Lam M. Nguyen

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(Updated on 02/21/2021)

FIELDS OF INTEREST

Design and Analysis of Learning Algorithms, Optimization for Representation Learning, Deep Reinforcement Learning, AI Solutions for Industry Research, Explainable AI

EDUCATION

2014 – 2018	**Ph.D.**, Department of Industrial and Systems Engineering, *Lehigh University*, Bethlehem, PA Thesis advisors: *Katya Scheinberg*, *Martin Takac*, and *Alexander L. Stolyar* Thesis title: A Service System with On-Demand Agents, Stochastic Gradient Algorithms and the SARAH Algorithm **Elizabeth V. Stout Dissertation Award** Research areas: Optimization for Large Scale Problems, Machine Learning, Deep Learning, Stochastic Models, Optimal Control
2011 – 2013	**M.B.A.**, College of Business, *McNeese State University*, Lake Charles, LA **Beta Gamma Sigma (Academic Honor)**
2004 – 2008	**B.S.**, Applied Mathematics and Computer Science, Faculty of Computational Mathematics and Cybernetics, *Lomonosov Moscow State University*, Moscow, Russia Thesis advisor: *Vladimir I. Dmitriev* Thesis title: Methods for Detecting Hidden Period in Some Economics Processes

RESEARCH EXPERIENCE

10/2018 – Present	**Research Scientist**, *IBM Thomas J. Watson Research Center*, Yorktown Heights, NY Research areas: Optimization, Machine Learning, Deep Learning, Reinforcement Learning, AI Solutions, Explainable AI
05/2018 – 08/2018	**Research Intern**, *IBM Thomas J. Watson Research Center*, Yorktown Heights, NY Research areas: Optimization, Machine Learning, Deep Learning, Reinforcement Learning
08/2017 – 05/2018	**Research Co-op**, *IBM Thomas J. Watson Research Center*, Yorktown Heights, NY Research areas: Optimization, Machine Learning, Deep Learning
06/2017 – 08/2017	**Research Intern**, *IBM Thomas J. Watson Research Center*, Yorktown Heights, NY Research areas: Optimization, Machine Learning, Deep Learning
09/2014 – 05/2017	**Research Assistant**, *Lehigh University*, Bethlehem, PA Research areas: Optimization for Large Scale Problems, Machine Learning, Deep Learning, Stochastic Models, Optimal Control
01/2012 – 12/2013	**Graduate (Research) Assistant,** *McNeese State University*, Lake Charles, LA Research areas: Operations Management and Finance

PUBLICATIONS

[20] Regression Optimization for System-level Production Control.
Dzung T. Phan, **Lam M. Nguyen**, Pavankumar Murali, Nhan H. Pham, Hongsheng Liu, and Jayant R. Kalagnanam.
The 2021 American Control Conference (***ACC 2021***), 2021

[19] Hogwild! over Distributed Local Data Sets with Linearly Increasing Mini-Batch Sizes.
Nhuong V. Nguyen, Toan N. Nguyen, Phuong Ha Nguyen, Quoc Tran-Dinh, **Lam M. Nguyen**, and Marten van Dijk.
The 24th International Conference on Artificial Intelligence and Statistics (***AISTATS 2021***), 2021 *(29.8% acceptance rate)*

[18] A Hybrid Stochastic Optimization Framework for Stochastic Composite Nonconvex Optimization.
Quoc Tran-Dinh, Nhan H. Pham, Dzung T. Phan, and **Lam M. Nguyen**.
*Mathematical Programming (**MAPR**), 2021*

[17] Hybrid Variance-Reduced SGD Algorithms for Nonconvex-Concave Minimax Problems.
Quoc Tran-Dinh, Deyi Liu, and **Lam M. Nguyen**.
*The 34th Conference on Neural Information Processing Systems (**NeurIPS 2020**)*, 2020 *(20.1% acceptance rate)*

[16] A Scalable MIP-based Method for Learning Optimal Multivariate Decision Trees.
Haoran Zhu, Pavankumar Murali, Dzung T. Phan, **Lam M. Nguyen**, and Jayant R. Kalagnanam.
*The 34th Conference on Neural Information Processing Systems (**NeurIPS 2020**)*, 2020 *(20.1% acceptance rate)*

[15] Inexact SARAH Algorithm for Stochastic Optimization.
Lam M. Nguyen, Katya Scheinberg, and Martin Takac.
Optimization Methods and Software (***GOMS***), volume 36(1), 237-258, 2020

[14] Pruning Deep Neural Networks with L0-constrained Optimization.
Dzung T. Phan, **Lam M. Nguyen**, Nam H. Nguyen, and Jayant R. Kalagnanam.
*The 20th IEEE International Conference on Data Mining (**ICDM 2020**)*, 2020 (*19.7% acceptance rate*)

[13] Stochastic Gauss-Newton Algorithms for Nonconvex Compositional Optimization.
Quoc Tran-Dinh, Nhan H. Pham, and **Lam M. Nguyen**.
*The 37th International Conference on Machine Learning (**ICML 2020**)*, PMLR 119, 2020 *(21.8% acceptance rate)*

[12] ProxSARAH: An Efficient Algorithmic Framework for Stochastic Composite Nonconvex Optimization.
Nhan H. Pham, **Lam M. Nguyen**, Dzung T. Phan, and Quoc Tran-Dinh.
*Journal of Machine Learning Research (**JMLR**)*, volume 21(110), 1-48, 2020

[11] A Hybrid Stochastic Policy Gradient Algorithm for Reinforcement Learning.
Nhan H. Pham, **Lam M. Nguyen**, Dzung T. Phan, Phuong Ha Nguyen, Marten van Dijk, and Quoc Tran-Dinh.
The 23rd International Conference on Artificial Intelligence and Statistics (***AISTATS 2020***), PMLR 108, 2020

[10] New Convergence Aspects of Stochastic Gradient Algorithms.
Lam M. Nguyen, Phuong Ha Nguyen, Peter Richtarik, Katya Scheinberg, Martin Takac, and Marten van Dijk.
*Journal of Machine Learning Research (**JMLR**)*, volume 20(176), 1-49, 2019

[9] Tight Dimension Independent Lower Bound on the Expected Convergence Rate for Diminishing Step Sizes in SGD.
Phuong Ha Nguyen, **Lam M. Nguyen**, and Marten van Dijk.
*The 33th Conference on Neural Information Processing Systems (**NeurIPS 2019**)*, 2019 *(21.17% acceptance rate)*

[8] PROVEN: Verifying Robustness of Neural Networks with a Probabilistic Approach.
Tsui-Wei Weng, Pin-Yu Chen*, **Lam M. Nguyen***, Mark S. Squillante*, Akhilan Boopathy, Ivan Oseledets, and Luca Daniel.
*The 36th International Conference on Machine Learning (**ICML 2019**)*, PMLR 97, 2019 *(22.5% acceptance rate)*

[7] Characterization of Convex Objective Functions and Optimal Expected Convergence Rates for SGD.
Marten van Dijk, **Lam M. Nguyen**, Phuong Ha Nguyen, and Dzung T. Phan.
*The 36th International Conference on Machine Learning (**ICML 2019**)*, PMLR 97, 2019 *(22.5% acceptance rate)*

[6] ChieF: A Change Pattern based Interpretable Failure Analyzer.
Dhaval Patel, **Lam M. Nguyen**, Akshay Rangamani, Shrey Shrivastava, and Jayant Kalagnanam.
*2018 IEEE International Conference on Big Data (**IEEE BigData 2018**)*, 2018

[5] SGD and Hogwild! Convergence Without the Bounded Gradients Assumption.
Lam M. Nguyen, Phuong Ha Nguyen, Marten van Dijk, Peter Richtarik, Katya Scheinberg, and Martin Takac.
*The 35th International Conference on Machine Learning (**ICML 2018**)*, PMLR 80, 2018 (*25% acceptance rate*)
IBM Research AI – Selected Publications 2018

[4] SARAH: A Novel Method for Machine Learning Problems Using Stochastic Recursive Gradient.
Lam M. Nguyen, Jie Liu, Katya Scheinberg, and Martin Takac.
*The 34th International Conference on Machine Learning (**ICML 2017**)*, PMLR 70:2613-2621, 2017 (*25% acceptance rate*)
Van Hoesen Family Best Publication Award

[3] A Queueing System with On-demand Servers: Local Stability of Fluid Limits.
Lam M. Nguyen, and Alexander L. Stolyar.
Queueing Systems (***QUESTA***), 1-26, Springer, 2017

[2] A Service System with Randomly Behaving On-demand Agents.
Lam M. Nguyen, and Alexander L. Stolyar.
The 42nd International Conference on Measurement and Modeling of Computer Systems (***SIGMETRICS 2016***), ACM SIGMETRICS Performance Evaluation Review, 44(1):365-366, 2016 (*25% acceptance rate*)

[1] CEO Compensation: Does Financial Crisis Matter?
Prasad Vemala, **Lam Nguyen**, Dung Nguyen, and Alekhya Kommasani.
International Business Research, 7(4):125-131, 2014

PREPRINTS

[12] Differential Private Hogwild! over Distributed Local Data Sets.
Marten van Dijk, Nhuong V. Nguyen, Toan N. Nguyen, **Lam M. Nguyen** and Phuong Ha Nguyen.
Technical report, arXiv preprint, 2021

[11] Shuffling Gradient-Based Methods with Momentum.
Trang H. Tran, **Lam M. Nguyen**, and Quoc Tran-Dinh
Technical report, arXiv preprint, 2020

[10] An Optimal Hybrid Variance-Reduced Algorithm for Stochastic Composite Nonconvex Optimization.
Deyi Liu, **Lam M. Nguyen**, and Quoc Tran-Dinh
Technical report, arXiv preprint, 2020

[9] Asynchronous Federated Learning with Reduced Number of Rounds and with Differential Privacy from Less Aggregated Gaussian Noise.
Marten van Dijk, Nhuong V. Nguyen, Toan N. Nguyen, **Lam M. Nguyen**, Quoc Tran-Dinh, and Phuong Ha Nguyen.
Technical report, arXiv preprint, 2020

[8] Finite-Time Analysis of Stochastic Gradient Descent under Markov Randomness.
Thinh T. Doan, **Lam M. Nguyen**, Nhan H. Pham, and Justin Romberg.
Technical report, arXiv preprint, 2020

[7] A Unified Convergence Analysis for Shuffling-Type Gradient Methods.
Lam M. Nguyen, Quoc Tran-Dinh, Dzung T. Phan, Phuong Ha Nguyen, and Marten van Dijk.
Technical report, arXiv preprint, 2020

[6] Convergence Rates of Accelerated Markov Gradient Descent with Applications in Reinforcement Learning.
Thinh T. Doan, **Lam M. Nguyen**, Nhan H. Pham, and Justin Romberg.
Technical report, arXiv preprint, 2020

[5] Buffer Zone based Defense against Adversarial Examples in Image Classification.
Kaleel Mahmood*, Phuong Ha Nguyen*, **Lam M. Nguyen**, Thanh Nguyen, and Marten van Dijk.
Technical report, arXiv preprint, 2019

[4] Hybrid Stochastic Gradient Descent Algorithms for Stochastic Nonconvex Optimization.
Quoc Tran-Dinh, Nhan H. Pham, Dzung T. Phan, and **Lam M. Nguyen**.
Technical report, arXiv preprint, 2019

[3] Finite-Sum Smooth Optimization with SARAH.
Lam M. Nguyen, Marten van Dijk, Dzung T. Phan, Phuong Ha Nguyen, Tsui-Wei Weng, and Jayant R. Kalagnanam.
Technical report, arXiv preprint, 2019

[2] When Does Stochastic Gradient Algorithm Work Well?
Lam M. Nguyen, Nam H. Nguyen, Dzung T. Phan, Jayant R. Kalagnanam, and Katya Scheinberg.
Technical report, arXiv preprint, 2018

[1] Stochastic Recursive Gradient Algorithm for Nonconvex Optimization.
Lam M. Nguyen, Jie Liu, Katya Scheinberg, and Martin Takac.
Technical report, arXiv preprint, 2017

PATENT APPLICATIONS

[12] An End-to-End Model for Training Decision Trees with Dimension Reduction. (Pending). *To be filed*
Dzung T. Phan, Michael Huang, Pavankumar Murali, and **Lam M. Nguyen**

[11] Method for Reasonable Matching Learning. (Pending). *To be filed*
Hoang Thanh Lam, Dzung T. Phan, Gabriele Picco, **Lam M. Nguyen**, and Vanessa Lopez Garcia

[10] Site-Wide Optimization for Mixed Regression Models and Mixed Control Variables. (Pending). *To be filed*
Dung Tien Phan, Nhan H. Pham, and **Lam M. Nguyen**

[9] A Method and System for Performing Distributed Training of Large-Scale Deep Neural Networks and Machine Learning Models. (Pending). *To be filed*
Lam M. Nguyen, Dung Tien Phan, and Jayant R. Kalagnanam.

[8] A Shuffling-Type Gradient Method for Training Machine Learning models with Big Data. *Filed on December 01, 2020*
Lam M. Nguyen and Dung Tien Phan

[7] Site-wide Operations Management Optimization for Manufacturing and Processing Control. *Filed on August 20, 2020*
Dung Tien Phan, **Lam M. Nguyen**, Pavankumar Murali, and Hongsheng Liu.

[6] System-level Control using Tree-based Regression with Outlier Removal. *Filed on*

	August 20, 2020
	Dung Tien Phan, Pavankumar Murali, and **Lam M. Nguyen**.
[5]	A Method for Tuning Hyper-Parameters for Classification. *Filed on July 27, 2020*
	Dung Tien Phan, Hongsheng Liu, and **Lam M. Nguyen**.
[4]	A Method and System for Automated Generation of Optimization Model for System-Wide Plant Optimization. *Filed on July 24, 2020*
	Dung Tien Phan, **Lam M. Nguyen**, Pavankumar Murali, and Nianjun Zhou.
[3]	System and Method for Quality Mode Prediction in Manufacturing and Process Industries. *Filed on February 20, 2020*
	Pavankumar Murali, Haoran Zhu, Dung Tien Phan, and **Lam M. Nguyen**.
[2]	Prediction Optimization for System-level Production Control. *Filed on July 23, 2019*
	Dzung T. Phan, **Lam M. Nguyen**, Pavankumar Murali, and Jayant R. Kalagnanam.
[1]	Compression of Deep Neural Networks. *Filed on March 13, 2019. US Patent Application 20200293876*
	Dzung T. Phan, **Lam M. Nguyen**, Nam H. Nguyen, and Jayant R. Kalagnanam.

THESES

2018	A Service System with On-Demand Agents, Stochastic Gradient Algorithms and the SARAH Algorithm.
	Lam M. Nguyen.
	PhD dissertation, Lehigh University, Bethlehem, PA
	Elizabeth V. Stout Dissertation Award
2008	Methods for Detecting Hidden Period in Some Economics Processes.
	Lam M. Nguyen.
	Undergraduate thesis, Lomonosov Moscow State University, Moscow, Russia

INVITED TALKS

11/2020	A Unified Convergence Analysis for Shuffling-Type Gradient Methods.
	INFORMS Annual Meeting, Virtual Conference
10/2019	Finite-Sum Smooth Optimization with SARAH.
	INFORMS Annual Meeting, Seattle, WA
11/2018	Inexact SARAH for Solving Stochastic Optimization Problems.
	INFORMS Annual Meeting, Phoenix, AZ
08/2018	Inexact SARAH for Solving Stochastic Optimization Problems.
	DIMACS/TRIPODS/MOPTA, Bethlehem, PA
03/2018	When does stochastic gradient algorithm work well?
	INFORMS Optimization Society Conference, Denver, CO
10/2017	SARAH: Stochastic recursive gradient algorithm.
	INFORMS Annual Meeting, Houston, TX
08/2017	SARAH algorithm.

	IBM Thomas J. Watson Research Center, Yorktown Heights, NY
11/2016	A queueing system with on-demand servers: local stability of fluid limits.
	INFORMS Annual Meeting, Nashville, TN
08/2016	A queueing system with on-demand servers: local stability of fluid limits.
	Modeling and Optimization: Theory and Applications, Bethlehem, PA

PROFESSIONAL ACTIVITIES

	Senior Program Committee – Area Chair (peer-reviewed conferences)
2020 – 2021	International Conference on Machine Learning (*ICML*)
2021	International Conference on Learning Representations (*ICLR*)
2021	International Conference on Artificial Intelligence and Statistics (*AISTATS*)
	Program Committee – Reviewer (peer-reviewed conferences)
2017 – 2019	International Conference on Machine Learning (*ICML*)
2017 – 2020	Conference on Neural Information Processing Systems (*NIPS/NeurIPS*)
2018 – 2020	International Conference on Learning Representations (*ICLR*)
2019 – 2020	International Conference on Artificial Intelligence and Statistics (*AISTATS*)
2021	Conference on Learning Theory (*COLT*)
2019 – 2021	AAAI Conference on Artificial Intelligence (*AAAI*)
2020	International Joint Conferences on Artificial Intelligence (*IJCAI*)
2019 – 2021	IEEE/CVF Conference on Computer Vision and Pattern Recognition (*CVPR*)
2019 – 2021	IEEE International Conference on Computer Vision (*ICCV*)
2020	European Conference on Computer Vision (*ECCV*)
2019 – 2021	Conference on Uncertainty in Artificial Intelligence (*UAI*)
	Reviewer (peer-reviewed journals)
2018 – 2020	Journal of Machine Learning Research
2020	Mathematical Programming
2020	SIAM Journal on Optimization
2021	SIAM Journal on Numerical Analysis
2020 – 2021	IEEE Transactions on Neural Networks and Learning Systems
2019 – 2020	IEEE Transactions on Signal Processing
2019	Artificial Intelligence
2018	Optimization Methods and Software
2020	SIAM Journal on Mathematics of Data Science
	Member
2020 – Present	**Editorial Board**, *Journal of Machine Learning Research*
2020	**Program Committee**, Optimization for Machine Learning (OPT 2020), *NeurIPS 2020 Workshop*

2018	**Program Committee**, "Modern Trends in Nonconvex Optimization for Machine Learning", *ICML 2018 Workshop*
	Session Chair / Organizer (conferences)
2020	Session "*Recent Advances in Stochastic Gradient Algorithms for Machine Learning Applications*", INFORMS Annual Meeting 2020
2019	Session "*Fast and Provable Nonconvex Optimization Algorithms in Machine Learning*", INFORMS Annual Meeting 2019
2018	Session "*Recent Advances in Optimization Methods for Machine Learning*", INFORMS Annual Meeting 2018
2018	Sessions "*Sparse Optimization*" and "*Stochastic Gradient Descent*", DIMACS/TRIPODS/MOPTA 2018
	Others
2020	**Reviewer**, IBM Ph.D. Fellowships

PROFESSIONAL MEMBERSHIPS

2016 – Present	Society for Industrial and Applied Mathematics (SIAM)
2014 – Present	The Institute for Operations Research and the Management Sciences (INFORMS)
2014 – Present	Beta Gamma Sigma (The International Business Honor Society)

MENTORSHIP

06/2020 – 09/2020	**Michael Huang**, Ph.D. student, *Department of Data Science and Operations, Marshall School of Business, University of Southern California* (IBM Research Intern)
10/2019 – Present	**Trang H. Tran**, Ph.D. student, *School of Operations Research and Information Engineering, Cornell University* (student of Prof. Katya Scheinberg)
05/2019 – 12/2019	**Hongsheng Liu**, Ph.D. student, *Department of Statistics and Operations Research, University of North Carolina at Chapel Hill* (IBM Research Intern). Now at *Huawei Technologies Co., Ltd.*, China
01/2019 – 08/2019	**Haoran Zhu**, Ph.D. student, *Department of Industrial and Systems Engineering, University of Wisconsin – Madison* (IBM Research Intern)
01/2019 – 06/2020	**Toan N. Nguyen**, Ph.D. student, *Department of Computer Science and Engineering, University of Connecticut* (student of Prof. Marten van Dijk)
01/2019 – 09/2020	**Nhuong V. Nguyen**, Ph.D. student, *Department of Computer Science and Engineering, University of Connecticut* (student of Prof. Marten van Dijk)
08/2018 – Present	**Nhan H. Pham**, Ph.D. student, *Department of Statistics and Operations Research, University of North Carolina at Chapel Hill* (student of Prof. Quoc Tran-Dinh) (IBM Research Intern)

PH.D. COMMITTEE MEMBERSHIP

09/2020 – Present	**Deyi Liu**, *Department of Statistics and Operations Research, University of North Carolina at Chapel Hill* (student of Prof. Quoc Tran-Dinh)

OTHER WORK EXPERIENCE

09/2014 – 05/2015	**Teaching Assistant**, *Lehigh University*, Bethlehem, PA Courses: Engineering Probability (ISE 111), Applied Engineering Statistics (ISE 121)
05/2013 – 08/2013	**Graduate Assistant (Web Developer),** *College of Business, McNeese State University*, Lake Charles, LA
01/2012 – 12/2013	**Graduate (Teaching) Assistant,** *McNeese State University*, Lake Charles, LA Courses: Human Resource Management (MGMT 310), Staffing (MGMT 315), Strategic Management (MGMT 481), Management Theory and Organizational Behavior (MGMT 604), Issues in Global Business (BADM 218), Entrepreneurial Finance for Small Business (FIN 308)
09/2008 – 08/2009	**Software Engineer**, *FPT Software Company*, Ho Chi Minh City, Vietnam
09/2007 – 05/2008	**Teaching Assistant,** *Lomonosov Moscow State University*, Moscow, Russia Courses: Mathematical Analysis (Calculus), Linear Algebra and Analytic Geometry

GRANT EXPERIENCE

09/2020 – 09/2021	**IBM Co-PI,** "*Hierarchical Disentangled Representations for Scalable Multi-agent Reinforcement Learning*", MIT-IBM Watson AI Lab Exploratory Projects, $100K, (MIT PI: Cathy Wu, IBM PI: Tsui-Wei (Lily) Weng)

HONORS & AWARDS

2019	IBM Outstanding Technical Achievement Award
2019	NeurIPS 2019 Top Reviewers
2019	Elizabeth V. Stout Dissertation Award, *Lehigh University*, Bethlehem, PA
2018	Van Hoesen Family Best Publication Award, *Lehigh University*, Bethlehem, PA
2016 – 2017	Dean's Doctoral Fellowship (RCEAS), *Lehigh University*, Bethlehem, PA
2014 – 2015	Dean's Doctoral Assistantship, *Lehigh University*, Bethlehem, PA
2014	Beta Gamma Sigma (Academic Honor Society)
2011 – 2013	Dore Graduate Stipends, *McNeese State University*, Lake Charles, LA