

Michela Paganini

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Education

(In progress) Ph.D. Physics, Yale University, expected 2018/2019

Thesis Advisor: Paul Tipton

M.S. Physics, Yale University, 2014

B.A. Physics, University of California, Berkeley, 2013

B.A. Astrophysics, University of California, Berkeley, 2013

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

Research

Member of the ATLAS Collaboration at CERN

2013 - present

- Ongoing Qualification Task for authorship rights in the ATLAS Collaboration. Optimization and calibration of track jet based b -tagging techniques. Tuning of impact parameter taggers (IP $\{2,3\}$ D), improvement of track-to-jet associator algorithm, retraining of BDTs using track jet collections and their relative input distributions.
- Member of the $hh \rightarrow \gamma\gamma bb$ analysis group, looking for production of Higgs pairs decaying to two photons and a pair of b quark-antiquark. Using Machine Learning techniques to explore an event-level approach to Physics Analysis, by designing, training and testing Recurrent Neural Networks to classify events with variable numbers of particles.
- Investigating Recurrent and Convolutional architectures for track-based b -tagging, drawing inspiration from Natural Language Processing techniques.

Advisor: Paul Tipton

- Exploring deep architectures with Dark Knowledge to capture and directly model the Matrix Element Method distribution. Using novel layers and constraint formulation to better reproduce not only discrimination power but also distribution shapes.

- Refined boosted top-tagging technique using Deep Learning framework for discrimination versus QCD background. Performed in-depth studies of pile-up and pT dependence, and compared efficiency with other substructure taggers. Systematically performed input selection for elimination of mismodeled variables.
- Developed boosted boson tagger using Deep Learning for binary and multiclass classification purposes for the $W' \rightarrow WZ$ analysis. Investigated ability to learn high order correlations between tracking and calorimeter variables, and performed variable selection studies.
- Data quality studies and corrections to dead modules of tile calorimeter for W' analysis.

Advisor: Tobias Golling

Supervision in Theoretical Astrophysics at the Cambridge Institute of Astronomy July-August 2012

- Galactic dynamics, mass-velocity profiles and anisotropy variation.

Advisor: Adriano Agnello.

Summer Research Assistant at Università degli Studi di Milano June 2012

- Neutrino Physics at the Borexino experiment, Gran Sasso National Laboratory.
- Positronium formation studies for Anti-Hydrogen production at AEGIS experiment, CERN.

Advisor: Marco Giulio Giammarchi.

Undergraduate Research Assistant in Theoretical Physics, University of California Berkeley Spring 2012

- Study of dark matter halos and gravity theories to understand how future observations of galaxies and clusters of galaxies will allow to test gravity on the kiloparsec length-scale.
- Discern among different theories of modified gravity, according to the agreement between our results and the value of Newton's gravitational parameter predicted by each theory.

Advisor: Tristan Smith.

Research Intern at SETI Institute, University of California, Berkeley Spring 2011

- Remote observing for Optical SETI.

Advisors: Shelley Wright, Remington Stone.

Undergraduate Research Assistant at the Space Sciences Lab, University of California, Berkeley 2010-2011

- Data collection and analysis for MAVEN, STEREO and VEX missions.
- Catalogs of coronal mass ejections, live monitoring of solar activity.

Advisor: Janet Luhmann.

Publications

The ATLAS Collaboration, *Search for Higgs boson pair production in the $b\bar{b}\gamma\gamma$ final state using pp collision data at $\sqrt{s}=13$ TeV with the ATLAS detector*, [[ATLAS-CONF-2016-004](#)]

Awards and Scholarships

Leigh Paige Prize, Yale Physics Department, 2013

UC Summer Grant, 2012

University of California Undergraduate Grant, 2011, 2012

UC Freshman Scholarship, 2010

Teaching

Yale University

- Spring 2015: Quantum Mechanics, teaching assistant for Prof. Dan McKinsey.
- Fall 2014: Classical Mechanics, teaching assistant for Prof. Sean Barrett.
- Spring 2014: General Physics Lab (EM), teaching assistant for Prof. Sean Barrett and Dr. Sidney Cahn.
- Fall 2013: General Physics Lab (Classical Mech.), teaching assistant for Prof. Tobias Golling and Prof. Richard Casten.

University of California, Berkeley

- Spring 2014: Science & Sense & Sensibility, undergraduate student instructor for Professors Saul Perlmutter, John Campbell and Robert MacCoun.

Skills

Languages: Italian and English (Bilingual), French (Intermediate), Spanish (Elementary), Latin
Computer Skills:

Operating Systems: Mac OS X, Linux, Windows

Programming: Python, C, LaTeX (advanced), C++, MATLAB, LabVIEW (intermediate), HTML (self-taught)

Libraries: numpy, scipy, pandas, scikit-learn, keras, rootpy; eigen

Software: Office, iWork, Adobe Dreamweaver

On Campus Involvement

CERN

S'Cool Lab Tutor	2015-present
Open Geneva Hackathon, <i>Preventing Suicide with Social Media Data</i>	2016
DiploHack, <i>Extracting Sensitive Human Rights Data from Inaccessible Countries</i>	2016
TEDxCERN Volunteer	2015
THEPort CERN Hackathon, <i>Integrating Humanitarian Data</i>	2015
POP Science, Nuit des Chercheurs	2015

Yale University

Graduate Student Assembly - Representative for Department of Physics	2013-2015
Graduate School of Arts and Science Executive Committee	2014-2015
Academics and Professional Development Committee Secretary	2014-2015
McDougal Graduate Student Life Fellow	2014-2015
Yale Minority Advisory Council - Graduate Representative	2013-2015
Board Member of Italian Society of Yale Students and Affiliates	2013-2015
Graduate Affiliate at Pierson Residential College	2013-2014
Co-Founder of iUSA (Italian University Societies in America)	2014

University of California, Berkeley

Society of Physics Students (SPS) Officer	2012-2013
SWPS Physics Undergraduate Coordinator	2012-2013
Member of Order of Omega Leadership Honor Society	2012-2013
Academic Tutor at Athletic Study Center	2012-2013
Founder of Italian Society at Berkeley	2010-2013
Team Manager - Div I Women's Tennis Team	2011-2013
Emerging Leaders Institute at Butler University	2012