

DILIP ARUMUGAM

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EDUCATION

Stanford University

Ph.D. Candidate in Computer Science

M.S. in Statistics

Advisor: Benjamin Van Roy

Committee: Chelsea Finn, Emma Brunskill, Tsachy Weissman

Expected June 2024

Expected March 2024

Brown University

M.S. in Computer Science

B.S. in Computer Science

Advisor: Michael L. Littman

May 2018

May 2017

TEACHING EXPERIENCE (★ = TA, † = HEAD TA, ‡ = GUEST LECTURER)

Stanford University [All Teaching Reviews]

- † Reinforcement Learning (CS234), Emma Brunskill, Spring 2023-2024.
- ★ Deep Reinforcement Learning (CS224R), Chelsea Finn & Karol Hausman, Spring 2022-2023.
- ‡ Reinforcement Learning: Frontiers (MS&E338), Benjamin Van Roy, Spring 2022-2023.
- † 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.
- ★ Deep Multi-Task & Meta Learning (CS330), Chelsea Finn & Karol Hausman, Autumn 2021-2022.
- ★ Reinforcement Learning (CS234), Emma Brunskill, Winter 2020-2021.
- ★ 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.

PUBLICATIONS

Peer-Reviewed (Journals & Conferences)

- *Bayesian Reinforcement Learning under Limited Cognitive Load*

Dilip Arumugam*, Mark K. Ho*, Noah D. Goodman, Benjamin Van Roy.

Open Mind: Discoveries in Cognitive Science – to appear, 2024.

- *Deciding What to Model: Value-Equivalent Sampling for Reinforcement Learning*
Dilip Arumugam, Benjamin Van Roy.
 Advances in Neural Information Processing Systems (NeurIPS), 2022.
 Multi-disciplinary Conference on Reinforcement Learning & Decision Making (RLDM), 2022.
 ICML Workshop on Decision Awareness in Reinforcement Learning, 2022.
- *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.
- *The Value of Information When Deciding What to Learn*
Dilip Arumugam, Benjamin Van Roy.
 Advances in Neural Information Processing Systems (NeurIPS), 2021.
- *Deciding What to Learn: A Rate-Distortion Approach*
Dilip Arumugam, Benjamin Van Roy.
 International Conference on Machine Learning (ICML), 2021.
- *Flexible and Efficient Long-Range Planning through Curious Exploration*
 Aidan Curtis, Minjian Xin, **Dilip Arumugam**, Kevin Feigelis, Daniel Yamins
 International Conference on Machine Learning (ICML), 2020.
- *Value Preserving State-Action Abstractions*
 David Abel, Nathan 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.
- *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.
- *Grounding Natural Language Instructions to Semantic Goal Representations for Abstraction and Generalization*
Dilip Arumugam*, Siddharth Karamcheti*, Nakul Gopalan, Eddie Williams, Mina Rhee, Lawson L.S. Wong, Stefanie Tellex.
 Autonomous Robots (AuRo), 2018.

- *State Abstractions for Lifelong Reinforcement Learning*

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

- *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.

- *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.

- *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.

Manuscripts & Preprints

- *Satisficing Exploration for Deep Reinforcement Learning*

Dilip Arumugam, Saurabh Kumar, Ramki Gummadi, Benjamin Van Roy.
In preparation, 2024.

Non-Archival Publications

- *Social Contract AI: Aligning AI Assistants with Implicit Group Norms*

Jan-Philipp Fränken, Sam Kwok, Peixuan Ye, Kanishk Gandhi, **Dilip Arumugam**, Jared Moore, Alex Tamkin, Tobias Gerstenberg, Noah D. Goodman.
NeurIPS Workshop on Socially Responsible Language Modelling Research (Spotlight + Oral), 2023.

- *Cultural Reinforcement Learning: A Framework for Modeling Cumulative Culture on a Limited Channel*

Ben Prystawski, **Dilip Arumugam**, Noah D. Goodman.
Proceedings of the 45th Annual Meeting of the Cognitive Science Society (CogSci), 2023.

- *Hindsight-DICE: Stable Credit Assignment for Deep Reinforcement Learning*

Akash Velu*, Skanda Vaidyanath*, **Dilip Arumugam**.
Preprint, 2023.

- *Fine-Tuning Inclusive Language Models*

Wanqiao Xu, Shi Dong, **Dilip Arumugam**, Benjamin Van Roy.
Preprint, 2023.

- *Inclusive Artificial Intelligence*
Dilip Arumugam, Shi Dong, Benjamin Van Roy.
 Preprint, 2022.
- *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.
- *In the ZONE: Measuring Difficulty and Progression in Curriculum Generation*
 Rose E. Wang, Jesse Mu, **Dilip Arumugam**, Natasha Jaques, Noah D. Goodman.
 NeurIPS Deep Reinforcement Learning Workshop, 2022.
- *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.
- *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.
- *Randomized Value Functions via Posterior State-Abstraction Sampling*
Dilip Arumugam, Benjamin Van Roy.
 NeurIPS Workshop on Biological and Artificial Reinforcement Learning, 2020.
- *Reparameterized Variational Divergence Minimization for Stable Imitation*
Dilip Arumugam, Debadeepta Dey, Alekh Agarwal, Asli Celikyilmaz, Elnaz Nouri, Bill Dolan.
 Preprint, 2019.
- *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.
- *Deep Reinforcement Learning from Policy-Dependent Human Feedback*
Dilip Arumugam, Jun Ki Lee, Sophie Saskin, Michael L. Littman.
 Preprint, 2018.
- *A Tale of Two DRAGGNs: A Hybrid Approach for Interpreting Action-Oriented and Goal-Oriented Instructions*
 Siddharth Karamcheti, Eddie Williams, **Dilip Arumugam**, Mina Rhee, Nakul Gopalan, Lawson L.S. Wong, Stefanie Tellex

ACL Workshop on Language Grounding for Robotics, 2017. [*Best Paper Award*]

· *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.

INDUSTRY EXPERIENCE

Technical Advisor on AI Summer 2023
SCB10X, Bangkok, Thailand
Contact: Mukaya (Tai) Panich

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

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

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

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

INVITED TALKS

Deciding What to Learn 2024
• Brown University
• Harvard University
• University of Toronto
• Princeton University

Deciding What to Learn in Multi-Armed Bandits 2023-2024
• Arizona State University
• Princeton University
• University of Southern California
• Cornell University
• Cornell Tech
• University of Washington

AWARDS & SERVICE

Conference Reviewer

ICML – 2020 [Top Reviewer Award], 2021, 2022, 2023

NeurIPS – 2021 [Outstanding Reviewer Award], 2023 [Top Reviewer Award]

ICLR – 2022

CoRL – 2018

IEEE Transactions on Information Theory – 2024

Journal Reviewer

JMLR – 2023

JAIR – 2023

IEEE TPAMI – 2021

Program Committee

NeurIPS Deep RL Workshop – 2020, 2021, 2022

ICML Decision Awareness in RL Workshop – 2022

ICML Neural Compression Workshop – 2023

NeurIPS Information-Theoretic Principles in Cognitive Systems Workshop – 2023

Student Co-organizer, Stanford Reinforcement Learning Group, 2020 - 2021.

Brown University CS Department Senior Prize, 2017.

Sigma Xi Scientific Research Honor Society, 2017.

Brown University CS Department Undergraduate Research Symposium Award, Spring 2017.