

## Overview

I build and lead focused teams that take applied problems and work on generalized ways to solve them that translate beyond a single use. I specialize in building interdisciplinary bridges that translate ambiguous domain expert intuition into contemporary AI approaches, and building artifacts like open-source platforms or foundation models that endure beyond a single project.

## Education and work experience

- 2018–  
CURR. **Meta (formerly Facebook)**  
RESEARCH SCIENTIST, FAIR | 2023–CURR.  
TECHNICAL LEAD / MANAGER, REALITY LABS RESEARCH | 2022–2023  
RESEARCH SCIENTIST, OCULUS / REALITY LABS RESEARCH | 2018–2021  
*Scientific Direction & Impact*
- Developed the modeling and experimentation strategy for a novel sEMG foundation model and guided its technical execution, resulting in a draft publication and transfer to Meta's product organization, where it remains in use.
  - Defined the research vision for ML-driven human-in-the-loop experimentation, leading to the creation of [AEPsych](#), an open-source platform enabling SOTA results in this domain ([AISTATS2022](#); [AAAI2023](#); [UAI2024](#)).
  - Drove adoption of AEPsych to 3+ internal teams and external labs, where it enables experiments not previously possible in both applied (e.g. [SIGGRAPH2022](#)), and academic (e.g. [JoV 2025](#)) settings.

### *Program & Organizational Development*

- Lead the human data workstream for the AI Research Agents project, including defining data collection protocols, establishing quality gates, defining the training (SFT/DPO) strategy, and directing a team of 3+ in execution. Scaled data acquisition from zero to a multi-million dollar delivery in under 6 months by engaging with 5+ vendors and 4+ annotation types (45+ distinct engagements).
- Co-authored a charter to consolidate research efforts into a new AI team focused on human-machine collaboration, an initiative that has since grown to a 20+ person organization
- Performed technical due diligence on machine learning systems and data infrastructure for a \$500M+ acquisition.
- Created and lead an org-wide diversity, equity and inclusion champions initiative.

### *Mentorship & people management*

- Provided formal mentorship to 5+ engineers and scientists (L3-L5), including mentoring a senior (L5) scientist and successfully driving a direct report's promotion to an L5 role.

- Drove team growth and development: hired 1 FTE and secured budget for 3 contractors, ran planning and goal-setting, and secured cross-functional alignment and support.
- Mentored 9+ PhD interns on topics including multi-scale memory systems, adaptive experimentation, theory of deep learning, brain-computer interfaces and action recognition.

2014– **Postdoctoral Research Associate, Princeton University**  
 2018 ADVISOR: J. D. Cohen

- Built a theory and model of the dynamics of multi-stimulus decision making, extending the diffusion decision model and sequential probability ratio test. Evaluated against human behavioral data.
- Developed separable covariance models for analysis high-dimensional spatiotemporal neuroimaging data as part of Intel-Princeton collaboration. Open-sourced as part of the [brainIAK](#) package.
- Mentored undergraduate and graduate students.

2009–  
 2014 **Ph.D., Psychology (Cognition & Cognitive Neuroscience), University of Michigan**  
 COMMITTEE: R. L. Lewis & S. Singh (co-chairs), J. Boland, J. Brennan, J. Hale

- Designed, performed and analyzed behavioral, eye-tracking, and computational experiments to drive theoretical developments in the understanding of eye movement control for reading as a bounded-optimal sequential inference process
- Mentored undergraduate and master's students, including co-advising 4 undergraduate senior theses and one accelerated master's thesis.

2008–  
 2009 **Research Assistant, Cognitive Neuroscience of Language Lab, University of Maryland**

- Designed and executed behavioral and neuroimaging experiments while leading infrastructure upgrades, including selecting vendors for two new eye-trackers, implementing a lab-wide backup system, and delivering a technical mini-course.

2007–  
 2008 **Associate Product Manager, Gartner, Inc.**

- Managed the full product lifecycle for a new research offering, driving its expansion from a North American pilot to a worldwide launch that significantly exceeded revenue and adoption targets; presented usage and retention analyses to guide strategy at the executive level.

2007 **B.A., Linguistics, Yale University.** Senior thesis advisor: Maria Piñango.

## Skills and Languages

- **Areas of Expertise:** deep learning (transformers, LLMs); probabilistic machine learning (Gaussian Processes and Bayesian Optimization); applied statistics (mixed effect / hierarchical modeling, probabilistic programming); broad familiarity with other areas of contemporary ML including tensor methods, time series analysis, computer vision, etc.

- **Technical skills:** scientific programming (expert Python & R, familiarity with C++, Unity/C#, and MATLAB); High-throughput and high-performance computing; Deep learning frameworks (PyTorch, Huggingface Accelerate, etc); Neuroimaging methods (fMRI, EEG/MEG/EMG, fNIRS).
- **Leadership & Execution:** Project Management; vendor Management; research planning and roadmapping; stakeholder management.
- **Languages:** English, Russian, Hebrew, basic French.
- **Open-source contributions:** creator of [AEPsych](#) package for adaptive experimentation in psychophysics · primary developer of [brainiak.matnormal](#) prototyping toolkit for kronecker-separable covariance models for neuroscience · contributor to [botorch](#), [gpytorch](#), [pymanopt](#).

## Professional Activities & Awards

- 2015– REVIEWING: **Conferences:** AISTATS (Area Chair since 2022), Cognitive Science, ICLR, ICML, NeurIPS · **Journals:** TMLR, Psychological Review, Journal of Experimental Psychology: General, Journal of Memory and Language, NeuroImage, Frontiers in Psychology, Quarterly Journal of Experimental Psychology, Computational Brain and Behavior, Open Mind.
- 2019– CAREER DEVELOPMENT TALKS: University of Puget Sound Neuroscience Department, Princeton Neuroscience Institute, International Brain Lab, University of Michigan Psychology Department.
- 2018– Founding organizer, Conference on the Mathematical Theory of Deep Neural Networks ([DeepMath](#)).
- 2022
- 2015 Co-organizer, workshop on [Random Walks across Decision Making Domains](#), Computational and Systems Neuroscience (Cosyne) 2015.
- 2014 Best Student Paper, Cognitive Modeling and Computational Linguistics (CMCL) 2014.

## Selected Publications & Talks

For a complete list, see <https://scholar.google.com/citations?user=DFmkeEQAAAAJ>

### JOURNAL ARTICLES, BOOK CHAPTERS, AND PROCEEDINGS

- 2025 Toledo, E., Hambardzumyan, K., Josifoski, M., Hazra, R., Baldwin, N., ..., **Shvartsman, M.**, et al. (2025). AI Research Agents for Machine Learning: Search, Exploration, and Generalization in MLE-bench. To appear in NeurIPS 2025. [pdf](#)
- 2025 Zhao, B., Magka, D., Jiang, M., Li, X., Raileanu, R., ..., **Shvartsman, M.**, et al. (2025). The Automated LLM Speedrunning Benchmark: Reproducing NanoGPT Improvements. To appear in NeurIPS 2025. [pdf](#)
- 2025 Mehlman, N., Gagnon-Audet, J., **Shvartsman, M.**, Niu, K., Miller, A. H., and Sodhani, S. (2025). Scaling and Distilling Transformer Models for sEMG. *Transactions on Machine Learning Research*. [pdf](#)
- 2025 Williams, A., Hong, F., Sanders, C., **Shvartsman, M.**, Guan, P., and Brainard, D. (2025). A Wishart Process model combined with adaptive sampling for efficiently capturing discrimination thresholds in high-dimensional stimulus spaces. *Journal of*

*Vision*, 25(9), 2641-2641. DOI:[10.1167/jov.25.9.2641](https://doi.org/10.1167/jov.25.9.2641)

- 2024 **Shvartsman, M.**, Letham, B., Bakshy, E., and Keeley, S. (2024). Response Time Improves Gaussian Process Models for Perception and Preferences. UAI2024. [pdf](#).
- 2023 Keeley, S., Letham, B., Tymms, C., Sanders, C., and **Shvartsman, M.** A Semi-Parametric Model for Decision Making in High-Dimensional Sensory Discrimination Tasks. AAAI 2023. [pdf](#).
- 2022 Letham, B., Guan, P., Tymms, C., Bakshy, E., and **Shvartsman, M.** Look-Ahead Acquisition Functions for Bernoulli Level Set Estimation. AISTATS2022. [pdf](#).
- 2022 Guan, P., Mercier, O., **Shvartsman, M.**, and Lanman, D. Perceptual Requirements for Eye-Tracked Distortion Correction in VR. SIGGRAPH2022. DOI:[10.1145/3528233.3530699](https://doi.org/10.1145/3528233.3530699)
- 2021 Kumar, M., ..., **Shvartsman, M.**, et al. (2021). BrainIAK: The Brain Imaging Analysis Kit. *Aperture Neuro*. DOI:[10.52294/31bb5b68-2184-411b-8c00-a1dacb61e1da](https://doi.org/10.52294/31bb5b68-2184-411b-8c00-a1dacb61e1da)
- 2018 **Shvartsman, M.**, Sundaram, N., Aoi, M., Charles, A., Willke, T and Cohen, J. D. (2018). Matrix-variate models for fMRI analysis. In Storkey, A., and Perez-Cruz, D., AISTATS2018. Extended version available at arXiv: [1711.03058](https://arxiv.org/abs/1711.03058).
- 2016 **Shvartsman, M.**, Srivastava, V., Sundaram, N., and Cohen, J. D. (2016) Using behavior to decode allocation of attention in context dependent decision making. ICCM2016.
- 2015 **Shvartsman, M.**, Srivastava, V., and Cohen, J. D. (2015) A Theory of Decision Making Under Dynamically Changing Context. NeurIPS2015.
- 2014 **Shvartsman, M.**, Lewis, R. L., and Singh, S. Computationally Rational Saccadic Control: An Explanation of Spillover Effects Based on Sampling from Noisy Perception and Memory. CMCL @ ACL2014. **Best student paper award**.
- 2010 \*Bratman, J., \***Shvartsman, M.**, Lewis, R. L., & Singh, S. (2010). A new approach to exploring language emergence as boundedly optimal control in the face of environmental and cognitive constraints. ICCM2010. (\*equal contribution) **Best Student Paper honorable mention**.

#### WORKING PAPERS, PREPRINTS, AND COMMENTARIES

- In Prep. **Shvartsman, M.**, et al. (in prep.). A foundation model for surface electromyography. Under internal review.
- In Prep. **Shvartsman, M.**, Srivastava, V., Sundaram, N. and Cohen, J. D. (in prep.). A theory of decision making from multiple stimuli. Draft available upon request.

#### POSTERS AND ORAL PRESENTATIONS (WITHOUT PROCEEDINGS)

- 2025 Kalra, D., Gagnon-Audet, J., Gromov, A., Mediratta, I., Niu, K., Miller, A. H., and **Shvartsman, M.** A Scalable Measure of Loss Landscape Curvature for Analyzing the Training Dynamics of LLMs. DeepMath oral 2025.
- 2023 **Shvartsman, M.** (2023) AEPsych: a platform for human-in-the-loop experimentation. Invited talk given at STE||AR Colloquium on Artificial Intelligence Research and Optimization @ LSU, and Perceptual Reality Lab @ Berkeley.
- 2019 **Shvartsman, M.** (2019). Gaussian processes and cognitive models for joint modeling of brain and behavior. **Invited talk**, Joint Modeling Workshop, Midwest Cognitive Science Conference.

- 2017 **Shvartsman, M.**, Srivastava, V., Sundaram, N., and Cohen, J. D. (2017) A theory of decision making under changing context. **Invited talk** given at IBM Research; Koditschek Lab, Dept. of Electrical and Systems Engineering, University of Pennsylvania; Frank Lab, Dept. of Cognitive, Linguistic and Psychological Sciences, Brown University.
- 2014 **Shvartsman, M.**, Lewis, R. L., & Singh, S. (2014) Spillover frequency effects in a sequential sampling model of reading. Talk given at the CUNY conference on human sentence processing. <10% talk acceptance rate.
- 2012 **Shvartsman, M.**, Lewis, R. L., & Singh, S. (2012) The adaptive nature of eye-movement control in linguistic tasks. Talk given at the CUNY conference on human sentence processing. <10% talk acceptance rate.
- 2011 **Shvartsman, M.**, Lewis, R., Singh, S., Smith, M., & Bartek, B. (2011). Predicting Task Performance from Individual Variation in Eye-Movement Control Strategies. Poster presented at the CUNY conference on human sentence processing.
- 2009 **Shvartsman, M.**, Bergelson, E. & Idsardi, W.J. (2009) From tones to vowels: a neurophysiological investigation of sine and formant dyads. Poster presented at the neurobiology of language conference.

### Mentoring and Teaching

- 2020– Mentor for the Aspirations in Computing Program at the National Association for Women in Technology (AiC @ NCWiT) and company-internal mentorship programs.
- 2016–18 Weekly statistics workshops/tutorials for Princeton Neuroscience Institute graduate students and postdocs (jointly with Dave Kleinschmidt).
- 2010–16 Co-mentoring University of Michigan honors undergraduate theses (B. Berend, C. Sanders, M. Shyam, E. Wilcox) and one accelerated masters thesis (Y. Kazerooni).
- 2010–12 Graduate Student Instructor, Introduction to Linguistics and Introduction to Cognitive Psychology. Grader, Introduction to Psycholinguistics.