

Education

Massachusetts Institute of Technology

Ph.D., Physics, 2021 – present

California Institute of Technology

B.S., Physics, 2017 – 2021

GPA: 4.24/4.33 (class rank 2)

Awards & Fellowships

Postgraduate Fellowships (2021)

- Hertz Fellowship
- DoD NDSEG Fellowship
- Marshall Scholarship (declined)
- NSF Graduate Research Fellowship (declined)
- Stanford Knight-Hennessy Scholarship (declined)
- Rhodes Scholarship Finalist (declined interview)

Caltech Richard Feynman Prize in Theoretical Physics (2021)

Awarded annually to a Caltech senior for excellence in theoretical physics.

Caltech George W. Housner Prize for Academic Excellence and Original Research (2021)

Awarded annually to a Caltech senior for outstanding original scientific research.

Caltech Thomas A. Tisch Prize for Undergraduate Teaching in Computing and Mathematical Sciences (2021)

Awarded for outstanding teaching and course development in computing/math.

Caltech Deans' Cup (2021)

Recognizes efforts to improve the quality of undergraduate life at Caltech.

Barry M. Goldwater Scholar (2020)

National scholarship in natural sciences, engineering, and mathematics.

Caltech Green Memorial Prize (2020)

Awarded annually to a Caltech undergraduate student for original research.

Caltech Haren Lee Fisher Memorial Award (2020)

Awarded annually to a Caltech junior for great promise in physics.

2nd, Student Research Competition, ACM Grand Finals (2020)

1st, Student Research Competition, SC19 IEEE/ACM Conf. (2019)

Awarded for deep learning mitigation of noise on quantum hardware.

1st (\$100,000), Citadel Data Open Championship (2019)

1st (\$20,000), Citadel Data Open West Coast Regional (2019)

Awarded by former Chief of AI at Microsoft for malaria interpretable AI.

Invited Talks “Near-term beyond-classical computing.” *Logic, Quantum Computing, and Artificial Intelligence* (LQCAI), 2021.

“Quantum machine learning for near-term applications.” Purdue Univ., 2021.

“A deep learning model for noise prediction on near-term quantum devices.” Cambridge Quantum Computing (CQC), 2020.

“Novel machine learning algorithms for quantum annealing with applications in high energy physics.” *Quantum Techniques in Machine Learning*, Korea Advanced Institute of Science and Technology (KAIST), 2019.

“Machine learning applications of quantum annealing in high energy physics.” *AI-at-SLAC Seminar*, Stanford Linear Accelerator Center, 2019.

Papers

A. Zlokapa, H. Neven, and S. Lloyd, “A quantum algorithm for training wide and deep classical neural networks.” [arXiv:2107.09200](https://arxiv.org/abs/2107.09200) [quant-ph], 2021.

M. Niu*, A. Zlokapa*, M. Broughton, S. Boixo, M. Mohseni, V. Smelyanskyi, and H. Neven, “Entangling quantum generative adversarial networks.” [arXiv:2105.00080](https://arxiv.org/abs/2105.00080) [quant-ph], 2021. (*equal contribution)

A. Zlokapa and A. Gheorghiu. “A deep learning model for noise prediction on near-term quantum devices.” [arXiv:2005.10811](https://arxiv.org/abs/2005.10811) [quant-ph], 2020. (Submitted.)

A. Zlokapa, S. Boixo and D. Lidar. “Boundaries of quantum supremacy via random circuit sampling.” [arXiv:2005.02464](https://arxiv.org/abs/2005.02464) [quant-ph], 2020. (Submitted.)

A. Zlokapa, A. Mott, J. Job, J.-R. Vlimant, D. Lidar and M. Spiropulu, “Quantum adiabatic machine learning by zooming into a region of the energy surface.” *Physical Review A*, 2020, 102 (6), 62405-62413. <https://doi.org/10.1103/PhysRevA.102.062405>

A. Zlokapa, A. Anand, J.-R. Vlimant, J. Duarte, J. Job, D. Lidar and M. Spiropulu, “Charged particle tracking with quantum annealing optimization.” [arXiv:1908.04475](https://arxiv.org/abs/1908.04475) [quant-ph], 2019. (Submitted.)

A. Zlokapa, K. Terao, H. Tanaka, and M. Spiropulu, “Machine Learning Methods for Event Reconstruction with Liquid Argon Time Projection Chamber Data.” DUNE Document, 2019. (Under submission.)

A. Zlokapa, J.-R. Vlimant, and M. Spiropulu, “Optimizing Event Simulation Using Evolutionary Computing Techniques.” *CERN CMS/IN/Simulation*, 2019.

J.-R. Vlimant, et al, “Large-Scale Distributed Training Applied to Generative Adversarial Networks for Calorimeter Simulation.” *European Physical Journal Web of Conferences*, 2019, 214 (06025). <https://doi.org/10.1051/epjconf/201921406025>

A. Tremsin, et al, “In-Situ Observation of Phase Separation During Growth of $\text{Cs}_2\text{LiLaBr}_6\text{:Ce}$ Crystals Using Energy-Resolved Neutron Imaging,” *Crystal Growth & Design*, 2017, 17 (12), 6372-6381. <https://doi.org/10.1021/acs.cgd.7b01048>

Major Conferences

M. Niu*, A. Zlokapa* (presenter), M. Broughton, M. Mohseni, V. Smelyanskiy, and H. Neven, “Quantum generative adversarial networks with provable convergence.” *APS March Meeting*, 2021. Oral presentation. (*equal contribution)

X. Ju, et al, “Graph Neural Networks for Particle Reconstruction in High Energy Physics Detectors.” *33rd Annual Conference on Neural Information Processing Systems (NeurIPS)*, *Machine Learning for Physical Science Workshop*, 2019.

A. Zlokapa and A. Gheorghiu, “A deep learning approach to noise prediction and circuit optimization for near-term quantum devices.” *IEEE/ACM International Conference on High Performance Computing, Networking, Storage and Analysis*, 2019. **1st place, ACM SC19. 2nd place, ACM Grand Finals (22 conferences).**

Additional Conferences

A. Zlokapa, A. Mott, J. Job, J.-R. Vlimant, D. Lidar and M. Spiropulu, “Quantum adiabatic machine learning by zooming into a region of the energy surface.” *APS March Meeting*, 2021. Oral presentation.

A. Zlokapa, et al, “Novel machine learning algorithms for quantum annealing with applications in high energy physics.” *Qubits North America*, 2019.

J.-R. Vlimant, A. Zlokapa, et al., “Machine learning for charged particle tracking and beyond.” Institut Pascal, Orsay, 2019.

A. Zlokapa, et al, “Charged Particle Tracking as a QUBO Problem Solved with Quantum Annealing-Inspired Optimization.” *19th International Workshop on Advanced Computing and Analysis Techniques in Physics Research*, 2019. *Connecting the Dots / Intelligent Trackers Workshop*, 2019.

X. Ju, A. Zlokapa, et al, “HEP.TrkX Charged Particle Tracking Using Graph Neural Networks.” *19th International Workshop on Advanced Computing and Analysis Techniques in Physics Research*, 2019. *Connecting the Dots / Intelligent Trackers Workshop*, 2019.

A. Zlokapa, J.-R. Vlimant, and M. Spiropulu, “Optimizing Monte Carlo Event Generation Using Evolutionary Computing Techniques.” *CERN CMS Week*, 2018.

J.-R. Vlimant, et al, “Training Generative Adversarial Models over Distributed Computing Systems.” *23rd International Conference on Computing in High Energy and Nuclear Physics*, 2018.

Teaching & Service

Division of Physics, Math and Astronomy, Caltech

“Introduction to Quantum ML,” Caltech freshman physics seminar.

Teaching assistant, Ph101 Order-of-Magnitude Physics, 2021.

INQNET instructor, quantum computing summer program, 2020 and 2021.

Computing and Mathematical Sciences Department, Caltech

Thomas A. Tisch Prize for Undergraduate Teaching in Computing and Mathematical Sciences, 2021.

Teaching assistant, ACM95a Introductory Methods of Applied Mathematics, 2021.

Teaching assistant, CS156b Learning Systems, 2020 and 2021.

Reviewer: *Physical Review X*, *Physical Review A*

Outreach

Caltech COVID-19 Research Initiative (2020–2021)

Launched a campus-wide COVID-19 research effort with around 15% of the Caltech student body. Presented to the Chief Data Scientist of *The New York Times*, faculty from Stanford, Berkeley, and Caltech, and state-level health officials. Redesigned CS156b course into an AI COVID-19 forecasting competition, with resulting models used by the California Department of Public Health. Developed data-driven pooled testing algorithms and presented to faculty from Stanford and NCBS (India). Performed Bayesian analysis of epidemiological models presented in a briefing to Priscilla Chan and the head of science at the Chan Zuckerberg Initiative.

President, Caltech Data Science Organization (2019–2021)

Founded club and recruited 200 members. Taught artificial intelligence workshops resulting in \$50,000 of competition prizes by new members within the first 6 months and \$200,000 in total. Raised \$10,000 for student initiative in fair machine learning.

Outreach leader, Caltech Y (2020)

Led an elementary school science outreach program for minorities in STEM, organizing a group of Caltech students to present weekly science demos.

Seminar organizer, Computing and Mathematical Sciences (CMS) Department, Caltech (2020)

Invited and hosted AI speakers from academia and industry to CMS seminars.

Panelist, Caltech Information Science and Technology Council (2019)

Panelist on trustee council for institute-wide “CS+X” efforts.

Interests

Assistant Concertmaster (first violin), Caltech Orchestra. Piano. Tennis.