Curriculum Vitae

Eric J. Leonardis, PhD

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EDUCATION AND TRAINING

Salk Institute for Biological Studies – August 2022 to Present
Postdoctoral Fellow – NIH T32 Trainee
Research Interests: Deep Reinforcement Learning, 3D Pose Tracking
Project - "Musculoskeletal Modeling and Imitation Learning for Dexterous Reaching with the Mouse Forelimb."
Grants Awarded:
"Interpretable NeuroAI for Motor Control: Massively Parallel Imitation Learning of Musculoskeletal Dynamics" – $100,000
Foresight Institute Grant – October 2025 to Present
Grants Contributed To:
"Understanding Sensorimotor Control Through Realistic Neuro-Biomechanical Simulation" – $2,478,214
NIH BRAIN U01 Grant – Aug 2023 to October 2025
"Collaborative Research: Perception, Behavior and Learning in the Museum" – $530,819
NSF Grant – Aug 2022 to Aug 2023

University of California, San Diego – September 2014 to June 2022
PhD and MS in Cognitive Science
Dissertation - "Interactive Neurorobotics: Brain and Body Coupling During Interactive Multi-Agent Scenarios"
Research Interests: Systems Neuroscience, Robotics, Behavior
National Science Foundation Temporal Dynamics of Learning Center Trainee
GPA: 3.98
Grants Awarded:
"Discovering patterns in human-robot interaction: New tools for complex adaptive social systems" $300,000
US-AU Air Force Office of Scientific Research / Defense Science and Technology Group Grant – January 2017 to May 2019
Best paper award at the 1st Annual Review and Workshop AFOSR – DSTG Co-Sponsored Research Program on Trusted Autonomy
"A Neurobehavioral Foundation for Affective Computing: Rat-Robot Brain-Computer Interfaces for Dynamic Interaction" $25,000
Kavli Institute for the Brain and Mind (KIBM) Innovative Research Grant – May 2016 to August 2017
Grants Contributed To:
"Behavioral, Physiological, and Quantitative Models of Pro-Social Behavior" $1,500,000
NIMH R01 Research Grant – Aug 2016 to April 2019
"Socially Situated Neuroscience: Creating a suite of tools for studying sociality and interoception" $300,000
NSF BRAIN EAGER Grant – Aug 2014 to April 2017

Hofstra University – Fall 2010 to Spring 2014
Bachelor of Arts (BA); Triple Major in Psychology, History and Chinese Studies
Summa Cum Laude; Phi Beta Kappa; Honors College Associate; Provost's Scholar and Dean's List, Vince Brown Scholarship
GPA: 3.87

RESEARCH EXPERIENCE

Postdoctoral Fellow – Talmo Pereira and Eiman Azim Lab – Aug 2022 – Present
Working with Talmo Pereira and Eiman Azim on deep 3D pose tracking in lab animals and massively parallel imitation learning in virtual biomechanical rodent models to understand the neural computations underlying motor control.

Postdoctoral Fellow – Talmo Pereira and Tom Albright Lab – Aug 2022 – Sept 2023
Working with Talmo Pereira and Tom Albright on deep pose tracking in lab animals and long term monitoring of human behavior in the Los Angeles County Museum of Art.

Graduate Researcher – Andrea Chiba Lab – Aug 2015 – Spring 2022
Working with Professor Andrea Chiba and Dr. Laleh Quinn on a rodent behavioral paradigm where a rodent learns how to control a robot in a goal oriented reinforcement learning paradigm.

Visiting Scholar – Complex and Intelligent Systems Laboratory – Mar 2016 – Nov 2017
Worked with Professor Janet Wiles at the University of Queensland on Recurrence Quantification Analysis / Topological Data Analysis.

Graduate Researcher – Cognitive Neuroscience and Neuropsychology Lab – Aug 2014 – Aug 2015
Worked with Professor Ayse Saygin on using electrophysiological techniques to investigate the neural basis of biological motion perception. I was responsible for designing experiments, analyzing data, programming android robots and experimental interfaces.

Lab Rotation – Cognitive and Neural Dynamics Lab – Mar 2015 – June 2015
Worked with Professor Bradley Voytek and a team of lab members to perform EEG data analysis using electrophysiological methods.

Lab Assistant – Human and Artificial Learning Lab – June 2013 – Aug 2014
Assisted Professor Oskar Pineño with designing Arduino physical computation applications. Constructing a low-cost EEG operated brain-computer interface and linking it with robotic devices.

Editing Intern – "The History and Evolution of Psychology: A Philosophical and Biological Perspective" – 2013– 2014
Paid academic internship with Professor Brian D. Cox, editing bibliographic information for a textbook published with Routledge.

TEACHING/MENTORSHIP EXPERIENCE

Salk Institute for Biological Studies

Mentor – Salk Institute High School Summer Scholars Program - Summer 2024
Acted as a mentor for high school research fellows supervising a 3D pose tracking project.

Mentor – Salk Institute Summer Undergraduate Research Fellowship (SURF) Program - Summer 2023, Summer 2024
Acted as a mentor for undergraduate research fellows supervising projects using deep learning for animal pose tracking.

Teaching Assistant – SLEAP: Automating behavior quantification using deep learning – February 2024
Assisted Talmo Pereira at COSYNE 2024 in Lisbon, Portugal in a tutorial workshop to get users started with quantifying animal behavior with the SLEAP deep learning framework.

UC San Diego

Co-Instructor – DSC 180 – Deep Imitation Learning – Fa 2022 - Wi 2023
Co-taught a Data Science capstone course with Dr. Talmo Pereira about developing deep reinforcement learning tools for rodent behavior.

Instructor / Teaching Assistant – COGS 8 – Hands-On Computing – Fa 2020, Wi 2015, 2021, Spr 2016, 2019, 2020, 2022
Taught Arduino programming in C and robotics from the perspective of cognitive science. Led as instructor Spr 2019 – Spr 2022

Instructor / Teaching Assistant – COGS 100 – Cyborgs Now and In The Future – Spr 2018, Fa 2018, Wi 2019
Assisted Professor Taylor Scott and Professor David Kirsh to teach an introduction to classical AI / cognitive science and human-computer interaction theory such as embodied, distributed and situated cognition in 2018. Lead as an instructor in Wi 2019.

Instructor – Academic Connections – Introduction to Cognitive Science – Summer 2015 - 2022
Worked with co-instructor Tom Donoghue to design and teach an introduction to cognitive science class for high school students, more than 40 hours of lectures spanning psychology, robotics, AI, neuroscience, linguistics, anthropology and philosophy for 7 years in a row.

Instructor – Academic Connections – Hands-On Computing for Cognitive Science – Summer 2020
Taught an online class for high school students about simulating nonlinear dynamical systems using Processing programming language.

Co-Instructor – COMM 190 – Performing Cybernetics – Spring 2017

Teaching Assistant – COGS 17 – Neurobiology of Cognition – Fall 2015 **– COGS 184 - Modeling the Evolution of Cognition** – Winter 2015 – **COGS 179 – Cognitive Electrophysiology –** Fall 2019 **– COGS 170 – Brain Waves Across Scales –** Winter 2020

REFERENCES

Publications and Conference Papers

Leonardis, E., Nagamori, A., Yang, Y., Park, J., Saunders, H., Azim, E., Pereira, T. D. (2025) Massively Parallel Imitation Learning of Mouse Forelimb Musculoskeletal Reaching Dynamics. *NeurIPS 2025: Data on the Brain & Mind Concrete Applications of AI to Neuroscience and Cognitive Science Workshop*, San Diego, CA.

Zhang, C., Yang, Y., Sirbu, A., Abe, E., Warnberg, E., Leonardis, E., Aldarondo, D. E., Lee, A., Prasad, A., Foat, J., Bian, K., Park, J., Bhatt, R., Saunders, H., Nagamori, A., Thanawalla, A. R., Huang, K. W., Plum, F., Beck, H., Flavell, S. W., Labonte, D., Richards, B. A., Brunton, B. W., Azim, E., Richards, B., Ölveczky, B. P., & Pereira, T. D. (In Prep.) MIMIC-MJX: Neurobiomechanical emulation of animal behavior.. To submit to *Nature: Methods*.

Jackson, I., Kohli, R., Leonardis, E., de Sa, V., Fei, S., Quinn, L., Lou, Y., & Chiba, A. (2025). Explore-Exploit Behaviors During Rat-Robot Interactions Optimize Social and Spatial Security. IEEE International Conference on Development and Learning (ICDL). Prague, Czech Republic. September 16-19, 2025.

Maree, L., Afshar, S., Oline, S., Leonardis, E.J., Falkner, A. L., & T. D. Pereira (2024). Multi-view triangulation-enabled annotation for multi-animal 3D pose in SLEAP. *Measuring Behavior 2024: 13th International Conference on Methods and Techniques in Behavioral Research*, Aberdeen, Scotland.

Leonardis, E.J., Breston, L., Lucero-Moore, R., Sena, L., Kohli, R., Schuster, L., Barton-Gluzman, L., Quinn, L.K., Wiles, J., & Chiba, A.A. (2022). Interactive Neurorobotics: Behavioral and Neural Dynamics of Agent Interactions. *Frontiers in Psychology Special Issue on Robots and Bionic Systems as Tools to Study Cognition: Theories, Paradigms, and Methodological Issues.*

Leonardis, E. (Chair), Turner, M., Pelkey, J., Semenuks, A., Coulson, S., Adachi, I. & Forster, D. (2021). Conceptual Blending in Animal Cognition: A Comparative Approach. *43rd Annual Cognitive Science Society Conference 2021*, Vienna, AUT

Breston, L., Leonardis, E. J., Quinn, L. K., Tolston, M., Wiles, J., & Chiba, A. A. (2021). Convergent Cross Sorting for Estimating Dynamic Coupling. *Scientific Reports*, 11(1), 1-10.

Heath, S., Ramirez, C., Arnold, J., Olsson, O., Taufatofua, J., Pounds, P., Wiles, J., Leonardis, E., Gygi, E., Leija, E., Quinn, L., Chiba, A. (2018) PiRat: An autonomous framework for studying social behavior in rats and robots. *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018), Madrid, Spain*.

Leonardis, E. (2017). Amygdala. & Hippocampus. *Encyclopedia of Animal Cognition and Behavior*. (Eds. Vonk, J. & Shackelford, T.K.) Springer.

Leonardis, E. & Saygin, A. (2015). Humanoid Robots and the Social Brain: Ethical Implications. *Human-Robot Interaction (HRI) 2015: The Emergent Policy and Ethics of Human-Robot Interaction Workshop, 10th ACM/IEEE International Conference.*

Selected Poster Presentations

Leonardis, E., Nagamori, A., Thanawalla, A., Yang, Y., Saunders, H., Gilmer, J., Zhang, C., Bian, K., Olveczky, B., Al Borno, M., Azim, E., Pereira, T. D. (Under Review). Musculoskeletal imitation learning: Physics-aware constraints promote naturalistic muscle activity. *Computational and Systems Neuroscience (COSYNE) 2024, Lisbon, Portugal.*

Zhang, C., Sirbu, A., Yang, Y., Leonardis, E., Park, J., Prasad, A., Bian, K., Abe, E., Warnberg, E., Brunton, B., Richards, B., Olveczky, Pereira, T. D. (Under Review). MIMIC-MJX: Neuromechanical imitation of animal behavior enables flexible models of embodied control. *Computational and Systems Neuroscience (COSYNE) 2024, Lisbon, Portugal.*

Bian, K., Jha, A., Buchanan, K., Zhang, C., Yang, Y., Leonardis, E., Pereira, T. D., Linderman, S. (Under Review). A framework for segmenting and generating neuromechanical sensorimotor control. *Computational and Systems Neuroscience (COSYNE) 2024, Lisbon, Portugal.*

Leonardis, E.J., Yang, Y., Nagamori, A., Park, J., Bian, K., Barbano, A., Foat, J., Azim, E., Pereira, T.D. (2025) Behavior‑Driven Musculoskeletal Modeling for Embodied Neural Control: Dextrous Forelimb Reaching in Mice. *Society for Neuroscience Conference 2025*, San Diego, CA.

Yang, Y., Leonardis, E.J., Bian, K., Zhang, C., Azim, E., Ölveczky, B., & Pereira, T. D. (2025). VNL-playground: fast and biologically realistic virtual environment for simulating animal behavior. *Society for Neuroscience Conference 2025*, San Diego, CA.

Bian, K., Leonardis, E., Yang, Y., Zhang, C., Wang, Y., Ölveczky, B., & Pereira, T. D. (2025). Topology-driven insights into naturalistic behavior from neuromechanical agent modeling. *Society for Neuroscience Conference 2025*, San Diego, CA.

Jackson, I., Kohi, R., Lucero-Moore, R., Lou, Y., Quinn, L. K., Breston, L., Wiles, J., Chiba, A. A., Leonardis, E. (2025). Robotic exploratory control via subcortical oscillations. *Society for Neuroscience Conference 2025*, San Diego, CA.

Leonardis, E.J., Barbano, A., Yang, Y., Nagamori, A., Foat, J., Gilmer, J., Al Borno, M., Azim, E., & Pereira, T.D. (2025). Examining the impact of biomechanical actuation on neural representations for embodied control and imitation learning for natural movement. *Computational and Systems Neuroscience (COSYNE) 2025, Montreal, Quebec, Canada.*

Leonardis, E.J., Butler, D., Lee, A., Aldarondo, D.E., Ölveczky, B., Azim, E., & Pereira, T.D. (2024). The impact of biomechanical actuation on neural embodied control. *Computational and Systems Neuroscience (COSYNE) 2024, Lisbon, Portugal.*

Leonardis, E.J., Butler, D., Lee, A., Aldarondo, D.E., Ölveczky, B., Azim, E., & Pereira, T.D. (2023). Examining the role of biomechanical actuation in neural embodied control. *Simulated Bodies: Whole Body Biomechanical Models.* Howard Hughes Medical Institute - Janelia Research Campus, Ashburn, VA.

Maree, L., Leonardis, E., Gepshtein, S., Pfaff, S., Metallo, C., & Pereira, T. (2023). Quantifying behavior using deep learning. Society of Biological Psychiatry Annual Meeting, San Diego, CA. Biological Psychiatry, 93(9), Supplement 7.

Leonardis E.J., Breston L., Lucero-Moore R., Kohli R., Barton-Gluzman, M.. Aguilar-Rivera, L., Quinn L.K., Wiles J., & Chiba A.A. (2022). Brain and Body Coupling in Neural Circuitry Underlying Social Assessment. *Society for Neuroscience Conference 2022*, San Diego, CA.

Mullane, M. D., Cooper, H., Lindner, T., Leonardis, E. J., & Chiba, A. A. (2018). Perceiving emotional sounds (MAARI): Individual differences, prior learning and context. *Society for Neuroscience* and *Society for Social Neuroscience Conference 2018*, San Diego, CA.

Heath, S., Ramirez, C., Arnold, J., Olsson, O., Taufatofua, J., Pounds, P., Wiles, J., Leonardis, E., Gygi, E., Leija, E., Quinn, L., Chiba, A. (2018) PiRat: An autonomous rat-sized robot as a social companion for studying social behavior in rats using real-time tracking. *Society for Neuroscience Conference 2018*, San Diego, CA.

Leonardis, E., Heath, S., Wiles, J., Chiba, A. A., Quinn, L. K. (2016). Social Investigation of Conspecifics and Robots: Oscillatory Neural Dynamics. *Society for Neuroscience Conference 2016*, San Diego, CA.

Leonardis, E., Heath, S., Wiles, J., Quinn, L. K., Chiba, A. A. (2016). A Social Brain-Computer Interface for Rat-Robot Interactions. *Network for The Science of Learning Meeting 2016,* Arlington, VA.

Conference Talks + Invited Lectures

Leonardis, E. (2025) The Elephant Man and Disability. *American Academy of Neurology Meeting and Dr. Ali Christy's History of Neurology and Film Class,* April 8th. Digital Gym Cinema*,* San Diego, CA.

Leonardis, E. (2024) Body Horror and the Brain. *Neurohumanities Network Event.* Harvard Medical School. Boston, MA. Virtual.

Leonardis, E. (2024) Explaining AI. Invited Public Lecture at *Hofstra University Cultural Center*, April 16th, Hofstra University, Hempstead, NY.

Leonardis, E. (2024). AI Ethics. Invited Guest Lecture for *CGS 010 Introduction to Cognitive Science* with Professor John Teehan, April 16th, Hofstra University, Hempstead, NY.

Leonardis, E. (2024). Deep Learning for 2D and 3D Pose Estimation. Invited Guest Lecture for *CSC 158 Artificial Intelligence* with Professor Simona Doboli, April 15th, Hofstra University, Hempstead, NY.

Leonardis, E. (2023, 2024). Human and Animal Pose Estimation. Invited Guest Lecture for *COGS 13 Field Methods: Cognition in the Wild* with Professor Federico Rossano. UCSD, La Jolla, CA.

Leonardis, E., Semenuks, A., & Coulson, S. (2021). What is indexical and iconic in animal blending? In Conceptual Blending in Animal Cognition: A Comparative Approach. *43rd Annual Cognitive Science Society Conference 2021*, Vienna, AUT

Leonardis, E. (2020). The Misuse of Algorithms in Data Science. Invited Guest Lecture *for COMM 164 Behind the Internet: Invisible Geographies of Power and Inequality* with Instructor Yelena Gluzman, UCSD, La Jolla, CA.

Leonardis, E. (2018, 2019). Cyborg as Post-Human. Invited Guest Lecture for *COGS 100 Cyborgs Now and In The Future* with Instructor Michael Allen, UCSD, La Jolla, CA.

Leonardis, E. (2017). Rat-Robot Brain Computer Interfaces for Dynamic Interactions. *Kavli Institute for the Brain and Mind Annual Symposium on Innovative Research. La Jolla, CA.*

Leonardis, E. (2017). Rats, Robots, Respiration and Rhythm. *Cognition at Work: UCSD Cognitive Science Student*

Association's 11th Annual National Cognitive Science Conference, UCSD, April 9th, La Jolla, CA.
Leonardis, E. (2017). Historical Examples of Misapplications in Data Science. Invited Guest Lecture on Data Ethics for COGS 9 Introduction to Data Science with Dr. Jason Fleischer.

Technical Demonstrations

Leonardis, E., D'Amico, A., Guerin, S., Verhoef, T., & de Sa, V. (2018). PenguinBird OpenBCI DIY Educational Platform. *The Equity Journey: Investing in the Whole Learner. Grantmakers For Education Conference 2018.* Coronado, CA
Leonardis, E., Mousavi, M., Miller-Rigoli, C., Cooper, H., Contreras, F., & Verhoef, T. (2018). PenguinBird: Dancing Robot Brain-Computer Interface. *IBM Artificial Intelligence for Healthy Living Center (AIHL) SmartHome Demonstration* at Calit2, UCSD, La Jolla, CA.
Leonardis, E., Heath, S., Wiles, J., Quinn, L. K., Chiba, A. A. (2016). Brain-Computer Interfaces (BCI) for Social Interaction and Animal Models. *Temporal Dynamics of Learning Center Demo Session*, January 28th in La Jolla, CA.

Science Communication, Radio/Podcasts, and Exhibited Art

Leonardis, E. (Panelist), Mendez Gandica, B., Jones, L., Brown, A., Riek, L., & Decker, A. (Moderator). (2025). The Evolution of A.I. through Film and in Reality. *San Diego Comic-Con International.* San Diego, CA.
Leonardis, E. (2025). Animal Communication in Babe: Pig In The City. *Science on Screen.* Digital Gym Cinema, San Diego, CA.
Leonardis, E. (2024). Neuroscience of the New Flesh: Body Horror in Your Brain. *Nerd Nite SD.* Ken Club, San Diego, CA.
Leonardis, E. (2023). Neuroscience of Fear and Zombie Languages. *Secret Morgue 4: Zombie Autopsy.* Comic Con Museum. San Diego, CA.
Farokhmanesh, M. (2023). What Creepy Video Game Sounds Do to Your Brain. *WIRED.* February 7th.
Leonardis, E. (2019). Cats and Baboons. *Secret Morgue 3.1: When Animals Attack.* Comic Con Museum. San Diego, CA.
Accomando, B. (2020). Global Pandemic Film Primer with Eric Leonardis. *Cinema Junkie Podcast on KPBS.* San Diego, CA.
Accomando, B. (2020). Pop Culture, Neuroscience, And COVID-19 with Eric Leonardis. *KPBS Midday Edition.* San Diego, CA.
Leonardis, E. (2019). Brain-Computer Interfaces: Applications and Ethical Conundrums. *National Geographic Brain Games and San Diego Nerd Nite at San Diego Comic Con.* Hotel Solamar, San Diego, CA.
Leonardis, E. (2019). Introducing David Cronenberg's The Fly. Reel Science 3.0 at Digital Gym Cinema with SD Film Geeks and San Diego Natural History Museum. San Diego, CA. Radio Promo on *KPBS Midday Edition* and *Cinema Junkie Podcast*.
Gluzman, Y. & Leonardis, E. (2015). Their Position. *The Ephemeral Objects Exhibit.* San Diego Art Institute. San Diego, CA.

Reviewer

NeurIPS: Data on the Brain and Mind Workshop
Nature: Scientific Data
Journal of Experimental Psychology: Applied
Salk (EDGE) Elevate Diversity in Graduate Education Program
Computational and Systems Neuroscience (COSYNE) Conference
Frontiers in Cellular Neuroscience, Section on Cellular Neurophysiology
Frontiers in Bioengineering and Biotechnology, Section on Bionics and Biomimetics: Hypothesis and Theory

Scientific Consulting for Film

National Academy of Sciences Science and Entertainment Exchange
NYU Tisch Film and Television
Sloan Foundation

Community

Underrepresented Minorities Advancing Scientific Engagement (URMASE) Events Chair