Giuseppe Puglisi, PhD
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CONTACT INFORMATION	Researcher at Universitá degli studi di Catania via S. Sofia, 64 Catania, IT, 95123	*Citizenship:* Italian, EU *E-mail:* giuseppe.puglisi@dfa.unict.it *Webpage:*http://giuspugl.github.io

RESEARCH INTERESTS

Cosmic Microwave Background Data-analysis for CMB polarization. Map-making techniques, simulation of systematics , Galactic foreground separation, estimation of cosmological parameters.

Large Scale Structures Dark Energy equation of state, Neutrino Anomalies

Modelling Galactic and Extragalactic Emission Modelling the polarized emission coming from synchrotron, thermal dust, molecular line processes contaminating the CMB signal at large angular scales. Polarized Radio emission from Active Galactic Nuclei.

Machine Learning in Data-analysis Adopting Neural Networks to improve the modelling of Galactic Foregrounds. Unsupervised learning procedure to analyze our data by means of clustering techniques or manifold embedding.

BIBLIOMETRICS

- **Scopus Author ID**: 56924810000
- **ORCID**: 0000-0002-0689-4290
- **ResearcherID**: ABG-5313-2021
- **Publications**:
  - 47 papers published in major peer-reviewed journals
  - 20 conference proceedings
- **Total number of citations**: 2,403
- **h-index**: 20
- **Presentations**:
  - 14 talks at conferences
  - 10 talks at department seminars
  - 5 posters at conferences

ACADEMIC APPOINTMENTS

Researcher (RTDb) at Universitá degli studi di Catania,
- Period: November 2022 - October 2025
- Focus: Simulations for CMB polarization experiments

RESEARCH EXPERIENCES

Researcher (RTDa) at Universitá degli studi di Roma - Tor Vergata,
- Period: September 2021 - October 2022
- Referee: Prof. Nicola Vittorio
- Focus: Simulations for CMB polarization experiments

Senior Postdoctoral Fellowship University of California - Berkeley Berkeley Center for Cosmological Physics,(BCCP)
- Period: January 2020- August 2021
- Referee: Dr. Julian Borrill
- Focus: Data Analysis for future space satellite CMB polarization experiment

Postdoctoral Fellowship Kavli Institute of Particle Astrophysics and Cosmology (KIPAC) Stanford University
- Period: January 2018- December 2019
- Referee: Prof. Chao-Lin Kuo
- Focus: Systematics and Foreground simulations for CMB polarization experiment

PhD in Astrophysics 110/110 cum laude
International School for Advanced Studies - SISSA Trieste
- Period:November, 2013 - October, 2017

- Title:*B-mode Polarization Experiments for the Cosmic Microwave Background: Map-making and Foreground Modeling*
- Advisors: Prof. Carlo Baccigalupi (SISSA), Dr. Giulio Fabbian (IAP-Paris)
- Opponents: Prof. Paolo Natoli, Dr. Ingunn Wehus

Master's Degree in High Performance Computing
Period: May 2015 - December,16th 2016
Institutions: SISSA, ICTP
Project title: *Accelerating CMB Maps production with Deflation Preconditioners*
Advisors: Dr. Luca Heltai, Prof. Carlo Baccigalupi, Dr. Giulio Fabbian (SISSA)

SCHOLARSHIPS AND AWARDS

Co-PI of PRIN 2022 grant
Period: September 2023-December 2025
Institutions: INFN- Ferrara, University of Catania
Research field: Data-analysis for CMB experiments
Focus: Noise estimation and mapmaking for Polarbear experiment
PI: Dr. Martina Gerbino

Dean "Erasmus Traineeship Training PhD Students"
Period: June 2016-September 2016
Institutions: AstroParticule et Cosmology (APC), Paris
Research field: Data-analysis for ground based CMB experiments
Focus: Noise estimation and mapmaking for Polarbear experiment
Supervisor: Dr. Radek Stompor

Undergrad scholarship
Period: July 2013-November 2013
Institutions: International School for Advanced Studies (SISSA),Trieste
Research field: Forecast of polarized Galactic emission and parametric component separation for sub-orbital CMB experiments.
Supervisor: Prof. Carlo Baccigalupi

TEACHING AND MENTORING

Advanced Cosmology
- Course for the Master in Physics of University of Catania
    Period:Since October 2024

Physics Laboratory III
- Course for the Bachelor in Physics of University of Catania
    Period:Since October 2024

General Physics : Mechanics and Thermodynamics
- Course for Industrial Engineering Bachelor of University of Catania
    Period:Since March 2023

Laboratory of Astrophysics
- Course for the Master in Physics of University of Catania
    Period:Since March 2023

CMB polarization Classes
- PhD in Astrophysics joint program University of Rome - Sapienza and Tor Vergata
    Period:February 2023

Radiative Processes Lectures
- University of Rome - Tor Vergata
    Period:October-November 2022

Relativity and Cosmology Lectures
- University of Rome - Tor Vergata
    Period: April - May 2022

Advanced Cosmology Lectures
- University of Rome - Tor Vergata
    Period: Dec 2021

PhD co-supervision

- A. Carones (2021-now, Roma Tor Vergata), K. Cheung (2020-2021, UC Berkeley), E. Yang (2018-2020, Stanford), J. Kang (2018-2019, Stanford)

Master MSc supervision

- V. Francalanza (2023, UniCT), A. Annoni (2016, SISSA), L. Yang (2015, Beijing University), L. Siyu (2015, Beijing University)

Summer Projects supervision

- Xiran Bai (2018, University of Michigan)

PROFESSIONAL
ACTIVITIES

- Leader of Work Package 1 on *"HPC codes enabling and optimization"*, Spoke3 of the Italian Network *Centro Nazionale 1*
- Simulation Production Manager of the Litebird space mission 2022-present
- Source and Transients pipeline Leader for the Simons Observatory, 2021-present
- Galactic Science Analysis Working Group Leader for the Simons Observatory, 2023-present
- Member of the Membership Panel Committee of the Simons Observatory, 2022-present
- Member of the Speaker Selection Committee of the Litebird Collaboration, 2022-present
- Member of Pan-Experiment Galactic Science group, 2021 - present
- Member of Low-ell Working group of CMB-Stage IV experiment, 2019-present
- Member of Polarbear and Simons Array Collaboration, 2014-present
- Member of Machine Learning applications on High Energy Physics at University of California, 2020-2021
- Referee for *JCAP*, 2020- present
- Referee fpr *Monthly Notices of the Royal Astronomical Society*, 2018 -present
- Referee for *Astronomy & Astrophysics* , 2019 - present
- Referee for *New Astronomy*, 2021 - present
- Referee for *Experimental Astronomy*, 2021 - present

EDUCATION

Course in Convolutional Neural Networks - Coursera
Certification Date Oct 2018, License 48PYEMPR4XB8

Course in Machine Learning - Stanford University
Certification Date Sept 2018, License P3Q2PH3MYC2U

Master in High Performance Computing SISSA - ICTP
http://www.mhpc.it
Period: September 2014- May 2015
Thesis Defense: December, 16th 2016

 MSc in Physics, curriculum of Astrophysics,("Laurea Magistrale") , 110/110
Universitá degli Studi di Milano
Final GPA: **28.85/30** with 2 special mentions
18th October 2010 - 16th April 2013

BSc in Physics, curriculum of General Physics, 110/110 cum laude
Universitá degli studi di Catania
Final GPA: **28.8/30** with 4 special mentions
10th October 2007 - 18th November 2010

Musical Studies Degree for Clarinet, Final Score: 8/10
2003 - 2010 Istituto Musicale "V. Bellini" di Catania

SEMINARS AND INVITED TALKS	• Lecturer , "Galactic modelling and systematics for CMB experiments", *LiteBIRD hands-on Meeting* , Kavli IPMU, Tokyo, Jun 2023
	• Invited Talk, "The LiteBIRD cosmic microwave background polarization survey ", *Cosmology 2023 in Miramare* , Trieste, Aug 2023
	• Invited Talk, "Galactic modelling with PySM", *2023 Summer Collaboration Meeting* , SLAC, Jul 2023
	• Session Chair , "Galactic modelling and emission", *2023 Summer Collaboration Meeting* , SLAC, Jul 2023
	• Organizer and Chair of Workshop *Astrophysics with CMB-S4- Sources and Transients*, University of Urbana Champaign (Illinois) , Jul 2022
	• Talk, "Supervised and Unsupervised learning techniques on Galactic modelling", *Machine Learning for Astrophysics* , Catania , Jun 2022
	• Talk, "Improved Foreground Removal for B-Modes Detection with Clustering Method", *From Planck to the Future of CMB* , Ferrara , May 2022
	• Seminar, "Clustering methodologies with parametric fitting", Astrophysics Seminar, *University of Oxford*, Oct 2021,
	• Seminar, "Challenges in future CMB polarization data", Astrophysics Seminar, *University of TorVergata - Rome*, May 2021,
	• Seminar, "Extending Galactic models for Cosmic Microwave Background emission with adversarial nets", KICP Seminar, *University of Chicago*, January 2021,
	• Seminar, "Extending Galactic models for Cosmic Microwave Background emission with adversarial nets", International Physics Network, *Machine learning and big data in Physics*, January 2021, virtual event
	• Seminar," Extending Galactic foreground models for CMB with GANs", *University of California Berkeley, Cosmology and Machine Learning group meeting* , December 2020
	• Invited talk , " Optimizing the interplay of systematic effects and observing strategy in CMB space missions", *Workshop on CMB systematics* , November 2020
	• Seminar , " Inpainting Astrophysical emissions with neural networks " , *CEA Paris*, April, 2020, link youtube
	• Invited talk, "Modeling high resolution Synchrotron emission with neural networks , *CMB-S4 LBNL meeting*", April, 2020
	• Invited talk, "Modeling Fractional polarization of point sources ", *CMB-S4 LBNL meeting*, April, 2020
	• Seminar, "Hunting Primordial Gravitational waves in the Cosmic Microwave Background ", *Universitá di Catania*, EPS young minds meeting, June 2019
	• Seminar, " CMB B-mode Polarization Experiments and Galactic Foreground Modelling", *Osservatorio INAF di Catania*, June 2019
	• Invited Talk, " B-mode forecasts from extra-galactic point sources", In: *CMB foreground B-mode studies* , October 2018, Tenerife
	• Invited Talk, "Building 3D Galactic models", In: *ASI Cosmos- Conference* , April 18, 2018, SISSA Trieste
	• Seminar, "Challenges in CMB B-mode data analysis: what's next?" , *Kavli Institute of Physics Astronomy and Cosmology - Stanford University*, March 2018
	• Seminar, "CMB B-mode Polarization Experiments and Galactic Foreground Modelling", *University of Bologna , Astrophysics Dept., Istituto di Fisica Cosmica (IASF) and Istituto di Radio Astronomia (IRA)*, October 2017
CONFERENCES AND SCHOOLS	• Talk, "Challenges in forthcoming CMB experiments", INAF -USCVIII,Critical Computation, Catania, June 2023
	• Member of Local Organizing Committee, LiteBIRD meeting October 2021
	• Organizer panelist, *"Deep Generative Models for Fundamental Physics"* Workshop, March 2021
	• Member of Local Organizing Committee, CMB-Stage4 Spring meeting 2021, March 2021

- Speaker, "Optimizing the interplay of systematic effects and observing strategy in CMB space missions ," *237th Meeting of American Astronomical Society* , January 2021, Virtual meeting
- Chairman for Contributed talks on CMB session and for i-poster presentation on Dust, *237th Meeting of American Astronomical Society* , January 2021, Virtual meeting
- Speaker for the Foreground Working group updates, *Simons Observatory Global meeting*, June 2020, Virtual meeting
- Speaker for the Optic and calibration systematic updates, *Litebird Global meeting*, June 2020, Virtual meeting
- Talk," B-mode forecasts from extra-galactic radio sources", *ASI Cosmos- Conference* , April 2018, SISSA Trieste
- Talk, "A 3D model for CO molecular line emission", *AstroTS Conference*, September 2017, SISSA Trieste
- Talk, "Assessing Point Source emission in Polarbear 2nd season maps, Simons Array meeting, June 2017, Berkeley
- Talk, "Modeling CO line emission", Simons Observatory meeting , October 2016, Princeton
- Talk, "New challenges in Cosmic Microwave Background studies", *Italian CMB-day workshop*, March 2016, Italian Space Agency (ASI) Rome
- Talk, "Two-level preconditioned Conjugate gradient, a worked example", *Workshop on High Performance Computing*, 24-26 February 2016, SISSA - Trieste
- *First ICTP Advanced School on Cosmology*, May 2015, ICTP - Trieste
- *PhD School of Astrophysics Francesco Lucchin*, September 2013, Gaeta - Italy
- *New Light in Cosmology from the CMB* School & Workshop, 22th July - 2nd August 2013, ICTP - Trieste

CONFERENCE POSTERS
- "Systematics simulations with TOAST", *CMB-Stage 4 virtual meeting,* March 2021
- " Calibration, Beam and Cosmic ray Systematics simulations ", *LiteBIRD virtual meeting*, February 2021
- "Extending foreground emission with Neural Network",*34th Conference on Neural Information Processing Systems*", December 2020, Virtual meeting
- "Making maps with Deflation preconditioner", *CMB-Stage 4 meeting*, March 2019, Fermilab Chicago
- "Mitigating Gain Systematics", Litebird Collaboration Meeting, January 2019, ASI Rome

LANGUAGES
Italian **Native**
English **Fluent**
French **Good**
Spanish **Good**

COMPUTER SKILLS AND COMPETENCES
- **Programming Languages**: C, C++, Fortran, Python, Julia, parallel computing (OpenMP, OpenMPI, CUDA), Mathematica, IDL, Bash scripting
- **Operating systems**: LINUX, Macintosh, Windows
- **Productivity applications**: Installation of Scientific libraries, TEX, Gnuplot, GIT

INSTITUTIONAL RESPONSIBILITIES
-
- PostDoc Representative in the KIPAC management committee, Stanford 2018-2020
- Organizer of KIPAC Postdoc workshops and Astro-ph discussion, 2018-2019
- Organizer, SISSA weekly Cosmology discussion, 2015-2017

- 2014-2016: Student representative of the SISSA phD courses in the council for Research Fundings of Friuli-Venezia-Giulia region

- 2014-2016: Elected member of the SISSA student council as representative of the Astrophysics Sector

- 2008-2010: Elected member, as student representative in the Physics Department Committee of the University of Catania ("Consiglio di Coordinamento Didattico")