

# Rickesh Patel

Neuroethologist



## EDUCATION

August 2014 – June 2020

### **Doctor of Philosophy in Biological Sciences**

University of Maryland Baltimore County (UMBC)

- *Dissertation Advisor: Dr. Thomas W. Cronin*
- *Dissertation Title: Homing in the Benthos: Navigation and Orientation in Mantis Shrimp*

December 2017

### **Federation of European Neuroscience Societies (FENS) Winter Course 2017**

Universitätszentrum Obergurgl, University of Innsbruck

- *Topic of Course: The neural control of navigation behavior*

August 2008 – May 2013

### **Bachelors of Science in Biological Sciences**

California State University Long Beach (CSULB)

- *Chemistry Minor*
- *Biomedical Illustration Certification*
- *Cum Laude*
- *Undergraduate Honors Thesis: "Characterization of Hepatic Protein Expression in a Male Fish Exhibiting High Estradiol Levels – Potential Development of Estrogen Sensitive Biomarkers"; Thesis advisor: Dr. Kevin M. Kelley*
- *Graduated with University Honors and Departmental Honors in the Department of Biological Science*



## RESEARCH EXPERIENCE

September 2020- Present

### **Post-Doctoral Fellow- The Heinze Lab at Lund University**

Supervisor: Dr. Stanley Heinze

- *Postdoctoral project investigating the neural basis of path integration, a navigation behavior in bumblebees using behavioral and electrophysiological methods.*

August 2014 – August 2020

### **Graduate Researcher- The Cronin Lab at UMBC**

Advisor: Dr. Thomas W. Cronin

- *Dissertation project investigating navigation behavior in a stomatopod crustacean using behavioral methods to elucidate the navigational strategies and the sensory cues informing these strategies.*

April 2012- June 2014

### **Stream Ecologist: Field and Laboratory Researcher- CSULB Stream Ecology Assessment Laboratory**

Employer: Dr. Dessie Underwood

- *California State contracted bioassessment project of the Santa Ana and San Jacinto watersheds. Sampling and surveying macro-invertebrates from sediment samples to assess water quality.*

January 2011 - July 2013

### **Independent Undergraduate Researcher- CSULB Environmental Endocrinology Laboratory**

Advisor: Dr. Kevin M. Kelley

- *Endocrinology/Toxicology*
- *Independent undergraduate research project using proteomic analysis to determine how environmental endocrine disruptors affect the physiology of male fish living off the Southern California coast, developing estrogen sensitive biomarkers for future studies.*

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## PUBLICATIONS

- 2021 *Patel, R.N., Khil, V., Abdurahmonova, L. \*, Driscoll, H. \*, Patel, S., Pettyjohn-Robin, O., Shah, A., Goldwasser, T., Sparklin, B., & Cronin, T.W. (2021). Mantis shrimp recognize the shape of an object over its color. \*Indicates undergraduate researchers who contributed equally. Journal of Experimental Biology. 224, jeb242256.*  
-Work featured in the CBC documentary "The Nature of things: Living Colour". Aired 2019
- 2020 *Patel, R.N. & Cronin, T.W. (2020). Mantis shrimp navigate home using celestial and idiothetic path integration. Current Biology. 30, 1981-1987.*  
-Work featured in the BBC documentary "Animal Einsteins Episode 6: Travelers". Aired 2021.
- 2020 *Patel R.N. & Cronin, T.W. (2020). Path integration error and adaptable search behaviors in a mantis shrimp. The Journal of Experimental Biology. 223, 1-6.*
- 2020 *Patel, R.N. & Cronin, T.W. (2020). Landmark navigation in a mantis shrimp. Proceedings of the Royal Society B. 287, 20201898.*
- 2013 *Patel, R.N & Kelley, K.M. (2013). Characterization of Hepatic Protein Expression in a Male Fish Exhibiting High Estradiol Levels – Potential Development of Estrogen Sensitive Biomarkers. Annual Report, Institute for Integrated Research on Materials, Environment, and Society 2013.\* Not Peer-Reviewed*



## SELECTED PRESENTATIONS

- November 2020  
Invited Speaker *Patel, R.N.; Cronin, T.W. (2020). Aquatic Local Navigation in a Mantis Shrimp. Young Investigator Symposium for the International Society for Neuroethology.*
- August 2020  
Oral Presentation *Patel, R.N.; Cronin, T.W. (2020). Mantis Shrimp Navigate Home using Path Integration. Allee Symposium Competitor at the Animal Behavior Society Annual Meeting 2020.*
- July 2020  
Invited Speaker *Patel, R.N.; Cronin, T.W. (2020). Straight as the mantis shrimp swims: Path integration using hierarchical orientation cues in stomatopods; The American Museum of Natural History.*
- August 2019  
Poster Presentation *Patel, R.N.; Cronin, T.W. (2019). Hierarchical Compass Cues in a Path-Integrating Mantis Shrimp. International Conference on Invertebrate Vision; Bäckaskog, Sweden.*
- January 2019  
Oral Presentation *Patel, R.N.; Cronin, T.W. (2019). Celestial and Idiothetic Compasses in a Mantis Shrimp. Best Student Paper Competitor at the Society of Integrative and Comparative Biology Annual Meeting; Tampa, FL.*
- October 2018  
Invited Speaker *Patel, R.N.; Cronin, T.W. (2018). Path Integration in a Mantis Shrimp: A Potential Role of the Stomatopod Central Complex. Structure and Function of the Insect Central Complex; Janelia Research Campus; Ashburn, VA.*
- July 2018  
Poster Presentation *Patel, R.N.; Cronin, T.W. (2018). Path Integration Using Celestial and Idiothetic Compasses in a Mantis Shrimp. International Congress of Neuroethology; Brisbane, QLD Australia.*
- May 2018  
Oral Presentation *Patel, R.N.; Cronin, T.W. (2018). Local Navigation in a Mantis Shrimp. International Crustacean Congress IX; Washington DC.*
- December 2017  
Poster Presentation *Patel, R.N.; Cronin, T.W. (2017). Path Integration and Landmark Navigation in a Mantis Shrimp. Federation of European Neuroscience Societies, Neural Control of Behavior: Navigation; Obergurgl, Tyrol, Austria.*

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## AWARDS

March 2021	<b>Awarded the Richard E. Wolf Outstanding Doctoral Dissertation Award</b> by the University of Maryland Baltimore County, Department of Biological Sciences. \$1000 Prize
February 2021	<b>Awarded a Marie Curie Post-doctoral Fellowship</b> (Application Score 96.4/100) by the European Commission. €191852 Award
August 2020	<b>Awarded the Young Investigator Award</b> by the International Society for Neuroethology. \$1200 Award
August 2020	<b>Second Place Winner of the Allee Symposium Dissertation Competition</b> at the 2020 Animal Behavior Society Annual Meeting; Online Meeting. \$400 Prize
August 2019	<b>Second Place Poster Prize</b> at the 2019 International Conference of Invertebrate Vision; Bäckaskog, Sweden.
March 2019	<b>Winner of the Lightning Talk Competition</b> at the 2019 UMBC Graduate Association of Biological Sciences Annual Symposium; Baltimore, MD.
January 2019	<b>Winner of the Division of Neurobiology, Neuroethology, and Sensory Biology Best Student Paper competition</b> at the 2019 Society of Integrative and Comparative Biology Annual Meeting; Tampa, FL. \$150 Prize
January 2019	<b>Winner of the Crustacean Society Best Oral Presentation competition</b> at the 2019 Society of Integrative and Comparative Biology Annual Meeting; Tampa, FL. \$100 Prize
August 2018	<b>Awarded the UMBC GSA research grant</b> by the Graduate Student Association at UMBC. \$1000 Value
July 2018	<b>Awarded the Heiligenberg Student Travel Award</b> to attend the International Congress for Neuroethology; Brisbane, QLD Australia. \$700 Value.
July 2018	<b>Winner of the International Congress for Neuroethology Art Competition</b> at the International Congress for Neuroethology; Brisbane, QLD Australia.
December 2017	<b>Winner of the Best Student Presentation competition</b> at the 2017 FENS Winter School, Neural Control of Behavior: Navigation.
November 2017	<b>Awarded a full stipend</b> by the Federation of European Neuroscience Societies to attend the 2017 FENS Winter School, Neural Control of Behavior: Navigation. Approximately \$800 Value.
January 2017	<b>Winner of the Division of Animal Behavior's Best Student Poster competition</b> at the 2017 Society of Integrative and Comparative Biology Annual Meeting; New Orleans, LA. \$250 Prize.
January 2017, 2018, 2019	<b>Awarded the Charlotte Mangum Student Support Award</b> to attend the Society of Integrative and Comparative Biology Annual Meeting (2017 New Orleans, LA; 2018 San Francisco, CA; 2019 Tampa, FL). For 5 nights lodging each.
November 2016, 2017, 2018	<b>Awarded UMBC GSA travel grant</b> by the Graduate Student Association at UMBC. \$1750 Value Total.

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## TEACHING EXPERIENCE, MENTORSHIP, AND OUTREACH

Fall 2017, Spring and Fall 2018, Spring 2019	<b>Teaching Assistant at the University of Maryland Baltimore County</b> <u><b>Biology 142: Foundations of Ecology and Evolution Discussion</b></u> •Lead discussions about basic concepts in ecology and evolution, including natural selection, population growth, biogeography, species concepts, phylogenetics, ecological interactions, and hominid evolution.
Spring 2017	<u><b>Biology 305L: Comparative Physiology Laboratory</b></u> •Lead discussions about animal physiology and instruction of skills and methodologies for studying physiology, such as dissections, basic neurophysiology, cardiovascular physiology, and metabolic load.
Fall 2014, Spring and Fall 2016	<u><b>Biology 300L: Experimental Biology Laboratory</b></u> •Lead discussions and instruction about basic laboratory skills and methodologies, such as aseptic technique, pipetting, serial dilutions, and spectrophotometry.
Fall 2015	<u><b>Biology 302L: Genetics Laboratory- Phage Hunters</b></u> •Lead discussions about laboratory techniques, methodology, and troubleshooting including isolation of a bacteriophage from the environment, electron microscopy, and sequencing. •Lead discussions about interpreting peer-reviewed articles and scientific writing.
Fall 2018	<b>Guest Lecturer on the Neural Basis of Navigation Behaviors in Arthropods</b> 1.5 hour lecture for the Invertebrate Neurobiology course (HONR 200) at the University of Maryland Baltimore County
Spring 2018, Spring 2020	<b>Guest Lecturer on Marine Migration and Navigation</b> 2 hour lecture for the Physiology of Marine and Estuarine Animals course (BIOL 457/657) at the University of Maryland Baltimore County
Spring 2018	<b>Guest Lecturer on Biomes: Global Weather Patterns and Adaptations of Local Organisms</b> 1 hour lecture for the Ecology and Evolution course (BIOL 142) at the University of Maryland Baltimore
Spring 2017 - Present	<b>Undergraduate Research Mentor</b> •Mentored undergraduate researchers in designing and conducting a research project investigating what visual qualities make an object salient to the mantis shrimp, <i>Neogonodactylus oerstedii</i> , during recognition.. •Mentored undergraduate researchers on writing reports and abstracts, designing posters, and presenting work at the Undergraduate Research and Creative Achievement Day (URCAD) at the University of Maryland Baltimore County.
Fall 2015- Fall 2019	<b>Stream Ecology and Bioassessment Outreach Workshop for Elementary (Primary) Schools</b> Developed and carried-out a hands-on workshop in which elementary school students were taught about the importance of ecology, biodiversity, bioassessment, and conservation through an interactive presentation and activity where students were encouraged to identify actual stream macroinvertebrates using a simplified dichotomous key.
July 2018	<b>Outreach with High (Secondary) School Students in the Australian Brain-Bee Challenge</b> •Presented dissertation research to high school students from Queensland, Australia to teach them about brain functions, neuroscience research, and careers in neuroscience. •Competition was hosted by the Queensland Brain Institute, University of Queensland
Spring 2014	<b>Curator of the Entomology Teaching Collection- California State University Long Beach</b> Maintained and added specimens to the entomology teaching collection. Constructed the practical exams for the entomology class offered that semester.

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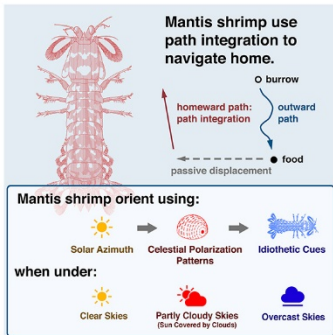


## PROFESSIONAL ORGANIZATIONS

2020 - Present	<i>Member of the Animal Behavior Society (ABS)</i>
2018 - Present	<i>Member of the International Society for Neuroethology (ISN)</i>
2013 - Present	<i>Member of the Society of Integrative and Comparative Biology (SICB)</i>
2018 - 2020	<i>Member of The Crustacean Society (TCS)</i>



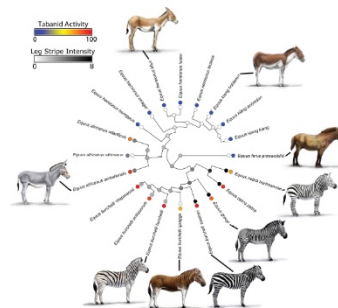
## SCIENTIFIC ILLUSTRATION AND OTHER SKILLS



*In Current Biology*



*Cover for the Journal of Experimental Biology*



*In Nature Communications*



*In Behavioral Ecology*

2012 - Present	<p><b>Certified Biomedical Illustrator</b></p> <ul style="list-style-type: none"> <li>• Artwork published in the scientific journals, <i>Nature Communications</i>, <i>Behavioral Ecology</i>, <i>Current Biology</i>, and the <i>Journal of Experimental Biology</i>, numerous popular science websites, <i>Motherboard (Vice)</i>, and <i>The Washington Post</i>.</li> <li>• Media include watercolors, colored pencils, oil paints, pen and ink, graphite, charcoal, Adobe Photoshop, Adobe Illustrator and Adobe Indesign.</li> <li>• Sample portfolio available at: <a href="http://rickeshpatel.weebly.com">http://rickeshpatel.weebly.com</a></li> </ul>
2014 - Present	<p><b>Certified Advanced Open-Water SCUBA Diver</b></p> <ul style="list-style-type: none"> <li>• Certified through the Professional Diving Instructors Corporation (PDIC)</li> <li>• 29 Hours of Underwater Time</li> </ul>