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Kara J. Emery

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Academic Positions

2021 – present **Post-Doctoral Associate**
Center for Data Science
New York University

Education

2015 – 2021 (expected) **Ph.D. in Integrative Neuroscience**
University of Nevada, Reno
Adviser: Michael A. Webster

2011 – 2014 **B.A. in Psychology and Neuroscience** *(honors)*
Roosevelt University

Research Interests

I am interested in the computational strategies that underlie visual processing and learning. My work has characterized how perception differs between observers and how it is impacted by sensory history, particularly in the context of color perception and visual adaptation. I also have experience in and would like to continue collecting, formatting, and analyzing large-scale datasets of tracked behavior in virtual environments. I have employed many methods for my research such as psychophysics, computational modeling, virtual reality, eye tracking, neuroimaging, and machine learning.

Research Experience

2015 – present Graduate Research Assistant; *University of Nevada, Reno*; Adviser: Dr. Michael A. Webster
2020 Research Collaborator; *Facebook Reality Labs (Eye Tracking)*; Adviser: Dr. Sachin Talathi
2019 Ph.D. Intern; *Facebook Reality Labs (Display Systems Research)*; Adviser: Dr. Marina Zannoli
2018 Ph.D. Intern; *Facebook Reality Labs (Display Systems Research)*; Adviser: Dr. Marina Zannoli
2017 Research Intern; *National Institutes of Health (NEI)*; Adviser: Dr. Bevil Conway
2016 Research Fellow; *Chuo University*; Adviser: Dr. Masami Yamaguchi
2015 Research Intern; *Harvard University*; Adviser: Dr. Susan Carey
2014 Undergraduate Research Assistant; *Roosevelt University*; Adviser: Dr. Sarah Elliott
2012 – 2014 Undergraduate Research Assistant; *Roosevelt University*; Adviser: Dr. Amy Dexter

Pending Manuscripts

1. **Emery, KJ**, Volbrecht, VJ, Peterzell, DH, Webster, MA. Fundamentally different coding strategies for color and motion revealed by individual differences in perception. *(in preparation)*

2. **Emery, KJ**, Webster, MA. Inferring neural coding strategies from adaptation aftereffects. *(in preparation)*

3. **Emery, KJ**, Webster, MA. Adaptation, Bayesian inference, and error correction. *(in preparation)*

4. **Emery, KJ**, Volbrecht, VJ, Peterzell, DH, Webster, MA. Individual differences in hue scaling suggest mechanisms narrowly tuned for hue and broadly tuned for lightness and saturation. *(in preparation)*

Scientific Publications

1. **Emery, KJ**, Zannoli, M., Xiao, L., Warren, J., Talathi, S. (2021). OpenNEEDS: A Dataset of Gaze, Hand and Head Pose, and Scene Images in Open-Ended VR Environments. *ACM Symposium on Eye Tracking Applications*

2. **Emery, KJ**, Zannoli, M., Xiao, L., Warren, J., Talathi, S. (2021). Estimating Gaze From Head and Hand Pose and Scene Images for Open-Ended Exploration in VR Environments. *IEEE VR*

3. **Emery, KJ**, Parthasarathy, KP, Joyce, D, Webster, MA. (2021). Color perception and compensation in color deficiencies assessed with hue scaling. *Vision Research*

4. Matera, C, **Emery, KJ**, Volbrecht, VJ, Vemuri, K, Kay, P, Webster, MA. (2020). A comparison of two methods of hue scaling. *Journal of the Optical Sciences of America A, 37*(4), A44-A54.

5. **Emery, KJ**, Webster, MA. (2019). Individual differences and their implications for color perception. *Current Opinion in Behavioral Sciences, 30*, 28-33.

6. **Emery, KJ**, Volbrecht, VJ, Peterzell, DH, Webster, MA. (2017). Variations in normal color vision. VI. Factors underlying individual differences in hue scaling and their implications for models of color appearance. *Vision Research, 141*, 51-65.

7. **Emery, KJ**, Volbrecht, VJ, Peterzell, DH, Webster, MA. (2017). Variations in normal color vision. VII. Relationships between color naming and hue scaling. *Vision Research, 141*, 66-75.

Patents

1. Gao. W., Zannoli, M., Sulai, Y., **Emery, KJ**. (2021). Pancake lens ghosting mitigation. *U.S. Patent No. 10,890,776*. Washington, DC: U.S. Patent Trademark Office.

Invited Talks

1. Visual coding strategies implied by individual differences or adaptation, 2019
   UC Berkeley Redwood Center for Theoretical Neuroscience

2. Inferring neural coding strategies from adaptation aftereffects, 2019
   Vision Sciences Society Annual Meeting Symposium: What can be inferred about neural population codes from psychophysical and neuroimaging data?

3. Decoding perceptual representations from individual differences, 2018
   European Conference on Visual Perception Symposium: What individual differences teach us about vision

4. The perceptual representation of "space" defined by color versus motion, 2017
   University of Pennsylvania, Brainard/Aguirre Labs

Conference Presentations *(selected)*

*published abstract

1. **Emery, KJ**, Webster, MA. (June, 2020). Adaptation, Bayesian inference, and error correction. *Vision Sciences Society Annual Meeting: St. Petersburg, FL, USA*. [poster]*

2. **Emery, KJ**, Matera, C, Kay, P, Vemuri, K, Volbrecht, VJ, Peterzell, DP, Webster, MA. (July 2019). Categorical effects on color appearance. *25th Symposium of the International Colour Vision Society: Riga, Latvia*. [poster]

3. **Emery, KJ**, Volbrecht, VJ, Peterzell, DH, Webster, MA. (September 2018). Decoding perceptual representations from individual differences. *Optical Society of American Fall Vision Meeting: Reno, NV*. **[talk]**

4. **Emery, KJ**, Webster, MA. (May 2018). Inferring the neural representation of faces from adaptation aftereffects. *MODVIS: Computational and Mathematical Models in Vision*. **[talk]***

5. **Emery, KJ**, Peterzell, DH, Volbrecht, VJ, Webster, MA. (May 2018). The perceptual representation of "space" defined by motion versus color. *Vision Sciences Society Annual Meeting: St. Petersburg, FL, USA*. [poster]*

6. Aniban, A, Matera, C, **Emery, KJ**, Webster, MA. (May 2018). Faces as spectra: implications for adaptation and face coding. *Vision Sciences Society Annual Meeting: St. Petersburg, FL, USA*. [poster]*

7. **Emery, KJ**, Jeffery, L, McKone, E, Rhodes, G, Webster, MA. (August 2017). Reinterpreting face aftereffects. *40th European Conference on Visual Perception: Berlin, Germany*. **[talk]***

8. **Emery, KJ**, Peterzell, DH, Volbrecht, VJ, Webster, MA. (August 2017). Individual differences in hue scaling suggest mechanisms narrowly tuned for hue and broadly tuned for lightness. *24th Symposium of the International Colour Vision Society: Erlangen, Germany*. **[talk]**

9. **Emery, KJ**, Peterzell, DH, Volbrecht, VJ, Webster, MA. (May 2017). Individual differences in hue scaling suggest mechanisms narrowly tuned for color and broadly tuned for lightness. *Vision Sciences Society Annual Meeting: St. Petersburg, FL, USA*. **[talk]***

10. **Emery, KJ**, Peterzell, DH, Volbrecht, VJ, Webster, MA. (November 2016). Multiple mechanisms underlying color appearance and color naming. *Society for Neuroscience Annual Meeting: San Diego, CA, USA*. [poster]

11. **Emery, KJ**, Yang, J, Webster, MA, Yamaguchi, MK. (June 2016). Differences in blue-yellow color perception in infants and adults. *Sokendai Institute and JSPS Summer Program Conference: Hayama, Japan*. [poster]

12. **Emery, KJ**, Peterzell, DH, Volbrecht, VJ, Webster, MA. (May 2016). Factors underlying individual differences in hue scaling. *Vision Sciences Society Annual Meeting: St. Petersburg, FL, USA*. [poster]*

13. Emery, KJ, Dexter, AL. (May 2015). Identity and the politics of language use: The experiences of bilingual university students. *Midwest Psychological Association Annual Meeting: Chicago, IL, USA*. **[talk]**

HONORS & AWARDS

2020	NIH Outstanding Scholars in Neuroscience Award Program
2019	ICVS Best Poster Award
2018	Diana Hadley-Lynch Scholarship
2017	Dean's Merit Scholarship
2017	Student Travel Award, International Colour Vision Society
2017	FoVea Travel and Networking Award
2016	Japan Society for Promotion of Science Summer Prog. Award
2016	NSF East Asia and Pacific Summer Institutes Fellow
2016	NSF Graduate Research Fellowship Honorable Mention
2014	Franklin Honor Society, Roosevelt University
2014	Class of 2014 Student Laureate, Lincoln Academy of Illinois
2013	Pepsi Honors Scholarship

TEACHING

2017	Primary Instructor, *Research Methods*, University of Nevada, Reno
2015 – 2017	Teaching Assistant, *Perception*, University of Nevada, Reno
2017	Teaching Assistant, *Experimental Psychology*, University of Nevada, Reno

Mentoring

2017 – 2018	Alex Aniban, Nevada Undergraduate Research Award Program, University of Nevada, Reno Project: *Faces as spectra: Implications for adaptation and face coding*
2016 – 2017	Traci Tolles, Undergraduate Honors Program, University of Nevada, Reno Project: *Using EEG to determine blue-yellow and red-green perceptual asymmetries in the human visual system*

Publication Reviewing

EMICS Workshop at CHI 2021
Vision Research
Journal of the Optical Society of America A (JOSA A)
SVRHM Workshop at Neural Information Processing Systems (NeurIPS) 2019
Perception
Current Opinion in Behavioral Sciences
Cognition, Brain, Behavior

Technical Proficiency

Programming	Matlab, Python, R
Machine Learning	Tensorflow, PyTorch, XGBoost
EEG	Biosemi, Letswave
Psychophysics	ViSaGe, PsychToolbox
Virtual Reality	Unity, Oculus

Outreach & Service

2017	Judge, Western Nevada Regional Science & Engineering Fair
2016 – 2017	Coach, Nevada Brain Bee
2016 – 2018	Organizer, Brain Awareness Week
2015	Volunteer, Desert Research Institute
2015 – 2018	Mentor, Big Brothers Big Sisters
2015 – 2017	Organizer, Sierra NV Chapter SfN Symposium
2013	Coordinator, Midwest Brain Injury Clubhouse
2013	Transformational Learning Tutor, Jumpstart at Cook County Courthouse
2012 – 2013	Patient Care Volunteer, Odyssey Hospice

References

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