

# Connor J. Parde

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*Citizenship and Work Authorization: U.S. citizen; Canadian permanent residency in progress (spousal sponsorship)*

## Research Interests

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*My research integrates psychophysics and deep learning to develop theory-driven models of visual representation in humans and machines.*

- Computational models of high-level vision and object recognition
- Human–machine alignment in visual representations
- Psychophysics and representational geometry
- Deep learning as a theory-building tool in cognitive science
- Face perception and identity processing

## Academic Appointments

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### **Postdoctoral Research Associate**

Nov. 2023 – Present

Department of Psychology, Vanderbilt University

Supervisor: Frank Tong

- Computational and neuroimaging investigations of high-level visual representations
- Developed and evaluated deep learning models of object perception
- Designed, collected, and analyzed fMRI and behavioral data

## Education

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### **Ph.D. in Cognition and Neuroscience**

2023

University of Texas at Dallas, School of Behavioral and Brain Sciences

Dissertation: *Face Identity “Likeness”: Insights for the Study of Face Perception and Identification*

Advisor: Alice J. O’Toole

### **M.S. in Applied Cognition and Neuroscience**

2020

University of Texas at Dallas, School of Behavioral and Brain Sciences

Advisor: Alice J. O’Toole

### **B.S. in Cognitive Science**

2016

University of Texas at Dallas, School of Behavioral and Brain Sciences

Dean’s Award for Excellence in Cognitive Science

## Publications

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### Peer-Reviewed Journal Articles

1. **Parde, C. J.**, Strehle, V. E., Banerjee, V., Hu, Y., Cavazos, J. G., Castillo, C. D., & O'Toole, A. J. (2023). Twin identification over viewpoint change: A deep convolutional neural network surpasses humans. *ACM Transactions on Applied Perception*, 20(3), 1–15.
2. Mallick, S., Jeckeln, G., **Parde, C. J.**, Castillo, C. D., & O'Toole, A. J. (2023). The influence of the other-race effect on susceptibility to face morphing attacks. *ACM Transactions on Applied Perception*, 21(1), 1–13.
3. **Parde, C. J.**, Colón, Y. I., Hill, M. Q., Castillo, C. D., Dhar, P., & O'Toole, A. J. (2021). Closing the gap between single-unit and neural population codes: Insights from deep learning in face recognition. *Journal of Vision*, 21(8), 1–15.
4. Noyes, E., **Parde, C. J.**, Colón, Y. I., Hill, M. Q., Castillo, C. D., Jenkins, R., & O'Toole, A. J. (2021). Seeing through disguise: Getting to know you with a deep convolutional neural network. *Cognition*, 211, 104611.
5. Hill, M. Q., **Parde, C. J.**, Castillo, C. D., Colón, Y. I., Ranjan, R., Chen, J. C., ... O'Toole, A. J. (2019). Deep convolutional neural networks in the face of caricature. *Nature Machine Intelligence*, 1(11), 522–529.
6. **Parde, C. J.**, Hu, Y., Castillo, C. D., Sankaranarayanan, S., & O'Toole, A. J. (2019). Social trait information in deep convolutional neural networks trained for face identification. *Cognitive Science*, 43(6), e12729.
7. Hu, Y., **Parde, C. J.**, Hill, M. Q., Mahmood, N., & O'Toole, A. J. (2018). First impressions of personality traits from body shapes. *Psychological Science*, 29(12), 1969–1983.
8. O'Toole, A. J., Castillo, C. D., **Parde, C. J.**, Hill, M. Q., & Chellappa, R. (2018). Face space representations in deep convolutional neural networks. *Trends in Cognitive Sciences*, 22(9), 794–809.

### Conference Proceedings

1. **Parde, C. J.**, Castillo, C. D., Hill, M. Q., Colón, Y. I., Sankaranarayanan, S., Chen, J. C., & O'Toole, A. J. (2017). Face and image representation in deep convolutional neural network features. In *Proceedings of the 12th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2017)* (pp. 673–680).

### Manuscripts Under Review

- Zhu, Z., Chen, L., Liu, C. H., Fu, X., **Parde, C. J.**, & Hu, Y. *Computational principles of first impressions: Distinct codes for typicality and attractiveness*. Under review at *Proceedings of the National Academy of Sciences*.

### Manuscripts in Preparation

- **Parde, C. J.**, Jang, H., & Tong, F. *In preparation*. Evaluating generalizability to visual noise in convolutional neural networks trained for object perception.
- Jeon, I., **Parde, C. J.**, & Tong, F. *In preparation*. Constraining shortcut learning through high spatial frequency and color improves internal alignment between deep neural networks and human vision.

- **Parde, C. J.** & O'Toole, A. J. *In preparation*. Modeling “likeness” in face perception: A deep learning approach.

## Conference Presentations

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### Talks

- **Parde, C. J.**, Jang, H., & Tong, F. (2025). Re-evaluating the ability of object-trained convolutional neural networks for classifying out-of-distribution images. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- **Parde, C. J.**, Colón, Y. I., Hill, M. Q., Castillo, C. D., & O'Toole, A. J. (2020). Integrating single-unit and pattern codes in DCNNs trained for face recognition. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- **Parde, C. J.**, Colón, Y. I., Hill, M. Q., Castillo, C. D., & O'Toole, A. J. (2020). Integrating single-unit and pattern codes in DCNNs trained for face recognition. *British Psychological Society Cognitive Psychology Section Conference* (online).
- Colón, Y. I., Hill, M. Q., **Parde, C. J.**, Castillo, C. D., Ranjan, R., & O'Toole, A. J. (2019). Facial expression information in deep convolutional neural networks trained for face identification. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- Hill, M. Q., **Parde, C. J.**, Chen, J. C., Castillo, C. D., Blanz, V., & O'Toole, A. J. (2018). Hierarchical representations of viewpoint and illumination in DCNNs trained for face identification. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- **Parde, C. J.**, Hu, Y., Castillo, C. D., Sankaranarayanan, S., & O'Toole, A. J. (2018). Predicting social trait inferences from DCNNs trained for face identification. *International Summer School on Biometrics*, Alghero, Italy.

### Posters

- Jeon, I., **Parde, C. J.**, & Tong, F. (2025). Training convolutional neural networks with blurry images enables the learning of more human-aligned visual representations. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- **Parde, C. J.** & O'Toole, A. J. (2024). Modeling face-identity “likeness” with a convolutional neural network trained for face identification. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- Jeon, I., **Parde, C. J.**, & Tong, F. (2024). Investigating the impact of Gaussian noise on face recognition performance for humans and convolutional neural networks. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- **Parde, C. J.**, Strehle, V. E., Banerjee, V., Hu, Y., Cavazos, J. G., Castillo, C. D., & O'Toole, A. J. (2022). Comparing human and deep convolutional neural network performance on twin identification. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- Mallick, S., Jeckeln, G., **Parde, C. J.**, Castillo, C. D., & O'Toole, A. J. (2022). The influence of the other-race effect on morphed face identification. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.
- Colón, Y. I., **Parde, C. J.**, Hill, M. Q., Castillo, C. D., Cavazos, J., & O'Toole, A. J. (2020). Facial expression information in humans and DCNNs. *Vision Sciences Society Annual Meeting*, St. Pete Beach, FL.

- **Parde, C. J.**, Colón, Y. I., Hill, M. Q., Castillo, C. D., & O'Toole, A. J. (2020). Concurrent representational codes in DCNNs trained for face identification. *From Neuroscience to Artificially Intelligent Systems (NAISys)*, Cold Spring Harbor Laboratory.
- **Parde, C. J.**, Hu, Y., Castillo, C. D., Sankaranarayanan, S., & O'Toole, A. J. (2018). Predicting social trait inferences from DCNNs trained for face identification. *Dartmouth Center for Cognitive Neuroscience Workshop*.

## Submitted

- **Parde, C. J.**, Zhao, Z., & Tong, F. *Better models through worse images: Degradation training helps align CNNs with humans*. Submitted to the Vision Sciences Society Annual Meeting.

## Invited Talks & Colloquia

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- **Parde, C. J.** (2024). Understanding “likeness” in face perception. Invited talk, Cognitive and Computational Neuroscience Group, Vanderbilt University, Nashville, TN.
- **Parde, C. J.** (2021). Deep learning insights for single-unit and neural population codes in face recognition. Invited talk, Different Minds Collaborative, University of Victoria, Victoria, BC, Canada.
- **Parde, C. J.** (2020). Integrating single-unit and pattern codes in a DCNN trained for face identification. Invited talk, Postdoctoral and Early-Career Association of Researchers, National Institute of Standards and Technology (NIST), Washington, DC.
- Colón, Y. I., Hill, M. Q., **Parde, C. J.**, & O'Toole, A. J. (2020). Turning the black box white: How face recognition works in a deep convolutional neural network. Invited talk, Different Minds Collaborative, University of Victoria, Victoria, BC, Canada.

## Industry & Applied Research Experience

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### Scientific Consultant

Nov. 2022 – Oct. 2023

Exponent, Inc., New York, NY

Supervisor: Robert Rauschenberger

- Designed and administered controlled behavioral experiments to measure human perception in immersive virtual reality environments.
- Led large-scale, nationally distributed data-collection efforts involving diverse participant populations.
- Managed \$800,000+ in externally funded research projects, overseeing study design, timelines, and deliverables.
- Conducted interdisciplinary literature reviews on video-based misinformation and perceptual bias in digital media.
- Collaborated with scientists, engineers, and legal stakeholders to translate empirical findings into actionable insights.

## **Teaching & Mentoring**

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### **Graduate Teaching and Mentorship**

#### **Graduate Student Research Mentor** 2023 – Present

Vanderbilt University, Nashville, TN

- Mentored graduate students in research design, data analysis, and scientific writing in vision science and cognitive neuroscience.
- Provided hands-on guidance in training and evaluating machine learning models for visual object recognition.
- Advised students on conference preparation, presentation skills, and professional development.

#### **Guest Lecturer (Graduate Level)**

2018, 2019

Cognitive Science for Graduate Students, University of Texas at Dallas

- Delivered lectures on the application of neural networks and modern machine learning methods in the brain sciences.
- Introduced convolutional neural networks, generative adversarial networks, and recurrent neural networks as tools for theory-driven research.
- Demonstrated how computational models can be used to test hypotheses in visual perception and cognition.

### **Undergraduate Teaching and Mentorship**

#### **Undergraduate Student Research Mentor**

2016 – 2023

University of Texas at Dallas, Richardson, TX

- Supervised undergraduate researchers in machine learning, face perception, and visual cognition.
- Guided students in developing clear, testable hypotheses and executing independent research projects.
- Provided instruction in programming, data analysis, and computational modeling.
- Mentored students who subsequently pursued graduate training and research-oriented careers.

#### **Guest Lecturer (Undergraduate Level)**

2019

Cognitive Science for Undergraduate Students, University of Texas at Dallas

- Introduced foundational concepts in neural networks, including convolution, backpropagation, and loss functions.
- Demonstrated practical applications of machine learning to problems in computer vision.

### **Outreach and Early STEM Education**

#### **Program Instructor**

2014

Robotic Art – STEAM Camp, University of Texas at Dallas

- Co-developed and taught an introductory computer programming curriculum for primary- and secondary-school students.

- Introduced foundational programming concepts, including control flow, logic, and basic algorithmic thinking.
- Supported students in integrating programming into creative robotic art projects.

## Research Funding, Fellowships & Awards

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- **Carol L. and Maynard S. Redeker Fellowship** 2019  
University of Texas at Dallas (\$5,000)
- **IEEE International Summer School on Biometrics – Travel Grant** 2018  
Institute of Electrical and Electronics Engineers (\$1,500)
- **Behavioral and Brain Sciences Student Travel Grant** 2017–2019  
University of Texas at Dallas (Total: \$3,000)
- **Phi Theta Kappa Transfer Scholarship** 2012–2015  
University of Texas at Dallas (\$6,000)

## Professional Service

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- **Journal Reviewer**  
*Nature Communications; Cognitive Science; Behavioral Science; Journal of Vision; ACM Transactions on Applied Perception*
- **Professional Memberships**  
Member, Vision Sciences Society (2023–present)  
Student Member, Vision Sciences Society (2017–2023)  
Student Member, Institute of Electrical and Electronics Engineers (2016–2019)

## Technical Skills

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### Computational & Statistical Methods

Machine learning; deep neural networks; representational similarity analysis; multivariate statistics; signal detection theory; inferential statistics

### Programming & Software

Python; R; MATLAB; Java; C/C++; PyTorch; TensorFlow; LaTeX

### Experimental Methods

Behavioral psychophysics; virtual reality experimentation; fMRI data collection and analysis

### Languages

English (native); Spanish (conversational); French (basic)