

# Daniel Leeds

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## EDUCATION

- Carnegie Mellon University (CMU):** **Pittsburgh, PA**  
Ph.D. in Neural Computation, August 2013  
*Dissertation:* Searching for the visual components of object perception
- M.Sc. in Robotics, January 2010  
*Written Qualifier:* Learning the structure of natural sounds through hierarchical sparse coding
- Massachusetts Institute of Technology (MIT)** **Cambridge, MA**  
M.Eng. in Electrical Engineering and Computer Science (EECS), June 2006  
*Dissertation:* Assisted Auscultation: Creation and Visualization of High Dimensional Feature Spaces for the Detection of Mitral Regurgitation
- S.B. in EECS, June 2005

## POSITIONS

- Associate Professor, Computer and Information Science (CIS) Department, Fordham University 2019–Present
- Assistant Professor, CIS Department, Fordham University 2013–Present
- Graduate Student, Tarr Lab, CMU 2010–2013
- Graduate Student, Laboratory for Computational Perception, CMU 2006–2010
- Researcher, Computer Science/Artificial Intelligence Laboratory, MIT 2004–2006
- Technical Assistant, Secure Computer Systems Group, New York University 2003
- Researcher, Speech Communication Group, MIT 2002–2003

## PUBLICATIONS

### Journal Articles:

- JK Register-Mihalik, DD Leeds, E Kroshus, ZY Kerr, K Knight, C D’Lauro, RC Lynall, T Ahmed, Y Hagiwara, ... JD Schmidt, “Optimizing Concussion Care Seeking: Identification of Institutional and Individual Factors Predicting Previous Concussion Diagnosis Status”, *Medicine & Science in Sport & Exercise*, In press.
- RC Lynall, C D’Lauro, ZY Kerr, K Knight, E Kroshus, D Leeds, ... JD Schmidt, “Optimizing Concussion Care Seeking: The Influence of Previous Concussion Diagnosis Status on Baseline Assessment Outcomes”, *The American Journal of Sports Medicine*, In press.
- EM Aminoff, S Baror, EW Roginek, and DD Leeds, “Contextual associations represented both in neural networks and human behavior”, *Scientific Reports*, April 2022.
- DD Leeds, Y Zeng, BR Johnson, CA Foster, and C D’Lauro, “Beliefs and attitudes affecting concussion reporting among military cadets”, *Brain Injury*, January 2022.
- DD Leeds, A Nguyen, C D’Lauro, J Jackson, and B Johnson, “Prolonged concussion effects: constellations of cognitive deficits detected up to year after injury”, *Journal of Concussion*, 5, May 2021.
- I Bedzow and DD Leeds. “Artificial intelligence (AI) and halakhic responsibility for physicians to consult data” in *Studies in Judaism, Humanities, and Social Sciences*. Academic Studies Press, 2020.
- DD Leeds, C D’Lauro, and B Johnson, “Predictive power of head impact intensity measures for

recognition memory performance”, *Military Medicine*, Supplement-1, Mar-Apr 2019.

DD Leeds and MJ Tarr, “A method for real-time visual stimulus selection in the study of cortical object perception”, *Neuroimage*, 133, Jun 2016.

DD Leeds, JA Pyles, and MJ Tarr, “Exploration of complex visual feature spaces for object perception”, *Frontiers in Computational Neuroscience*, 8(106), Sept 2014.

DD Leeds, DA Seibert, JA Pyles, and MJ Tarr, “Comparing visual representations across human fMRI and computational vision”, *Journal of Vision*, 13(13), Nov 2013.

Z Syed, D Leeds, D Curtis, F Nesta, RA Levine, and J Guttag, “A Framework for the Analysis of Acoustical Cardiac Signals”, *IEEE Trans Biomed Eng.*, 54(4), Apr 2007.

#### **Conference presentations and proceedings:**

J Register-Mihalik, D Leeds, ... ZY Kerr, “Optimizing Concussion Care Seeking: Identification of Institutional and Individual Factors Predicting Previous Concussion Diagnosis Status,” *Military Health System Research Symposium*, September 2022.

JD Schmidt, ..., D Leeds, ... ZY Kerr, “Optimizing Concussion Care Seeking: A Longitudinal Comparison of Delayed Versus Immediate Care Seeking,” *Military Health System Research Symposium*, September 2022.

RC Lynall, ..., D Leeds, ... JD Schmidt, “Optimizing Concussion Care Seeking: Previous Concussion Diagnosis Status Influences Baseline Assessment Outcomes,” *Military Health System Research Symposium*, September 2022.

DD Leeds, C Chen, Y Zhao, F Metla, J Guest, and GM Weiss, “Generalized Sequential Pattern Mining of Undergraduate Courses,” *Educational Data Mining*, July 2022.

GM Weiss, E Brown, M Riad-Zaky, R Iannone, and DD Leeds, “Assessing Instructor Effectiveness Based on Future Student Performance,” *Educational Data Mining*, July 2022.

GM Weiss, J Denham, and DD Leeds, “The Impact of Semester Gaps on Student Grades,” *Educational Data Mining*, July 2022.

E Aminoff, S Baror, E Roginek, and D Leeds, “Inherent representations of contextual associations in neural networks and human behavior”, *Vision Sciences Society*, May 2022.

L Reno, C Habeck, Y Stern, D Leeds, “Identifying local cognitive representations in the brain across age spans through voxel searchlights and representational similarity analysis,” *Cognitive Sciences Society*, July 2021.

GM Weiss, N Nguyen, K Dominguez, and DD Leeds, “Identifying hubs in undergraduate course networks based on scale co-enrollments,” *Educational Data Mining*, June-July 2021.

T Gutenbrunner, DD Leeds, S Ross, M Riad-Zaky, and G Weiss, “Measuring the academic impact of course sequencing using student grade data,” *Educational Data Mining*, June-July 2021.

DD Leeds, M Zhang, and G Weiss, “Mining course groupings from student performance,” *Educational Data Mining*, June-July 2021.

E Roginek, S Baror, DD Leeds, and EM Aminoff, “Representing contextual associations in convolutional neural networks,” *Vision Sciences Society*, May 2021.

F Khan, GM Weiss, and DD Leeds, “Predicting the academic performance of undergraduate computer science students using data mining,” *Advances in Software Engineering, Education, and e-Learning*, March 2021.

SA Stein, GM Weiss, Y Chen, DD Leeds, “A college major recommendation system,” *ACM Conference Series on Recommender Systems*, September 2020.

A Nguyen, DD Leeds, C D’Lauro, and BR Johnson, “Current neurocognitive performance predicts prior concussion history,” *Military Health System Research Symposium*, August 2020.

W Charles, R Agarwal, and DD Leeds, “Modeling effects of blurred vision on category learning,” *Vision Sciences Society*, June 2020.

DD Leeds, C D’Lauro, W Song, and B Johnson, “The Effects of Fatigue and Sleep on Reported Concussion-Related Symptoms,” *Military Health Systems Research Symposium*, August 2019.

DD Leeds, C D’Lauro, W Song, and B Johnson, “The Effects of Fatigue and Sleep on Reported Concussion-Related Symptoms,” *Military Health Systems Research Symposium*, August 2019.

BR Johnson, DD Leeds, W Song, C D'Lauro, "Effects of fatigue and sleep on neurocognitive performance and concussion symptom reporting," *Neurotrauma*, July 2019.

DD Leeds and A Feng, "Modeling voxel visual selectivities through convolutional neural network clustering," *Vision Sciences Society*, May 2019.

DD Leeds and D Shutov, "Potential cortical and computational biases in representational similarity analysis," *Cognitive Computational Neuroscience*, September 2018.

S Cavanagh and D Leeds, "Computational study of changes to cortical vision with age," *Vision Sciences Society*, May 2018.

DD Leeds, BR Johnson, D DeFontes, and C D'Lauro, "The effect of sub-concussive impacts on post-exercise memory performance," *Society for Neuroscience*, November 2017.

DD Leeds and S Hyde, "Modeling mid-level visual representations through clustering in a convolutional neural network," *Cognitive Computational Neuroscience*, Sept 2017.

DD Leeds, C D'Lauro, D DeFontes, and B Johnson, "Predictive power of head impact intensity measures for short-term memory loss," *Military Health Systems Research Symposium*, August 2017.

F Tang, D Lyons, and D Leeds, "Landmark detection with surprise saliency using convolutional neural networks," *IEEE Intl Conf on Multisensor Fusion and Integration for Intelligent Systems*, Sept 2016.

DD Leeds and I Iotzov, "Single-kernel models of single-voxel visual selectivities in convolution neural networks," *Cognitive Science Society*, August 2016.

DD Leeds and D Shutov, "Semantic object grouping in the visual cortex seen through MVPA," *Vision Sciences Society*, May 2016.

DD Leeds and MJ Tarr, "Mixing hierarchical edge detection and medial axis models of object perception," *Vision Sciences Society*, May 2015.

DD Leeds, JA Pyles, and MJ Tarr, "Real-time fMRI search for the visual components of object perception," *Vision Sciences Society*, May 2014.

DD Leeds, JA Pyles, and MJ Tarr, "Evidence towards surround suppression in perception of complex visual properties," *Cosyne (Computational and Systems Neuroscience)*, Feb–Mar 2014.

DD Leeds, DA Seibert, JA Pyles, and MJ Tarr, "Uncovering the visual components of cortical object representation," *Statistical Analysis of Neural Data*, May 2012.

DA Seibert, DD Leeds, JA Pyles, and MJ Tarr, "Exploring computational models of visual object perception," *Vision Sciences Society*, May 2012.

DD Leeds, DA Seibert, JA Pyles, and MJ Tarr, "Unraveling the visual and semantic components of object representation," *Vision Sciences Society*, May 2011.

DD Leeds and MJ Tarr, "Searching for the visual components of cortical object representation," *Temporal Dynamics of Learning Center All Hands Meeting*, Jan 2011.

A Nestor, DD Leeds, JM Vettel and MJ Tarr, "Neurally-derived representations for face detection," *Statistical Analysis of Neural Data*, May 2010.

Z Syed, D Leeds, D Curtis, and J Gutttag, "Audio-visual tools for computer-assisted diagnosis of cardiac disorders," *Computer Based Medical Systems 2006*, Jun 2006.

**Invited talks:**

Computer and Information Science: Faculty Research Symposium, Fordham University, May 2019.

Psychometrics and Quantitative Psychology Seminar, Fordham University, November 2017.

Computational Biology Seminar Series, IBM Watson, August 2017.

Department of Computer Science, Stony Brook University SUNY, November 2015.

Cognitive Neuroscience Seminar, Columbia University College of Physicians and Surgeons, May 2015.

**Public data sets and software:**

M Riad-Zaky, GM Weiss, and DD Leeds, “Course grade analytics with networks.” <https://github.com/Fordham-EDM-Lab/CGAN>

GM Weiss, DD Leeds, et al., “Course Correlation Matrix.” Fordham University EDM Lab. Available at <https://www.cis.fordham.edu/edmlab/datasets/Course-Correlation-Matrix-v1.csv>

D Leeds, D Shutov, and J Pyles, “Local multi-voxel cortical representations of object semantics. fMRI and Mechanical Turk Data.” KiltHub. Available at [https://kilthub.figshare.com/articles/Local\\_multi-voxel\\_cortical\\_representations\\_of\\_object\\_semantics\\_fMRI\\_and\\_Mechanical\\_Turk\\_Data/5783469](https://kilthub.figshare.com/articles/Local_multi-voxel_cortical_representations_of_object_semantics_fMRI_and_Mechanical_Turk_Data/5783469)

**Technical reports:**

M Dogar, V Hemrajani, D Leeds, B Kane, and S Srinivasa, “Proprioceptive localization for mobile manipulators.” Pittsburgh, PA: CMU; 2010. CMU-RI-TR-10-05.

**ONGOING PROJECTS**

**Computer vision models of object representations:** Study of diverse computer vision models to identify their ability to account for human visual abilities and neural object encoding in the human cortical visual pathway.

**Education data mining:** Modeling effects of past course history on performance in present courses, including effects of major and instructor.

**Concussion reporting and effects:** Machine learning analyses of effects of concussion and factors leading to reduced reporting.

**Head strikes and cognition:** Statistical analyses of the kinematic properties of typical sub-concussive head strikes and the effects of head strikes on memory and cognition.

**Cognitive effects of aging:** Development and application of neuroimaging analysis techniques to understand the anatomical and functional correlates of decreasing cognitive function in aging populations

**Realtime fMRI search for visual properties:** Development of realtime analysis of neuroimaging data in conjunction with optimization approaches to identify visual properties used by human cortical vision.

**TEACHING**

**Instructor:**

*Fordham University:* Theory of Computation, Machine Learning, Computer Science I, Structures of Computer Science, Systems Neuroscience, Neuroscience Capstone Seminar

**Teaching assistant:**

*CMU:* Principles of Programming Languages

*MIT:* Computation Structures

**ACADEMIC SERVICE**

**Reviewer** for IEEE/ASME Conference on Advanced Intelligent Mechatronics, Frontiers in Computational Neuroscience, PLOS ONE, NeuroImage, Cognitive Computational Neuroscience, Human Brain Mapping, CVPR Workshop on Mutual Benefits of Cognitive and Computer Vision, IEEE Conference on Multisensor Fusion and Integration for Intelligent Systems

**Fordham University**

CIS Department: Associate Chair for Undergraduate Studies (Rose Hill, 2017–2020), Freshman

Core Advisor (2017–2018), Undergraduate Curriculum Committee Member, Computing Environment Committee Member, Digital Signage Coordinator (2013–2016), New Media and Digital Design Executive Committee Member (2015–2016), Academic Advisor  
Integrative Neuroscience (INS): Director (2020–Present), Executive Committee Member, Academic Advisor, Interim Director (Spring 2015)  
University: Faculty Evaluation Committee Member (2016–present), Core Curriculum Subcommittee on Mathematical/Computational Reasoning (2018–present), Library Committee (2017–2021), Interdisciplinary Research Award Committee Member, Reviewer for Fordham Undergraduate Research Journal (2018)

## HONORS, AWARDS, AND GRANTS

Fordham University Faculty Fellowship: Awarded for Spring 2022 (deferred to Fall 2022)  
CDMRP for Optimizing Concussion Care Seeking in Military Service Members and Athletes: A Machine Learning Approach: Awarded in 2020.  
NCAA / US Air Force Academy for Changing Attitudes about Concussion in Young and Emerging Adults: Awarded in 2019.  
Fordham University Research Fellowship at Columbia University: Awarded for Summer 2017  
Fordham University Faculty Fellowship: Awarded for Fall 2016  
Fordham University Faculty Research Grant: Awarded in 2016, 2014, 2013, and 2010  
National Science Foundation (NSF) Integrative Graduate Education and Research Training Fellow: Awarded in 2010  
NSF Graduate Research Fellow: Awarded in 2006  
Tau Beta Pi (Engineering Honor Society): Granted membership in February 2004  
Eta Kappa Nu (Electrical and Computer Engineering Honor Society): Granted membership in April 2004

## THESIS COMMITTEES

Eric Roginek MS, “Use of context for object recognition in convolutional neural networks” (Chair), 2022  
Wenrui Mu MS, “Iterative qubits management for quantum search” (Reader), 2022  
William Charles MS, “Modeling childhood visual development: the benefits of low resolution training data on category learning” (Chair), 2020  
Tianyu Zhang MS, “Classifying cognitive tasks based on brain activity” (Chair), 2020  
Tianyi Zhang MS, “Mining course groupings from student performance” (Chair), 2020  
Daniel Joseph BS Honors, “Transfer learning and network architecture: a study of convolutional neural networks” (Chair), 2020  
Qian Zhao MS, “The development of a ROS driver for the Crazyflie micro-drone and its use to study drone proximity detection via air disturbance analysis” (Reader), 2019  
Matthew McNeill MS, “A contextual bandit approach to general robot intelligence with common-sense reasoning” (Reader), 2019  
Trevor Buteau MS, “Digging in the wrong place: why asking a computer which emotion a human is feeling is the wrong question, and what the right question might be” (Reader), 2019  
Jeremy Roberts BS Honors, “The Lab Interpreter” (Chair), 2018  
Su Lo MS, “Detecting fake news using stance-based approach” (Chair), 2018  
Caleb Hulbert MS, “Biologically Inspired Semantic Navigation using Object Recognition” (Co-chair), 2017  
Jason Frydman (PhD), “Understanding the relationship between creative capacity and structure of semantic networks in trauma-exposed youth” (Reader), 2018  
Feng Tang MS, “Landmark detection with surprise saliency using convolutional neural networks” (Reader), 2016  
Tamer Aly MS, “Analysis of dual auditory systems using combinatorial fusion” (Reader), 2015

## COLLABORATIONS

Elissa Aminoff, Fordham University, “Top down influences in scene perception.”

Gary Weiss, Fordham University, “Education Data Mining.”

Damian Lyons, Fordham University, “Low-resolution object recognition.”

Julianne Schmidt, Robert Lynall (University of Georgia), Christopher D’Lauro (US Air Force Academy), Johna Register-Mihalik, Zachary Kerr (University of North Carolina), Emily Kroshus (University of Washington), Stephen Broglio (University of Michigan), and Thomas McAlister (Indiana University), “Optimizing concussion care seeking”

Christopher D’Lauro, Brian Johnson, and Julianne Schmidt, at US Air Force Academy, Walter Reed Army Institute of Research and University of Georgia, “Interdisciplinary Research on Concussions.”

Yaakov Stern and Christian Habeck, Columbia University College of Physicians and Surgeons, “Exploring cognitive aging using reference ability networks”

**Research advising at Fordham University:** Sarah Abdelaziz, Tanvir Ahmed, Cody Chen, Xuanming Cui, Joseph Denham, Son Tung Do, Jannatul Kabir, Emma Karn, Mahib Rahman, Eric Roginek, Tianyu Zhang, Jonah Harwood, Ruby Iannone, Junyang Long, Fiza Metla, Sarah Cavanagh; *Past:* Rohan Agarwal, Catarina Araujo, Yulia Barannikova, William Charles, Madison Combes, Davis DeFontes, Karla Dominguez, Amy Feng, Tishya Girdhar, Yuet Ho, Caleb Hulbert, Shane Hyde, Ivan Iotzov, Daniel Joseph, Faiza Khan, Kaitlyn Lavan, Su Lo, Anthony Matus, Maxwell MacKoul, Katherine Mays, Sheikh Muizz, Annie Nguyen, Laura Reno, Spencer Ross, David Shutov, Guilherme Soares, Wanjia Song, Samuel Stein, Mulin Tang, Ray Tischio, Yue Zeng, Tianyi Zhang, Lisha Zhou