# Shibhansh Dohare

Ph.D. student, Computing Science, University of Alberta
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## Educational Qualifications

- **Ph.D.** in Computing Science *Ongoing*
  University of Alberta; Advisors - Dr. Richard S. Sutton and Dr. Rupam Mahmood
- **Master of Science** in Computing Science *2020*
  University of Alberta; Advisors - Dr. Richard S. Sutton and Dr. 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

### In preparation

- *Maintaining Plasticity in Deep Continual Learning.* **Shibhansh Dohare**, J Fernando Hernandez-Garcia, Parash Rahman, Richard S. Sutton, A. Rupam Mahmood. In Preparation.

### Refereed Conferences

- *Gamma-Nets: Generalizing Value Estimation over Timescale*. Craig Sherstan, **Shibhansh Dohare**, James MacGlashan, Patrick M. Pilarski. AAAI 2020, *Oral Presentation.*

### Workshops & Lightly-Refereed Conferences

- *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.

## Achievements and Accolades

- Received the University of Alberta Doctoral Recruitment Award, 2021
- Co-led the university's team in our debut in the National Competition on Student Autonomous Underwater Vehicle (2016); we were the first runner-ups among 17 teams
- Ranked **144** among 150,000 students selected from JEE MAINS in JEE Advanced '14
- Scored 325/360 (**99.99 percentile**) in JEE-MAINS examination '14 over 1.3 million students
- Awarded KVPY fellowship in 2013-14 organized by the Department of Science and Technology, India

## Presentations and Posters

- Maintaining Plasticity in Deep Continual Learning [video]
  Keynote at CoLLAs, shared with Dr. Richard S. Sutton *(August 2022)*
  RL Sofa, MILA *(Nov 2022)*
- The Interplay of Search and Gradient Descent in Semi-stationary Learning Problems
  M.Sc. thesis seminar, University of Alberta *(Sep 2020)*
- Tea Time Talk — University of Alberta 2019, 2020, 2021
- AAAI Conference (poster) 2020
- The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (poster) 2019, 2022

## Experiences

- **Graduate Research Assistant** *(May'19 - Ongoing)*
  RLAI Lab at the University of Alberta
  - Established that the deep learning algorithm loses plasticity in continual learning problems
  - Developed the continual backpropagation algorithm that solves the loss of plasticity by selectively re-initializing low-utility hidden units
  - Mentored undergraduate students on research projects during their internships
- **Data Scientist Contract**, Alberta Machine Intelligence Institute (AMII) *(Jan'20 - Apr'20)*
  - Provided machine learning expertise to client companies
  - Worked with a team of data scientists to explore the potential of intelligent systems in new domains
- **AI Career Accelerator Program Participant**, AMII *(Oct'22 - Nov'22)*
  - Judged capstone projects of participants of Amii's ML Technician program
  - Developed a knowledge repository of frequently encountered ML methods and tools in time series analysis
- **Undergraduate Researcher** *(Jan'17 - Dec'17)*
  **Mentor:** Prof. Harish Karnick, Dept. of Computer Science and Engineering, IIT Kanpur
  - Developed a novel algorithm for abstractive text summarization based on Abstract Meaning Representation
  - Outperformed previous methods that used Abstract Meaning Representation for summarization
  - Highlighted the need for new datasets and evaluation metrics for summarization
- **Teaching Assistant**
  - CMPUT 296: Basics of Machine Learning, University of Alberta *Jan'20 - Apr'20*
  - CMPUT 397: Reinforcement Learning, University of Alberta *Jan'22 - Apr'22*

## Research Interests

- My long-term research goal is to understand the working of our minds. Specifically, to find the fundamental computational principles that give rise to the Mind, popularly and unfortunately known as *Artificial* Intelligence
- In pursuit of this goal, I am working on various aspects of online representation learning, reinforcement learning, and deep learning
- Most recently, I have focused on designing algorithms that can keep learning new things as our recent work showed that standard deep learning algorithms slowly lose plasticity, the ability to keep learning new things

## Technical Skills

- Proficient in languages like Python, C/C++, and Matlab. Seven years of experience with Linux-based operating systems, Shell scripting (Bash), and version control (Git)
- In-depth experience with popular machine learning and linear algebra libraries like Pytorch, Tensorflow, Numpy, Pandas, sklearn, ROS, and nltk
- Ability to communicate clearly as demonstrated by published works and public presentations

## Community

- Assisted at the Deep Learning & Reinforcement Learning Summer School (DLRLSS) 2019
- Volunteered with Circle K International in Fall 2019
- Volunteered at the 56th Annual Meeting of the Association for Computational Linguistics (ACL) in 2018
- Co-led the AUV Team at IIT Kanpur from 2015-16; we obtained and managed funds worth 800,000 INR; I coordinated a team of 5 students to develop the software to integrate low-level hardware signals with high-level mission planning
- Pool Technical Captain of Mauryans in Takneek 2015 at IIT Kanpur; led two hostels (Hall 3, 7) with 500 students each in the annual inter-pool technical competition(Takneek)