ca^{2+}$ -induced  $Ca^{2+}$  Release and SK channel Regulation in Pancreatic  $\beta$ -cells. *Molecular Endocrinology* 28: 458-476

Rachel E. Jarrard, **Yuchen Wang**, Amy E. Salyer, Evan P. Pratt, Ian M. Soderling, Marcy L. Guerra, Allison M. Lange, Hillary J. Broderick and Greg H. Hockerman (2013). Potentiation of Sulfonylurea Action by an EPAC-selective cAMP Analog in INS-1 Cells: Comparison of Tolbutamide and Gliclazide, and a Potential Role for EPAC Activation of a 2-APB-sensitive  $Ca^{2+}$  Influx. *Molecular Pharmacology* 83: 191-205

Xuri Wu, **Yuchen Wang**, Jianming Ju, Chen Chen, Nan Liu and Yijun Chen (2009). Enantioselective Synthesis of Ethyl S-2-hydroxy-4-phenylbutyrate by Recombinant Diketoreductase. *Tetrahedron Asymmetry* 20, 2504-2509

## PRESENTATIONS

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### Invited Talks

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| Society for Neuroscience, San Diego, CA<br>Adhesion GPCR Latrophilin 3 regulates synaptic function of cone photoreceptors in a trans-synaptic manner                | Nov 2022 |
| UAB Comprehensive Neuroscience Center Annual Retreat, AL<br>Trans-synaptic mechanism of synaptic connectivity and function – lessons learned from the visual system | Sep 2022 |
| The Retinal Neurobiology and Visual Processing FASEB Conference, Southbridge, MA<br>Molecular Insight into Cone Photoreceptor Wiring                                | Jun 2022 |
| Department of Ophthalmology and Visual Sciences, Washington University in St. Louis<br>Molecular Insights into Photoreceptor Wiring                                 | Sep 2021 |
| Retinal Circuits Symposium<br>Molecular Insights into Cone Photoreceptor Wiring   | Jul 2021 |
| Department of Ophthalmology and Visual Sciences, University of Texas Medical School at Houston  | Jun 2021 |

Trans-Synaptic mechanism of photoreceptor wiring	
Department of Optometry and Vision Science, University of Alabama at Birmingham	May 2021
Trans-Synaptic mechanism of photoreceptor wiring	
Department of Neuroscience, University of Toledo	Feb 2021
Trans-Synaptic mechanism of neuronal wiring in the visual system	
Department of Biomedical Sciences, University of Minnesota	Feb 2021
Trans-Synaptic mechanism of neuronal wiring in the visual system	
Neuroscience Departmental Research Meeting, Scripps, Jupiter, FL	Nov 2020
Trans-synaptic mechanisms of the selective wiring of photoreceptor neurons in the retina	
Scripps Research Fest, Jupiter, FL	Oct 2020
The role of cell adhesion molecules in vision	
Society for Neuroscience, Chicago, IL	Oct 2019
Trans-synaptic modulation of synaptic activity: Leucine-rich repeat protein LRIT1 selectively modulates cone photoreceptor synaptic function	
The Biology and Chemistry of Vision FASEB Conference, Steamboat Springs, CO	Jun 2017
Aligning a synapse: the role of $\alpha 2\delta 4$ in rod photoreceptor synaptogenesis	
The Department of Neuroscience, Scripps Florida, Jupiter, FL	Oct 2016
Molecular Insight into Rod Photoreceptor Synaptogenesis: the role of $\alpha 2\delta 4$ in rod photoreceptor synaptogenesis	
The Retinal Neurobiology and Visual Processing FASEB Conference, Keystone, CO	Jun 2016
Molecular Insight into Rod Photoreceptor Synaptogenesis	

### **Poster Presentations**

UAB Graduate Biomedical Sciences/Joint Health Sciences Research Symposium, Birmingham, AL	Aug 2022
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Molecular Insights Into Wiring Specificity and Synaptic Diversity

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| Society for Neuroscience 2021, virtual<br>Trans-synaptic mechanism of cone photoreceptor wiring   | Nov 2021 |
| EMBO Virtual Workshop on Molecular Neurobiology<br>The role cell adhesion molecules in vision   | May 2021 |
| Molecular Mechanisms of Neuronal Connectivity, Cold Spring Harbor Virtual Meeting,<br>Leucine-rich repeat proteins mediated trans-synaptic modulation of functional wiring of cone photoreceptors | Sep 2020 |
| Max Plank Florida Institute's Sunposium, West Palm Beach, FL<br>Cell adhesion molecule in neuron wiring: LRIT1 selectively modulates cone photoreceptor synaptic function                         | Mar 2019 |
| Retinal Neurobiology and Visual Processing FASEB Conference, Allegany, NY<br>LRIT1 is essential for regulating cone synaptic function   | Jun 2018 |
| Synapse 2018, Jupiter, FL<br>Auxiliary calcium channel subunit $\alpha 2\delta 4$ is required for the selective wiring of rod photoreceptors  | Feb 2018 |
| Scripps Research Fest Scientific Symposium, Jupiter, FL<br>Molecular Insight into Rod Photoreceptor Synaptogenesis  | Oct 2017 |
| Max Plank Florida Institute's Sunposium, West Palm Beach, FL<br>Auxiliary calcium channel subunit $\alpha 2\delta 4$ is required for the selective wiring of rod photoreceptors                   | Feb 2017 |
| ASPET Annual Meeting at Experimental Biology, Boston, MA<br>Characterization of a Dihydropyridine-insensitive Cav1.3 Channel  | Mar 2015 |
| Sigma Xi Life Sciences Poster Competition, West Lafayette, IN<br>The Dual Role of the Intracellular II-III loop of Cav1.2 in Channel Trafficking and Targeting                                    | Mar 2014 |
| Midwest Islet Club, University of Pittsburgh, PA  | May 2012 |

Comparison of the Actions of Tolbutamide and Gliclazide in INS-1 cells: The EPAC2-selective cAMP Analog 8-pCPT-2'-O-Me-cAMP-AM Potentiates Insulin Secretion and Ca<sup>2+</sup> Transients Stimulated by Both, and Gliclazide Stimulates Phospholipase-C Activity.

## MENTORING & TEACHING EXPERIENCE

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### *Students mentored at Scripps Florida*

<u>Noor Ibrahim</u> , FAU high school student	Sep 2021-Mar 2022
<u>Chuanping Zhao</u> , PhD graduate student, Scripps Research	Jun 2021-Jun 2022
<u>Hannah Deane</u> , PhD graduate student, Scripps Research	Sep 2021-Oc 2021
<u>Keying Deng</u> , Master's student in Biology Education, UCSD BUMMP	Nov 2020-Jun 2021
<u>Brooke Johnson</u> , Undergraduate student, UCSD BUMMP	Nov 2020-Jun 2021
<u>Abhi Ahuja</u> , Undergraduate student, Florida Atlantic University Investigating the role of adhesion GPCR LPHN3 in cone synaptic formation and function	Aug 2017-May 2019
<u>Talha Cheema</u> , Undergraduate student, Florida Atlantic University Exploring the molecular mechanism governing the selective wiring of retinal photoreceptors	Aug 2016- Feb 2017

### *Teaching experiences at Purdue*

<u>Organic Chemistry Lab (MCMP 204L)</u> Giving lecture to 46 1 <sup>st</sup> year pre-pharmacy students	Jan 2015-May 2015
<u>Organic Chemistry Lab (MCMP 205L)</u> Giving lecture to 22 2 <sup>nd</sup> year pre-pharmacy students	Aug 2014- Dec 2014
<u>Organic Chemistry (MCMP204)</u> Holding office hours and review session for >200 2 <sup>nd</sup> year pre-pharmacy students	Jan 2014-May 2014
<u>Pharmacology (MCMP 441)</u> Holding office hours and review session for 175 4th year pharmacy students	Aug 2012-Dec 2012
<u>Integrated Lab (MCMP 402)</u> Lab assistant for 21 3 <sup>rd</sup> year pharmacy students	Jan 2012-May 2012

## RESEARCH SKILLS

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**Biochemistry:** protein cross-linking, Western Blotting, recombinant protein expression in E.coli and mammalian system, immunoprecipitation, immunohistochemistry, RNA *in situ* hybridization

**Molecular biology:** CRISPR gene editing, molecular cloning, RT-PCR, construct design for creating transgenic mice,

**Electrophysiology:** electroretinography (ERG), patch clamp recording using HEK cell and primary cells

**Protein purification:** affinity chromatography purifying antibodies and recombinant proteins

**Light Microscopy:** Confocal, TIRF, STED

**Calcium imaging:** single-cell resolution recordings of cell activity

**Cell-based assays:** cell culture, luciferase reporter assay, NanoBiT protein-protein interaction assay, BRET assay

**Mouse Surgery:** subretinal and intraocular injection of plasmids and AAV