NICHOLAS ROBERTS

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA August 2019 - May 2021
M.S. Machine Learning **GPA:** 3.950
University of California San Diego, La Jolla, CA September 2015 - March 2019
B.S. Computer Science, Mathematics minor **GPA:** 3.864
- CSE Highest Distinction and Magna Cum Laude
- CSE Honors Thesis: *Soft Purity Loss: Directly Optimizing for Cluster Purity*

Fresno City College, Fresno, CA August 2013 - May 2015
Computer Science **GPA:** 3.845
- Leon S. Peters Honors Program

PUBLICATIONS

*equal contribution †alphabetical

WORK IN SUBMISSION

N. Roberts*, M. Khodak*, T. Dao, L. Li, M.F. Balcan, C. Ré, A. Talwalkar. (2021). *Searching for Convolutions and a More Ambitious NAS*. International Conference on Learning Representations (ICLR) 2021 (under review).

PEER-REVIEWED JOURNAL PUBLICATIONS

C. Zhang*, Y. Idelbayev*, **N. Roberts**, Y. Tao, Y. Nannapaneni, B.M. Duggan, J. Min, E.C. Lin, E.C. Gerwick, G.W. Cottrell, W.H. Gerwick. (2017). *Small Molecule Accurate Recognition Technology (SMART) to Enhance Natural Products Research*. Nature Scientific Reports.

PEER-REVIEWED CONFERENCE PUBLICATIONS

S. Dasgupta†, A. Dey†, **N. Roberts**†, S. Sabato†. (2018). *Learning from discriminative feature feedback*. Neural Information Processing Systems (NeurIPS), 2018.

PEER-REVIEWED WORKSHOP PUBLICATIONS

N. Roberts, D. Liang, G. Neubig, Z.C. Lipton. (2020). *Decoding and Diversity in Machine Translation*. NeurIPS 2020 Resistance AI Workshop.

M. Khodak, L. Li, **N. Roberts**, M.F. Balcan, A. Talwalkar. (2020). *A Simple Setting for Understanding Neural Architecture Search with Weight-Sharing*. ICML 2020 AutoML Workshop.

M. Khodak*, L. Li*, **N. Roberts**, M.F. Balcan, A. Talwalkar. (2020). *Weight-Sharing Beyond Neural Architecture Search: Efficient Feature Map Selection and Federated Hyperparameter Tuning*. MLSys 2020 On-Device Intelligence Workshop.

N. Roberts, D.A. Yap, V.U. Prabhu. (2019). *Deep Connectomics Networks: Neural Network Architectures Inspired by Neuronal Networks*. NeurIPS 2019 Real Neurons and Hidden Units Workshop.

N. Roberts, P.S. Purushothama, V.T. Vasudevan, S. Ravichandran, C. Zhang, W.H. Gerwick, G.W. Cottrell. (2019). *Using Deep Siamese Neural Networks to Speed up Natural Products Research*. NeurIPS 2019 workshop on Machine Learning and the Physical Sciences.

D.A. Yap, **N. Roberts**, V.U. Prabhu. (2019). *Grassmannian Packings in Neural Networks: Learning with Maximal Subspace Packings for Diversity and Anti-Sparsity*. NeurIPS 2019 Workshop on Bayesian Deep Learning.

N. Roberts, V.U. Prabhu, M. McAteer. (2019). *Model Weight Theft With Just Noise Inputs: The Curious Case of the Petulant Attacker*. ICML 2019 Workshop on Security and Privacy of Machine Learning.

PRESENTATIONS

Model Weight Theft With Just Noise Inputs: The Curious Case of the Petulant Attacker

- **Spotlight presentation**
  ICML 2019 Workshop on Security and Privacy of Machine Learning. Long Beach, CA, USA. June 2019.

Small Molecule Accurate Recognition Technology: A Digital Frontier to Reshape Natural Product Research

- **Spotlight presentation**
  Applied Machine Learning Days 2018. Lausanne, Switzerland. January 2018.

AWARDS

"Travel" Award 2020
Neural Information Processing Systems (NeurIPS)

Outstanding Undergraduate Researcher Award (honorable mention) 2019
Computing Research Association (CRA)

Travel Award 2018
Neural Information Processing Systems (NeurIPS)

Best Spotlight Presentation Award 2018
Applied Machine Learning Days (AMLD)

MISC. PROJECTS

Searching Skip Connection Graphs with RogueNet with Professor Ameet Talwalkar (CMU)

· Developed a ResNet-based NAS search space, comprising only skip connections, to study edge learning
· Evaluated the edge learning performance of various stochastic and mixture relaxation NAS methods

Adversarial Robustness Bounds for Recurrent Neural Networks with Professor David Meyer (UCSD)

· Extended existing adversarial robustness work on lower bounding adversarial perturbation norms to RNNs

Kumaraswamy-Beta Variational Autoencoder with Professor David Meyer (UCSD)

· Developed a novel probabilistic approach to learning disentangled Boolean attributes of image data
· Evaluated the performance of learning disentangled Boolean attributes of the CelebA dataset

Soft Purity Loss: Directly Optimizing for Cluster Purity with Professor Gary Cottrell (UCSD)

· Developed the Soft Purity Loss for clustering based on a continuous relaxation of the purity measure
· Evaluated Soft Purity Loss as a regularizer for siamese neural networks using contrastive loss

EXPERIENCE

Talwalkar Lab (SAGE Lab) May 2020 - August 2020
Research Assistant

· Explored two directions for expanding NAS search spaces: large scale edge learning and operation learning
· Gave monthly research presentations to J.P. Morgan researchers

Amazon AWS AI June 2019 - August 2019
Applied Scientist Intern

· Identified areas for improvement in existing ASR systems when recognizing rare or zero shot entities
· Researched and developed methods for hypothesis rescoring in ASR systems using neural language modeling

UnifyID February 2019 - June 2019
AI Fellow + Machine Learner Intern

· Developed a novel model extraction attack against deep learning models for computer vision using just noise inputs
· Researched ways to apply network neuroscience findings to deep learning

Intuit June 2018 - September 2018
Software Engineering Intern

· Researched and implemented a novel controllable text generation model as a service within Intuit
· Identified dynamic topic models as a promising direction for analyzing customer support tickets over time

Altum January 2018 - May 2018
Applied Scientist Intern

· Developed language model to extract NLP features from text data for cryptocurrency trading
· Implemented SoTA unsupervised sentiment analysis models for classifying streaming online forum data

UCSD CSE Department September 2017 - March 2018
Data Science Tutor

· Tutored DSC 10 Introduction to Data Science, under Professor Janine Tiefenbruck
· Tutored DSC 20 Principles of Data Science, under Professor Marina Langlois

Teradata June 2017 - September 2017
Software Engineering Intern

· Improved training methodology and architecture of deep learning time series model used internally
· Developed open source Spark-Teradata connector forked from Databricks connector for AWS Redshift

Skqrl June 2016 - December 2016
Software Engineering Intern

· Developed web scraping tool to compile product data
· Designed and implemented search pipeline and database using Python, Django, and MySQL

ModSpot January 2016 - March 2016
Software Engineering Intern

· Implemented new user account, edit profile, and login designs in Objective-C for iOS application
· Refactored analytics code for gathering statistics on app usage

The Comeback Community June 2015 - September 2015
Volunteer Full Stack Developer

· Developed website for educational nonprofit using Google Cloud Platform

Fresno City College January 2015 - May 2015
Tutor

· Tutored calculus, linear algebra, data structures, discrete mathematics, and Android app development

Fresno County Sheriff's Office May 2013 - August 2013
IT Intern

· Replaced malfunctioning hardware in employee PCs

EXTRACURRICULAR ACTIVITIES

CMU:	MSML Student Committee 2019-2021	(Virtual) Event Organizer
UCSD:	Tau Beta Pi Engineering Honor Society	House Leader
	Triton Engineering Student Council	Data Analyst
	Data Science Student Society	Workshop Coordinator
FCC:	Google Developer Group Fresno City College	President/Founder
	Science and Engineering Club	Treasurer

TECHNOLOGIES AND SKILLS

Competent:	Python, PyTorch, AWS, TensorFlow, Java, Scala, C/C++, Unix, Docker
Familiar:	SQL, Kaldi ASR, Google Cloud Platform, Matlab/Octave, JavaScript