RESEARCH INTERESTS
Reinforcement Learning, Information Theory, Machine Learning, Artificial Intelligence

EDUCATION

Stanford University
Ph.D. Candidate in Computer Science
Advisor: [Benjamin Van Roy]  
[In progress, Fall 2018 -]

Brown University
M.S. in Computer Science
B.S. in Computer Science
Advisor: [Michael L. Littman]  
[May 2018]
[May 2017]

SELECTED PAPERS & PUBLICATIONS

1. On Rate-Distortion Theory in Capacity-Limited Cognition & Reinforcement Learning
   - [Dilip Arumugam], Mark K. Ho, Noah D. Goodman, Benjamin Van Roy.
   - NeurIPS Workshop on Information-Theoretic Principles in Cognitive Systems, 2022.

2. Deciding What to Model: Value-Equivalent Sampling for Reinforcement Learning
   - [Dilip Arumugam], Benjamin Van Roy.
   - Advances in Neural Information Processing Systems (NeurIPS), 2022.
   - ICML Workshop on Decision Awareness in Reinforcement Learning, 2022.

3. Planning to the Information Horizon of BAMDPs via Epistemic State Abstraction
   - [Dilip Arumugam], Satinder Singh.
   - Advances in Neural Information Processing Systems (NeurIPS), 2022.
   - NeurIPS Workshop on Ecological Theory of Reinforcement Learning, 2021

4. Between Rate-Distortion Theory & Value Equivalence in Model-Based Reinforcement Learning
   - [Dilip Arumugam], Benjamin Van Roy.
   - Multi-disciplinary Conference on Reinforcement Learning & Decision Making (RLDM), 2022.

5. The Value of Information When Deciding What to Learn
   - [Dilip Arumugam], Benjamin Van Roy.
   - Advances in Neural Information Processing Systems (NeurIPS), 2021.

6. Bad-Policy Density: A Measure of Reinforcement Learning Hardness
   - David Abel, Cameron Allen, [Dilip Arumugam], D. Ellis Hershkowitz, Michael L. Littman, Lawson L.S. Wong.
   - ICML Workshop on Reinforcement Learning Theory, 2021.
7. Deciding What to Learn: A Rate-Distortion Approach

Dilip Arumugam, Benjamin Van Roy.
International Conference on Machine Learning (ICML), 2021.

8. An Information-Theoretic Perspective on Credit Assignment in Reinforcement Learning

Dilip Arumugam, Peter Henderson, Pierre-Luc Bacon.
NeurIPS Workshop on Biological and Artificial Reinforcement Learning, 2020.

9. Randomized Value Functions via Posterior State-Abstraction Sampling

Dilip Arumugam, Benjamin Van Roy.
NeurIPS Workshop on Biological and Artificial Reinforcement Learning, 2020.

10. Value Preserving State-Action Abstractions

David Abel, Nate Umbanhowar, Khimya Khetarpal, Dilip Arumugam, Doina Precup, Michael L. Littman.
International Conference on Artificial Intelligence and Statistics (AISTATS), 2020.
Multi-disciplinary Conference on Reinforcement Learning & Decision Making (RLDM), 2019.
ICLR Workshop on Structures and Priors in Reinforcement Learning, 2019.

11. Goal-Directed Learning as a Bi-level Optimization Problem

Pierre-Luc Bacon, Dilip Arumugam, Emma Brunskill
Multi-disciplinary Conference on Reinforcement Learning & Decision Making (RLDM), 2019.

12. State Abstraction as Compression in Apprenticeship Learning

David Abel, Dilip Arumugam, Kavosh Asadi, Yuu Jinnai, Michael L. Littman, Lawson L.S. Wong.
Association for the Advancement of Artificial Intelligence (AAAI) Conference, 2019.

13. Deep Reinforcement Learning from Policy-Dependent Human Feedback

Dilip Arumugam, Jun Ki Lee, Sophie Saskin, Michael L. Littman.
Preprint, 2018.

14. Grounding Natural Language Instructions to Semantic Goal Representations for Abstraction and Generalization

Dilip Arumugam*, Sidd Karamcheti*, Nakul Gopalan, Eddie Williams, Mina Rhee, Lawson L.S. Wong, Stefanie Tellex.
Autonomous Robots (AuRo), 2018.

15. State Abstractions for Lifelong Reinforcement Learning

David Abel, Dilip Arumugam, Lucas Lehmert, Michael L. Littman.
International Conference on Machine Learning (ICML), 2018.

16. Sequence-to-Sequence Language Grounding of Non-Markovian Task Specifications

Nakul Gopalan*, Dilip Arumugam*, Lawson L.S. Wong, Stefanie Tellex.
Robotics: Science and Systems, 2018.
17. Mitigating Planner Overfitting in Model-Based Reinforcement Learning

Dilip Arumugam, David Abel, Kavosh Asadi, Nakul Gopalan, Chris Grimm, Jun Ki Lee, Lucas Lehnert, Michael L. Littman.
Preprint, 2017.

18. Accurately and Efficiently Interpreting Human-Robot Instructions of Varying Granularities

Dilip Arumugam*, Siddharth Karamcheti*, Nakul Gopalan, Lawson L.S. Wong, Stefanie Tellex.
Robotics: Science and Systems, 2017.

19. Grounding English Commands to Reward Functions

James MacGlashan, Monica Babes-Vroman, M. desJardins, Michael L. Littman, Smaranda Muresan, Shawn Squire, Stefanie Tellex, Dilip Arumugam, and Lei Yang.
Robotics: Science and Systems, 2015.

PROFESSIONAL EXPERIENCE

Research Scientist Intern
DeepMind, London, UK
Mentors: Brendan O’Donoghue & Satinder Singh
Summer 2021

Visiting Researcher
Montreal Institute for Learning Algorithms (MILA), Montreal, QC
Mentor: Pierre-Luc Bacon
Summer 2020

Reinforcement Learning Group Research Intern
Microsoft Research, Redmond, WA
Mentor: Debadeepta Dev
Summer 2019

Microsoft Research, Cambridge, UK
Mentors: Matthew Johnson, Katja Hofmann, & Dave Bignell
Summer 2016

TEACHING EXPERIENCE

Stanford University (⋆ = TA, † = Head TA, ‡ = Guest Lecturer)

† Reinforcement Learning (CS234), Emma Brunskill, Winter 2022-2023.

‡ Reinforcement Learning: Frontiers (MS&E338), Benjamin Van Roy, Spring 2021-2022.

† Reinforcement Learning (CS234), Emma Brunskill, Winter 2021-2022. (Reviews)

⋆ Deep Multi-Task & Meta Learning (CS330), Chelsea Finn & Karol Hausman, Autumn 2021-2022.

⋆ Reinforcement Learning (CS234), Emma Brunskill, Winter 2020-2021. (Reviews)

⋆ Deep Multi-Task & Meta Learning (CS330), Chelsea Finn, Autumn 2020-2021.

⋆ Artificial Intelligence: Principles & Techniques (CS221), Chelsea Finn & Nima Anari, Spring 2019-2020.

Brown University
- Deep Learning (CSCI1470/CSCI2470), Eugene Charniak, Fall 2017.
- Deep Learning Seminar (CSCI2950K), Eugene Charniak, Fall 2016.
- Applied Artificial Intelligence (CSCI1410), Stefanie Tellex, Fall 2015.

**AWARDS & SERVICE**

Conference Reviewer - CoRL (2018), ICML (2020 [Top Reviewer Award], 2021, 2022), NeurIPS (2021 [Outstanding Reviewer Award]), ICLR (2022), IEEE TPAMI (2021)

Program Committee - NeurIPS Deep RL Workshop (2020, 2021, 2022), ICML Decision Awareness in RL Workshop (2022)

Student Co-organizer, Stanford Reinforcement Learning Group, 2020 - present.

Brown University CS Department Incoming Graduate Student Orientation Czar, 2017.

Brown University CS Department Senior Prize, 2017.

Sigma Xi Scientific Research Honor Society, 2017.