

Dr. Viviana Acquaviva

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Education

Ph.D. Degree in Astrophysics at SISSA/ISAS, Trieste, Italy (2006)

Thesis: “Weak lensing and cosmic acceleration”

M. Sc. Degree in Physics at University of Pisa, Italy (2002)

Thesis: “Non-Gaussianity from inflation”

Appointments

Professor, Physics Department, CUNY NYC College of Technology (2021 - present)

Adjunct Senior Research Scientist, Lamont-Doherty Earth Observatory and LEAP (Learning the Universe with Artificial Intelligence and Physics) Center, Columbia University (2023 - present)

Associate Member/Visiting Scholar, Center for Computational Astrophysics, Flatiron Institute (2016 - present).

Associate Professor, Physics Department, CUNY NYC College of Technology (2017 - 2021)

Visiting Scholar, Institut de Ciències de Cosmos, Universitat de Barcelona (2019 - 2020)

Visiting Research Scientist, American Museum of Natural History (2012 - 2019)

Assistant Professor, Physics Department, CUNY NYC College of Technology (2012 - 2017)

Research Associate at Rutgers University (2011 - 2012)

Postdoctoral Fellow at Rutgers University (2009 - 2011)

Partnership for International Research and Education Postdoctoral Fellow

at the University of Pennsylvania (2006 - 2007) and Princeton University (2007 - 2009)

Research Interests

Developing, validating and testing improved metrics to assess similarity in climate maps, using data science tools.

Learning from simulations in galaxy formation and climate science, with machine learning and Bayesian inference tools: model discovery, causal structure learning, representation learning, uncertainty quantification.

Ethical AI for scientists: what does responsible and fair AI look like in the physical sciences?

Pedagogy, inclusion, and equity in STEM.

Scholarship Summary

55 published papers in peer-reviewed journals or peer-reviewed conference proceedings. Two invited review articles for science outreach journals. $\sim 9,700$ citations; h-index: 34 (source: Google Scholar).

Author, “Machine Learning for Physics and Astronomy”, Princeton University Press (2023).

> 70 invited seminars and lectures, > 50 contributed talks/posters in conferences and workshops.

Select Invited Presentations

“Machine Learning for Science: A Journey from Astrophysics to Climate”, Colloquium, Yale Institute for Foundations of Data Science (2023).

“Machine Learning and Multiscale Phenomena”, Invited Review, Simons Meeting for Multi-scale Physics (2023).

“Machine Learning with Pen and Paper”, Astrophysics Colloquium, Center for Computational Astrophysics, Flatiron Institute (2023).

“From ML x Astrophysics to ML x Climate: A journey across disciplines”, Invited Review Talk, Joint KITP-CCA Workshop, Center for Computational Astrophysics, Flatiron Institute (2023).

“Galaxy evolution with machine learning: The perilous road from simulations to data”:

Physics and Astronomy Seminar, University of Pennsylvania (2023).

Astronomy Colloquium, Center for Astrophysics, Harvard University (2022).

Data Analytics Seminar Series, Institute for Computational Astrophysics, St Mary University (2022).
Astrophysics/Data Science colloquium, University of Minnesota (2022).

Teaching Experience Summary

Undergraduate course instructor: PHYS 3600, Machine Learning for Physics and Astronomy (2018-2023); PHYS 1117, Astronomy I (2012-2023); PHYS 1000, The Physical Universe (2016); PHYS 1112, General Physics II (2015); CUNY NYC College of Technology. Total Enrollment: 750; Average teaching evaluation: 4.8/5.0.

Graduate course instructor: PHYS 85200, Machine Learning for Scientists, CUNY Graduate Center (2020, 2023). Total enrollment: 30.

Massive Open Online Courses: Developer and Lecturer, Machine Learning for Physics and Astronomy; Total enrollment: 385 (2023); Aprendizaje Automático para Física y Astronomía (in preparation; exp. 03/2024).

Summer school/conference lecturer: LSST Data Science Fellowship, Drexel University (2023); 18th Vatican Observatory Summer School “Learning the Universe: Data Science Tools for Astronomical Surveys”, Vatican Observatory, Castelgandolfo, Italy (2023); “Essential Cosmology for the Next Generation”, Playa del Carmen, Mexico (2022); Machine Learning x Astronomy course, Center for Computational Astrophysics, Flatiron Institute (2021 and 2019); online Summer School “Adventure in the Theoretical Sciences”, CUNY Graduate Center (2020).

Select Awards and Honors

2023 Chambliss Astronomical Writing Award from the American Astronomical Society for astronomy writing for an academic audience, specifically textbooks at either the upper-division undergraduate or graduate level, for *Machine Learning for Physics and Astronomy*.

Women Who Code’s **Mentorship award** and “**100 Technologist to Watch**” award (2023).

“**Tecnovisionarie**” award for Italian Women in AI, AI x Astrophysics prize, by Women&Tech (2021).

Forbes “100 Italian Successful Women” (2021).

“**50 women who did or are doing the history of Information Technology**” by Wired Italy (2020).

Inspiring 50 Award, recognizing the 50 most influential Italian Women in Tech (2018).

Feliks Gross award for outstanding scholarship, CUNY Academy of Arts and Sciences (2017).

Recent Grant Awards (last 5 years)

LEAP Research funding award, PI, “The Metrics Reloaded: Improved similarity assessment for climate maps”, NSF, \$111,380 (2024).

PIVOT Fellowship award, Simons Foundation, PI, “From galaxy evolution to climate models: a data-driven journey”, \$280,000 (2023).

PSC-CUNY research award, PI, “Yes, we can: Inferring galaxy properties from cosmological simulations using machine learning”, \$12,000 (2021); “Learning from simulations: a framework for domain adaptation techniques in Astrophysics”, \$6000 (2020).

NSF S-STEM award, co-PI, “Engaging, Empowering, and Retaining New Scholars in Science, Technology, Engineering and Mathematics,” \$999,625 (2019-2024).

Google Cloud Platform Research Credit award, PI, \$5,000 (2019).

Research In the Classroom grant by the CUNY Research Foundation, PI, “Estimating the physical properties of galaxies using Machine Learning”. \$7,380 (2019).

Select Professional Experience

Member, AI Advisory Council to the Italian government. We are tasked with developing a strategic plan for Artificial Intelligence activities and regulation in Italy (2023-).

Data Science Advisory Group (DSAG) member for NSF’s National Optical-Infrared Astronomy Research Lab (NOIRLab) (2021-2023).

Harlow Shapley Visiting Lecturer, American Astronomical Society (2016-2021).

Ph.D Committee member for **Carlos Ordaz**, CUNY (exp. 2026); **Dr. Regina Sarmiento**, Instituto de Astrofísica de Canarias (2023); **Dr. Shihua Zhao**, CUNY (2022); **Dr. Zoe Ansari**, University of Copenhagen (2022); **Dr. David Valcin**, University of Barcelona (2021); **Dr. Wouter Dobbels**, University of Ghent (2021);

Dr. Nicola Bellomo, University of Barcelona (2020); **Dr. Karthik Iyer**, Rutgers University (2019).

Scientific Organizing Committee Member: 18th Vatican Observatory Summer School (co-Chair), Vatican Observatory, Castelgandolfo, Italy (June 2023); Meeting in a Meeting “Machine Learning in Astronomy: Methods, Applications, and Challenges”, American Astronomical Society Meeting 238, online (June 2021); International Workshop “The Art of Measuring Physical Parameters in Galaxies”, University of California Riverside, (2018); International School in Astronomy and Data Analysis “ADAIX” (Valencia, Spain, 2018); “SabinoFest International Workshop, to celebrate the 60th birthday of Sabino Matarrese (Castiglioncello, Italy, 2015).

Grant Proposal Reviewer: Simons Foundation: Scientific Software Research Faculty Award; **Sloan Foundation:** Junior Faculty Research Awards in Science and Engineering; **National Science Foundation:** Institutes for Data-Intensive Research in Science and Engineering, Astrostatistics, Cosmology and Extragalactic Astronomy panels. **Science and Technology Facilities Council:** Astronomy Grant Panel. **NASA:** Hubble Fellowship Postdoctoral Program, Hubble Space Telescope annual Time Allocation Committee and science review panel, Postdoctoral Program. **CUNY Sponsored Programs:** Dissertation Award, CUNY Graduate Center ; Faculty Development Grant, Borough of Manhattan Community College.

Referee for the journals: “Nature Review Physics”, “Astronomy and Computing”, “The Astrophysical Journal”, “The Dark Universe”, “Monthly Notices of the Royal Astronomical Society”, “Journal of Cosmological Physics”, and “Astronomy and Astrophysics”; **Reviewer** for the NeurIPS workshop “Machine Learning for the Physical Sciences” and the ICML workshop “Machine Learning for Astrophysics”.

Select University Service Experience

Member, Technology Industry Committee, CUNY (2023-present).

Member and Chair of 2022 Faculty Search, Department Appointment Committee (2018-present).

Member, Executive Research Council, NYCCT (2021-present).

Member, CUNY Office of Research Faculty Advisory Council (2020-present).

Program Director/Internship Director, Applied Computational Physics program, 2018-2019 and 2021-2022.

Faculty Liaison and Grants Outreach Coordinator, Office of Sponsored Program, NYCCT (2021-2023).

Member, Institute for the Theoretical Sciences of the CUNY Graduate Center Steering Committee member (2021-2023).

Member, Undergraduate Research Committee, NYCCT (2012-2022).

Member, General Education assessment committee, NYCCT (2014-2018).

Recent Student Mentoring (last 5 years)

Research mentor for: **Festa Buçinca**, Ph.D. candidate, CUNY; **Jake Postiglione**, Applied Computational Physics graduate, incoming CUNY Ph.D. student (2021-present); **Olga Privman**, Applied Computational Physics graduate, school Valedictorian, incoming CUNY Masters student; **Dr. Andy Lawler**, Ph. D. advisee and postdoctoral collaborator, Baylor University, 2017-2022; **Carlos Aguayza**, Applied Computational Physics intern, 2019; **Herschel Gordon**, Applied Computational Physics intern, 2019; **Andrea Zambrano**, Applied Computational Physics intern, 2019; **Justin Peterkin**, AstroCom scholar, now a Ph.D. student at the University of Maryland, 2019; **Dr. Christopher Lovell**, visiting Astronomy Ph.D. candidate, now a Dennis Sciama Fellow, 2017-2019; **George Nwanwko**, Emerging Scholar, CUNY, now a senior software engineer at Intuit, 2018-2019; **Faraz Chahili**, CUNY Masters student, now a Ph. D. student at University of Syracuse, 2017-2019; **Harpreet Gaur**, Microsoft Research Data Science Internship recipient and Grace Hopper fellowship awardee, CUNY, now an associate technical program manager at LinkedIn, 2017-2019; **Hashir Qureshi**, Emerging Scholar and NASA Space Opportunity Grant recipient, CUNY, now a senior software engineer at Bluevine, 2017-2019.

Career mentor for: **Rosario Cecilio-Flores**, CUNY Master’s student (2023-present); **Hannah Stauss**, NYCCT Data Science major (2022-2023); **Nathanael Gutierrez**, CUNY Lehman College (2020-2022), now a Ph. D. student at Georgia Tech; **Sarah Medina**, AstroCom scholar and NASA grant recipient (2021-2022); **Ana Delgado**, CUNY Applied Computational Physics and AstroCom scholar, now a Ph.D. student at Harvard University (2018-2020).

Select DEI and Outreach Work

Invited Speaker, “Community building/ Finding your network”, workshop for early career Astronomers, Center for Astrophysics, Harvard University (2022); “Early Career Astronomers and their supporters” session, European Astronomical Society meeting (2022); “Navigating Science and Motherhood”, Astronomoms network online group meeting (2022).

Co-I and Mentor, “AstroComNYC: A Partnership between New York City Astronomers”, mentoring program for undergraduate students funded by the NSF (2012-present).

Organizer, “Career in the Sciences: An Interactive Panel” for undergraduate CUNY students, Flatiron Institute (2021); “How to support early career researchers” round table, Center for Computational Astrophysics of the Flatiron Institute (2021).

Panelist, NYU Women in STEM Peer Undergraduate Mentoring Program Career Panel (2019); Tri-State Postdoc career panel, Center for Computational Astrophysics of the Flatiron Institute (2018); Mentoring Workshop for faculty at CUNY community colleges, John Jay College, New York (2014); Panelist, “Women in STEM Panel Discussion and Workshop, LaGuardia Community College, New York (2014).

Faculty coordinator, City Tech Physics Club (2016-2019).

Public lecture speaker, including the Intrepid Museum Astronomy night, the “Paradox” lecture series at Rockefeller University, the NJ MENSA club, the Rutgers Society of Physics Students, the Rutgers society for Teaching Development, the Rutgers Astronomical Society, and several amateur Astronomy clubs in New York, New Jersey and Connecticut (2012-2019).

Curator, Italian translation for the Hayden Planetarium show “Dark Energy and Dark Matter” (2015).

Participant, “Intergalactic travel Bureau” (2015).

Creator, activities for 6-8 grade students “Dark Matter”, for the musical album “Biophilia” by Bjork (2012).

Participant and Organizer, Prison Teaching Project: I was a participant at Princeton University (2008-2012), and I established and coordinated the ongoing program at Rutgers University (2009-2012).