MICHELA PAGANINI

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INTERESTS

Deep Learning | Generative Modeling | Reproducibility | Computer Vision | Physics

EDUCATION

Yale University
Ph.D. in Physics, 2018
M.Phil. in Physics, 2016
M.S. in Physics, 2014 - Student Marshal

UC Berkeley
B.A. in Physics
B.A. in Astrophysics
- Class of 2013

University of Cambridge
Pembroke-King's Programme
- Summer 2012

SKILLS

Computing: Python, C, C++, LaTeX, Git, HTML

Libraries: PyTorch, TensorFlow, Keras, scikit-learn, pandas, NumPy, SciPy, Matplotlib, ROOT

Languages: English, Italian (bilingual), French (intermediate), Spanish (elementary)

Interpersonal Skills: Management, Event Planning, Effective Communication, Active Listening, Leadership, Flexibility

AWARDS

- HEP Center for Computational Excellence Summer Fellowship, 2017
- Leigh Paige Prize, Yale Physics Department, 2013
- UC Summer Grant, 2012

EXPERIENCE

Postdoctoral Researcher, Facebook AI Research
2018 - Present

Research Affiliate, NERSC, Lawrence Berkeley National Lab
2017 - Present

- Researched, developed, and deployed customized Generative Adversarial Networks to accelerate computationally intensive Physics simulation of particles interacting with matter in heterogeneously segmented 3D detectors
- Explored and benchmarked deep neural networks training and evaluation in HPC environment on Cori (#6 TOP500) with TensorFlow optimizations for modern Intel architectures.
- Applied Computer Vision to the identification of new Physics events from data in multi-channel, high-resolution sparse image format, using the search for R-parity violating supersymmetry as a case study.

Ph.D. Student, ATLAS Experiment, CERN
2013 - 2018

- Designed recurrent neural networks for impact parameter based flavor tagging which beat ATLAS benchmarks by ~200%. Leading effort to integrate into live analysis deployment.
- Pushing multi-stream LSTMs for event-level classification into production for the $hh \to \gamma\gamma bb$ analysis.

PUBLICATIONS

Author of over 200 papers with the ATLAS Collaboration. Selected papers:

M. Paganini et al., *Controlling Physical Attributes in GAN-Accelerated Simulation of Electromagnetic Calorimeters*, J. Phys. Conf. Ser. 1085 (2018) no.4, 042017, [arXiv:1711.08813]

W. Bhimji, S. Farrell, T. Kurth, M. Paganini, Prabhat, E. Racah, *Neural Networks for Physics Analysis on low-level whole-detector data at the LHC*, J. Phys. Conf. Ser. 1085 (2018) no.4, 042034, [arXiv:1711.03573]

M. Paganini, *Machine Learning Algorithms for b-jet tagging at the ATLAS experiment,* J. Phys. Conf. Ser. 1085 (2018) no.4, 042031, [ATL-PHYS-PROC-2017-211]

M. Paganini et al., *Accelerating Science with Generative Adversarial Networks: An Application to 3D Particle Showers in Multi-Layer Calorimeters*, Phys. Rev. Lett. 120, 042003 (2018), [arXiv:1705.02355]

M. Paganini et al., *CaloGAN: Simulating 3D High Energy Particle Showers in Multi-Layer Electromagnetic Calorimeters with Generative Adversarial Networks*, Phys. Rev. D 97, 014021 (2018), [arXiv:1712.10321]