

Sébastien M. R. Arnold

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Education

Ph. D. Computer Science

University of Southern California, Los Angeles, CA, USA

August 2017 - May 2023

B. Sc. Computer Science (*with honors*)

B. A. Mathematics (*with honors*)

University of Southern California, Los Angeles, CA, USA

August 2014 - August 2017

Experience

Machine Learning Lab - USC

Doctoral Candidate - Advisor: Prof. Fei Sha

Topic: Inductive biases for multi-task, transfer, and meta-learning. See: [P1](#), [P2](#), [P3](#), [P5](#), [P6](#), [P7](#), [T1](#), [T3](#), [T5](#)

August 2017 - Present

Language Team - Google

Research Intern - Manager: Dr. Ice Pasupat

Project: Meta-learning for large language models.

May 2022 - August 2022

Prime Economics - Amazon

Applied Scientist Intern - Manager: Dr. Charlie Manzanares

Project: Learning causal representations with weak contextual instruments.

May 2021 - August 2021

AWS AI - Amazon

Applied Scientist Intern - Manager: Dr. Avinash Ravichandran

Project: Episodic sampling for meta-learning. See: [P4](#), [T2](#)

May 2020 - August 2020

Mila - U. de Montreal

Visiting Ph.D. Researcher - Host: Prof. Ioannis Mitliagkas

Topic: Variance reduction in online stochastic optimization. See: [P8](#), [T4](#)

June 2018 - September 2018

Brain-Body Dynamics Lab - USC

Undergraduate Researcher - Advisor: Prof. Francisco Valero-Cuevas

Topic: Reinforcement learning for simulated, robotic, and cadaveric continuous control. See: [P12](#), [M2](#)

July 2016 - August 2017

Simulation and Modelling Lab - USC

Undergraduate Researcher - Advisor: Prof. Chunming Wang

Topic: Second-order optimization methods for distributed deep learning. See: [P11](#)

April 2016 - August 2017

Nervana - Intel

Algorithm Intern - Manager: Dr. Arjun Bansal

Project: Lead development of internal distributed deep learning library for [neon](#).

August 2015 - August 2016

Selected Publications available on [Semantic Scholar](#)

- P1 **Policy-Induced Self-Supervision Improves Representation Finetuning in Visual RL**
S. M. R. Arnold, F. Sha, *ArXiv Preprints*, 2023
- P2 **A Domain-Agnostic Approach for Characterization of Lifelong Learning Systems**
M. M. Baker et al. (47 authors), *Neural Networks*, 2023
- P3 **Policy Learning and Evaluation with Randomized Quasi-Monte Carlo**
S. M. R. Arnold, L. Chen, Y-F. Chen, P. L'Ecuyer, F. Sha, *AISTATS*, 2022
- P4 **Uniform Sampling over Episode Difficulty**
S. M. R. Arnold, G. S. Dhillon, A. Ravichandran, S. Soatto, *NeurIPS*, 2021, **Spotlight (Top 3%)**
- P5 **Embedding Adaptation Is Still Required For Few-Shot Learning**
S. M. R. Arnold, F. Sha, *ArXiv Preprints*, 2021
- P6 **learn2learn: A Library for Meta-Learning Research**
S. M. R. Arnold, P. Mahajan, D. Datta, I. Bunner, K. S. Zarkias, *ArXiv Preprints*, 2020
- P7 **When MAML Can Adapt Fast and How to Assist When It Cannot**
S. M. R. Arnold, S. Iqbal, F. Sha, *AISTATS*, 2021
- P8 **Reducing the Variance in Online Optimization by Transporting Past Gradients**
S. M. R. Arnold, P.-A. Manzagol, R. Babanezhad, I. Mitliagkas, N. Le Roux, *NeurIPS*, 2019, **Spotlight (Top 3%)**
- P9 **Understanding the Variance of Policy Gradient Estimators in Reinforcement Learning**
S. M. R. Arnold, J. A. Preiss, C-Y. Wei, M. Kloft, *SoCal ML Symposium*, 2019, **Best Poster Award**
- P10 **Writing Distributed Applications with PyTorch**
S. M. R. Arnold, *PyTorch Tutorials*, 2017, **200k+ Page Views** (as of December 2020)
- P11 **Accelerating SGD for Distributed Deep Learning Using an Approximated Hessian Matrix**
S. M. R. Arnold, C. Wang, *ICLR Workshop*, 2017
- P12 **Shapechanger: Environments for Transfer Learning**
S. M. R. Arnold, T. K. Pun, T. J. Denisart, F. J. Valero-Cuevas, *SoCal Robotics Symposium*, 2017

Selected Talks available [online](#)

- T1 **The Importance of Depth in Meta-Learning**
Invited Talk, *Cohere - Toronto, Canada (Remote)*, November 2022
Invited Talk, *OpenAI - San Francisco, USA (Remote)*, October 2022
- T2 **Uniform Sampling over Episode Difficulty**
Spotlight, *EPFL's NeurIPS Mirror Event - Lausanne, Switzerland*, December 2021
- T3 **To Transfer or To Adapt: A Study Through Few-Shot Learning**
Invited Talk, *Amazon - Seattle, USA*, August 2021
Invited Talk, *Google - Mountain View, USA (Remote)*, April 2021

T4 **Reducing the Variance in Online Optimization by Transporting Past Gradients**

Spotlight, *NeurIPS - Vancouver, Canada*, December 2019

T5 **learn2learn: A Meta-Learning Framework for Researchers**

Invited Talk, *Pytorch Dev Conference - San Francisco, USA*, October 2019

T6 **Introduction to Modern Reinforcement Learning**

Guest Lecture, *CSCI467, USC - Los Angeles, USA*, November 2018

Selected Software available on [GitHub](#)

learn2learn: A Library for Meta-Learning Research (Python, C/C++)

State-of-the-art implementation of algorithms & benchmarks for meta-learning research.

1st place at the Facebook PyTorch Summer Hackathon, 2019. 2.1k Stars, 27 Contributors.

Website: learn2learn.net GitHub: [learnables/learn2learn](https://github.com/learnables/learn2learn) ArXiv: [abs/2008.12284](https://arxiv.org/abs/2008.12284)

Professional Service

Reviewer TMLR'22-'23, ICLR'22-'23, NeurIPS'21-'22, ICML'21-'23, CVPR'21-'23, AISTATS'21-'22, ICCV'21, IEEE TSP'20, JOSS'20-'21.

Selected Awards

Google Research Award \$11,300 for research on Google Cloud Platform	2022
NeurIPS'21 Outstanding Reviewer Award Top 8% of reviewers	2021
East European ML Summer School Best Theory Poster	2019
USC Award for Excellence in Mathematics Honorable Mention (2 nd in Mathematics Department)	2017
USC Undergraduate Research Project 2 nd Place in Mathematics, Physics, and Engineering Departments	2017
David Wiesen Scholarship Recipient	2016
Microsoft Tuition Scholarship Finalist	2016
USC Provost Research Fellowship Recipient	2015, 2016
USC Viterbi Dean's List Recipient	2014, 2015, 2016

Press Coverage

M1 For gifted students, USC initiative fosters summer learning by <i>D. Krieger</i> , USC News	August 2019
M2 The Quest To Make A Robotic Cat Walk with Artificial Neurons by <i>M. Simon</i> , WIRED	March 2018

Mentoring

Jayasurya Sridharan – USC Computer Science B.Sc. *May 2019 - August 2019*
Project: Parallel and Differentiable Simulation of UAVs.

Ian Bunner – USC Quantitative Biology B.Sc. *December 2018 - September 2019*
Project: Off-Policy Meta-Reinforcement Learning.

Darío Urbina – USC Biomedical Engineering Ph.D. *January 2018 - May 2018*
Project: Reinforcement Learning for Tendon-driven Quadruped Locomotion.