

CONTACT
INFORMATION

Trustworthy AI, Inc.
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RESEARCH
INTERESTS

Optimization, machine learning, control theory, computational modeling & simulation

EDUCATION

Stanford University, Stanford, CA *Sept. 2014-Aug. 2020*

Degree: PhD. in Electrical Engineering

Dissertation: Safety-Critical Machine Learning: Development and Testing

Fannie & John Hertz Foundation Fellowship, William R. Hewlett Stanford Graduate Fellowship

University of Cambridge, Cambridge, UK *Oct. 2013-Aug. 2014*

Degree: M.Phil. in Information Engineering

Churchill Scholarship

Princeton University, Princeton, NJ *Sept. 2009-June 2013*

Degree: B.S.E. in Mechanical and Aerospace Engineering

Certificates: Applications of Computing, Applied and Computational Mathematics

Barry M. Goldwater Scholarship

Valedictorian

RESEARCH AND
WORK
EXPERIENCE

Trustworthy AI, Palo Alto, CA *Feb. 2018-Present*

Co-founder, President

– Startup provides a platform for risk modeling and safety evaluation of safety-critical autonomous software

– Lead developer of methods to train provably robust machine learning algorithms as well as statistical methodologies for performing rare-event simulation

Information Systems Lab, Stanford University *Sept. 2014-Aug. 2020*

Researcher (Advisor: John Duchi)

Committee: Mykel Kochenderfer, Marco Pavone, Dorsa Sadigh, Russ Tedrake

– Researched theoretical and applied problems in optimization applied to machine learning contexts

– Projects included developing efficient techniques for distributionally robust optimization and building scalable methods for testing self-driving cars

Toyota Research Institute, Cambridge, MA *June-Sept. 2017*

Researcher (Managers: Jon DeCastro, Russ Tedrake)

– Applied distributionally robust optimization methods to system verification and behavior-planning algorithms for autonomous driving

InSITE Fellowship, Stanford University *Nov. 2016-May 2017*

Fellow

– InSITE Fellowships pair entrepreneurially-minded graduate students with startups and venture capital firms

– Consulted with seed-stage VC firm Uncork Capital on blockchain investments

Quantifind, Menlo Park, CA *June-Sept. 2016*

Data Scientist

– Startup offers explanatory analytics solutions targeted towards marketing

– Developed algorithms that discover language patterns in Twitter correlating with brand revenue

Control Group & Machine Learning Group, University of Cambridge *Oct. 2013-Aug. 2014*

Researcher (Advisors: Glenn Vinnicombe, Carl Rasmussen)

– Researched distributed machine learning over networks

– Developed techniques to characterize and improve the robustness and accuracy of Gaussian process regression in distributed systems

Microsoft Online Services Division: adCenter, Microsoft (Bellevue, WA) *June-Aug. 2012*

Software Development Engineering Intern (Manager: Dragos Barac)

– Developed a device detection and identification feature to enable the intelligent delivery of ads to mobile and tablet devices in Bing search requests

- Merck Research Labs: Imaging Dept.**, Merck & Co. (West Point, PA) *June-Aug. 2011*
Intern (Manager: Dinko Gonzalez Trotter)
 – Developed software for the automated segmentation and registration of medical images used in pre-clinical trials of drug development
- Gas Dynamics Laboratory**, Princeton University *June-Aug. 2010*
Intern (Advisor: Alexander Smits)
 – Researched the three-dimensional nature of large-scale motions in fully turbulent pipe flow
- PA Governor’s School for the Sciences (PGSS)**, Carnegie Mellon University *July-Aug. 2008*
Researcher (Director: Barry Luokkala)
 – Developed an electromechanical driving mechanism for a Wilberforce Pendulum
- Combustion Research and Flow Technology, Inc.** (Pipersville, PA) *Aug.-Dec. 2007*
Intern (Advisor: Don Kenzakowski)
 – Researched the effects of riblets on reducing viscous drag over airfoils using computational fluid dynamics (CFD)

PAPERS

- Sinha, A.* , O’Kelly, M.* , Tedrake, R., Duchi, J. Neural bridge sampling for evaluating safety-critical autonomous systems. *NeurIPS*, 2020.
- Sinha, A. Safety-critical machine-learning: development and testing. *Stanford University PhD Thesis*. August 2020.
- Sinha, A.* , O’Kelly, M.* , Zheng, H.* , Mangharam, R., Duchi, J., Tedrake, R. FormulaZero: distributionally robust online adaptation via offline population synthesis. *ICML*, 2020.
- Norden, J.* , O’Kelly, M.* , Sinha, A.* . Efficient black-box assessment of autonomous vehicle safety. *CVPR Workshop on Scalability in Autonomous Driving*, 2020. *NeurIPS Workshop on Machine Learning for Autonomous Driving*, 2019.
- Tomkins-Lane, C., Norden, J., Sinha, A., Hu, R., Smuck, M., Digital biomarkers of spine and musculoskeletal disease from accelerometers: Defining phenotypes of free-living physical activity in knee osteoarthritis and lumbar spinal stenosis. *The Spine Journal*, 2019.
- O’Kelly, M.* , Sinha, A.* , Namkoong, H.* , Duchi, J., Tedrake, R. Scalable end-to-end autonomous vehicle testing via rare-event simulation. *NeurIPS*, 2018.
- Sinha, A.* , Namkoong, H.* , Duchi, J. Certifying some distributional robustness with principled adversarial training. *ICLR*, 2018.
- Smuck, M., Muaremi, A., Zheng, P., Norden, J., Sinha, A., Hu, R., Tomkins-Lane, C. Objective measurement of function following lumbar spinal stenosis decompression reveals improved functional capacity with stagnant real-life physical activity. *The Spine Journal*, 2018.
- Namkoong, H., Sinha, A., Yadlowsky, S., Duchi, J. Adaptive sampling probabilities for non-smooth optimization. *ICML*, 2017.
- Norden, J., Smuck, M., Sinha, A., Hu, R., Tomkins-Lane, C. Objective measurement of free-living physical activity (performance) in lumbar spinal stenosis: are physical activity guidelines being met? *The Spine Journal*, 2017.
- Sinha, A., and Duchi, J. Learning kernels with random features. *NIPS*, 2016.
- Sinha, A., Duchi, J., and Bambos, N. Dynamic management of network risk from epidemic phenomena. *IEEE Conference on Decision and Control*, 2015.
- Sinha, A. Distributed gaussian process regression in networked systems. *University of Cambridge M.Phil. Thesis*. August 2014.
- Sinha, A. Distributed consensus protocols in adaptive multi-agent systems. *Princeton University Senior Thesis*. May 2013.
- Hellström, L., Sinha, A., and Smits, A. Visualizing the very-large-scale motions in turbulent pipe flow. *Physics of Fluids*, 23:011703, 2011.

TALKS

- (joint talk with Matthew O’Kelly). A scalable risk-based framework for rigorous autonomous vehicle evaluation. *RSS 2019 Workshop on Safe Autonomy*. Freiburg, June 2019.
- Certifying some distributional robustness with principled adversarial training. *ICLR*. Vancouver, May 2018.
- A numerical toolkit for automated segmentation and registration. *Presented at Merck Imaging Department*. Aug. 2011.

Using riblets for airfoil drag reduction: a CFD analysis. *AAAS National Conference*. Chicago, Feb. 2009.

HONORS AND AWARDS	Fannie & John Hertz Foundation Newman Entrepreneurial Award	<i>Mar. 2018</i>
	Numerical Technologies Founders Prize (for top rank in PhD Qualifying Exam)	<i>Feb. 2015</i>
	William R. Hewlett Stanford Graduate Fellowship	<i>Nov. 2014</i>
	Elected as Valedictorian for Princeton's Class of 2013	<i>Apr. 2013</i>
	Fannie & John Hertz Foundation Fellowship	<i>Apr. 2013</i>
	Churchill Scholarship	<i>Jan. 2013</i>
	Elected to the Phi Beta Kappa Society, Princeton Chapter	<i>Sept. 2012</i>
	Barry M. Goldwater Scholarship	<i>Mar. 2012</i>
	Elected to the Tau Beta Pi Engineering Honor Society, Princeton Chapter	<i>Nov. 2011</i>
	National Merit Scholarship	<i>Apr. 2009</i>
	3-time Medalist at PA Junior Academy of Science State Competition	<i>May 2007, 2008, 2009</i>

TECHNICAL SKILLS AND PROFICIENCY	Languages: Assembly (IA-32), C, C++, C#, Objective-C, Fortran, Java, Python, SQL, Swift
	Applications: MATLAB, Mathematica, Pro/E, SolidWorks, TecPlot, Visual Studio, Xcode
	Frameworks: Django, Drake, PyTorch, Tensorflow

PROFESSIONAL SERVICE	Conference/Journal Reviewing: International Conference on Learning Representations (ICLR), International Conference on Machine Learning (ICML), Neural and Information Processing Systems (NeurIPS), Robotics: Science and Systems (RSS)
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Standards Committees: ITU FG-AI4AD, UL4600