Shibhansh Dohare

Ph.D. candidate, Computing Science, University of Alberta
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Education

- Ph.D. in Computing Science *2025*
  University of Alberta; Advisors - Richard S. Sutton and A. Rupam Mahmood
  Thesis - *Learning Forever with Artificial Neural Networks*
- Master of Science in Computing Science *2020*
  University of Alberta; Advisors - Richard S. Sutton and A. Rupam Mahmood
  Thesis - *The Interplay of Search and Gradient Descent in Semi-stationary Learning Problems*
- Bachelor of Technology in Computer Science and Engineering 2018
  Indian Institute of Technology Kanpur

Publications

Journal Papers

- *Loss of Plasticity in Deep Continual Learning*. **Shibhansh Dohare**, J Fernando Hernandez-Garcia, Qingfeng Lan, Parash Rahman, Richard S. Sutton, A. Rupam Mahmood. *Nature*, 2024.

Refereed Conference Papers

- *Reinitializing weights vs units for maintaining plasticity in neural networks*. J. Fernando Hernandez-Garcia, **Shibhansh Dohare**, Jun Luo, Richard S. Sutton. CoLLAs 2025, *Oral Presentation*.
- *Automatic Noise Filtering with Dynamic Sparse Training in Deep Reinforcement Learning*. Bram Grooten, Ghada Sokar, **Shibhansh Dohare**, Elena Mocanu, Matthew Taylor, Mykola Pechenizkiy, Decebal Constantin Mocanu. AAMAS 2023.
- *Gamma-Nets: Generalizing Value Estimation over Timescale*. Craig Sherstan, **Shibhansh Dohare**, James MacGlashan, Patrick M. Pilarski. AAAI 2020, *Oral Presentation*.

Workshop & Lightly-Refereed Conference Papers

- *Overcoming Policy Collapse in Deep Reinforcement Learning*. Shibhansh Dohare, Qingfeng Lan, Rupam Mahmood. Sixteenth European Workshop on Reinforcement Learning, 2023.
- *Automatic Noise Filtering with Dynamic Sparse Training in Deep Reinforcement Learning*. Bram Grooten, Ghada Sokar, Shibhansh Dohare, Elena Mocanu, Matthew Taylor, Mykola Pechenizkiy, Decebal Constantin Mocanu. Spotlight at Sparsity in Neural Networks workshop at ICLR 2023.
- *Continual Backprop: Stochastic Gradient Descent with Persistent Randomness*. Shibhansh Dohare, Richard S. Sutton, Rupam Mahmood. Reinforcement Learning and Decision Making (RLDM), 2022.
- *The Interplay of Search and Gradient Descent in Semi-stationary Learning Problems*. Shibhansh Dohare, Rupam Mahmood, Richard S. Sutton. Beyond Backpropagation, Workshop at NeurIPS 2020.
- *Unsupervised semantic abstractive summarization*. Shibhansh Dohare, Vivek Gupta, Harish Karnick. In Proceedings of ACL 2018, Student Research Workshop.

Media

- CHED radio station in Edmonton to discuss loss of plasticity *Nov 2024*
- AMII's Approximately Correct Podcast *Sep 2024*
  What it's like to publish in Nature [Spotify]
- New Scientist *Aug 2024*
  AI models can't learn as they go along like humans do
- Nature News and Views *Aug 2024*
  Switching between tasks can cause AI to lose the ability to learn
- **Nature Podcast** *Aug 2024*
  AI can't learn new things forever — an algorithm can fix that [Spotify]

Work Experience

- *Research Intern*, Huawei Technologies Canada *May'24 - Ongoing*
- *Teaching Assistant*, University of Alberta
  - CMPUT 365: Introduction to Reinforcement Learning *Jan'24 - Apr'24*
  - CMPUT 365: Introduction to Reinforcement Learning *Jan'23 - Apr'23*
  - CMPUT 397: Reinforcement Learning *Jan'22 - Apr'22*
  - CMPUT 296: Basics of Machine Learning *Jan'20 - Apr'20*
- *Reinforcement Learning Researcher*, NTWIST *Jun'21 - Dec'21*

Research

- My long-term research goal is to understand the workings of our minds. Specifically, to help find the computational principles that give rise to the mind. In pursuit of this goal, I am working on various aspects of continual learning, reinforcement learning, and deep learning
- I have contributed to exposing a fundamental problem with deep learning systems, where these systems lose the ability to learn new things. I also developed the continual backpropagation algorithm to overcome this problem.

Invited Talks and Panel Discussions

- Loss of Plasticity in Deep Continual Learning
  - National University of Singapore *April 2025*
  - Scalable Next Generation AI for the Real World, Singapore *Dec 2024*
  - Montreal Institute of Learning Algorithms *Nov 2024*
  - **Keynote** at AI Summit, Block Inc *Nov 2024*
  - Openmind Continual Learning Retreat *Oct 2024*
  - IEEE Functional Safety Standards Committee *Oct 2024*
  - Simon Fraser University *Sep 2024*
  - University of British Colombia *Sep 2024*
  - Beijing Academy of Artificial Intelligence *Sep 2024*
- Panelist for discussion on Continual Learning *Nov 2023*
  Thought Club of Huawei Canada Research Institute
- Maintaining Plasticity in Deep Continual Learning [video]
  - Openmind Continual Learning Retreat *Nov 2023*
  - Barbados Reinforcement Learning Workshop *Feb 2023*
  - AI Seminar, University of Alberta *Jan 2023*
  - RL Sofa, MILA *Nov 2022*
  - **Keynote** at CoLLAs 2022, shared with Richard S. Sutton *Aug 2022*
- Tea Time Talk — University of Alberta 2019, 2020, 2021, 2023
- The Interplay of Search and Gradient Descent in Semi-stationary Learning Problems *Sep 2020*
  M.Sc. thesis seminar, University of Alberta

Selected Achievements and Accolades

- Received the University of Alberta Doctoral Recruitment Award, 2021
- Co-led IIT Kanpur's team in its debut in the National Competition on Student Autonomous Underwater Vehicle (2016); we secured second position among 17 teams
- **Ranked 144** among the top 150,000 students selected from JEE Main in JEE Advanced 2014
- Scored 325/360 (**99.99 percentile**) in JEE-Main examination 2014 with over 1.3 million students
- Awarded KVPY fellowship in 2013-14 organized by the Department of Science and Technology, India

Technical Skills

- Proficient in languages like Python and C/C++. Eight years of experience with Linux-based operating systems, Shell scripting (Bash), and version control (Git)
- In-depth experience with ML frameworks like Pytorch, Tensorflow, NumPy, SciPy
- Ability to communicate clearly as demonstrated by published works and public presentations
- Deep Learning, Machine Learning, Continual Learning, Reinforcement Learning, Transformers, Language Models, Reproducibility, Statistics, Computational Experiments

Community Services

Organizing

- Co-organized Openmind Retreat 2024
- Co-organized the first RLAI Summit 2024

Reviewing

- Applications for CIFAR Deep Learning & Reinforcement Learning Summer School 2023, 2024
- Transactions on Machine Learning Research 2025
- NeurIPS, (Top) Reviewer 2023, 2024, 2025
- CoLLAs 2023, 2024, 2025
- ICLR 2024, 2025
- ICML 2024, 2025
- IJCAI 2024
- RLC 2024, 2025
- CVPR Continual Learning Workshop 2024
- IMOL Workshop at NeurIPS 2023