

ELENA LACCHIN

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RESEARCH INTEREST

Globular Clusters: Multiple Stellar Populations Formation - Stellar Feedback - Supernova Feedback - Rotation - Dynamical and Chemical Evolution - Star Formation in the Early Universe

Chemical Evolution of Galaxies: Ultra-Faint Dwarfs - Milky Way - Initial Mass Function - Nucleosynthesis - Stellar evolution - Dark Matter

Simulations: N-Body/Hydrodynamics - High Performance Computing and Parallel Computing

PRESENT POSITION

1 APRIL 2023 - PRESENT

Postdoctoral Research Fellow

Institute of Theoretical Astrophysics, Zentrum für Astronomie, Universität Heidelberg & Università degli Studi di Padova, Dipartimento di Fisica e Astronomia “G. Galilei”

Mentor: Prof. Michela Mapelli

EDUCATION

1 NOVEMBER 2019 - 30
JUNE 2023

Ph.D. in Astrophysics

Università di Bologna, Dipartimento di Fisica e Astronomia “Augusto Righi” & Istituto Nazionale di Astrofisica - Osservatorio di Astrofisica e Scienza dello Spazio Bologna

Thesis on: “Hydrodynamic simulations of multiple stellar populations in globular clusters”

Supervisor: Dr. Francesco Calura

2 OCTOBER 2017 - 20
SEPTEMBER 2019

Master’s degree in Physics - curricula Astrophysics and Cosmology

Università degli Studi di Trieste

Grade: 110/110 cum laude

Thesis on: “Chemical evolution of ultra-faint dwarf galaxies: the effects of the initial mass function”

Supervisor: Prof. Francesca Matteucci

29 SEPTEMBER 2014 - 14
JULY 2017

Bachelor’s degree in Physics

Università degli Studi di Trieste

Grade: 109/110

Thesis on: “Analisi dei cicli di attività solare dal 1749 al 2017”

Supervisor: Prof. Mauro Messerotti

EXPERIENCE

APRIL - JUNE 2022

Visiting Student

GEPI laboratory at the Observatoire de Paris, France

Project title: “Mass loss in Magellanic Clouds Globular Clusters”

Collaborators: A. Mastrobuono-Battisti, P. Di Matteo

LIST OF PUBLICATIONS

ORCID ID: [0000-0001-9936-0126](#)ResearchGate: [Elena-Lacchin](#)

9. Iorio G., Torniamenti S., Mapelli M., Dall’Amico M., Trani A.A., Rastello S., Sgalletta C., Rinaldi S., Costa G., Dahl-Lahtinen B., Escobar G., Korb E., Vaccaro M.P., **Lacchin E.**, Mestichelli B., Di Carlo U.N., Spera M., Arca Sedda M., “The boring history of Gaia BH3 from isolated binary evolution”, 2024, submitted
8. **Lacchin E.**, Mastrobuono-Battisti A., Calura F., Nipoti C., Milone A. P., Meneghetti M., Vanzella E., “Multiple stellar population mass loss in massive Galactic globular clusters ”, 2024, [A&A 681, A45](#).
7. Pascale R., Calura F., Lupi A., Rosdahl J., **Lacchin E.**, Meneghetti M., Nipoti C., Vanzella E. , Vesperini E., Zanella A., “Shaping the unseen: the influence of baryons and environment on low-mass, high-redshift dark matter halos in the SIEGE simulations ”, 2023, [MNRAS, 526, 1428](#).
6. **Lacchin E.**, Calura F., Vesperini E., Mastrobuono-Battisti A., “The role of rotation on the formation of second generation stars in globular clusters”, 2022, [MNRAS, 517, 1171](#).
5. Calura F., Lupi A., Rosdahl J., Vanzella E., Meneghetti M., Rosati P., Vesperini E., **Lacchin E.**, Pascale R., Gilli R., “Sub-parsec resolution cosmological simulations of star-forming clumps at high redshift with feedback of individual stars”, 2022, [MNRAS, 516, 5914](#).
4. **Lacchin E.**, Calura F., Vesperini E., “On the role of Type Ia supernovae in the second-generation star formation in globular clusters”, 2021, [MNRAS, 506, 5951](#).
3. **Lacchin E.**, Matteucci F., Vincenzo F., Palla M., “Chemical evolution of ultra-faint dwarf galaxies: testing the IGIMF”, 2020, [MNRAS, 495, 3276](#).
2. Palla M., Calura F., Matteucci F., Fan X. L., Vincenzo F., **Lacchin E.**, “The influence of a top-heavy integrated galactic IMF and dust on the chemical evolution of high-redshift starbursts”, 2020, [MNRAS, 494, 2355](#).
1. Gjergo E., Palla M., Matteucci F., **Lacchin E.**, Biviano A., Fan X. L., “On the origin of dust in galaxy clusters at low-to-intermediate redshift”, 2020, [MNRAS, 493, 2782](#).

ACCEPTED COMPUTATIONAL PROPOSALS

Almost 17M core hours on different supercomputers which is equivalent to ~ 600k € of research funds.

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| 2022 | PI of the proposal: “Towards a holistic view of the origin of multiple stellar populations in globular clusters”, EuroHPC JU grant, 14M core hours on Discoverer (BG). |
| 2021 | PI of the proposal: “Hydrodynamic simulations of proto-globular clusters: the role of Type Ia SNe”, 2M core hours on MARCONI 100/GALILEO 100, CINECA (IT). |
| 2020 | CO-I of the proposal: “Hydrodynamic simulations of the young star cluster PW1 in the Magellanic Stream” (PI: Francesco Calura), 500k core hours on GALILEO, CINECA (IT). |

- 2020 **PI** of the proposal: “Hydrodynamic simulations of iron-complex clusters”, **500k core hours** on GALILEO, CINECA (IT).
- 2020 **PI** of the proposal: “Hydrodynamic simulations of Globular Clusters”, **250k core hours** on MARCONI 100, CINECA (IT).

HONOURS & AWARDS

- JULY 2023 **"Christine Vandemoortele for research" Prize** of 3000 € awarded by the Department of Physics and Astronomy (DIFA) "Augusto Righi" for the best PhD's thesis in astrophysics at DIFA.
- OCTOBER 2022 **Travel Grant** of 500 € awarded by the MIAPbP to participate to the workshop “Star-Forming Clumps and Clustered Starbursts across Cosmic Time” in Garching, Germany.
- AUGUST 2022 **Travel Grant** of 500 € awarded to participate to the conference “Star formation in different environments 2022” in Quy Nhon, Vietnam (not used).
- JUNE 2022 **Travel Grant** of ~ 350 € awarded by the PNCG to participate to the conference “Journées scientifiques ‘Galaxies’ du PNCG 2022” in Strasbourg, France.
- APRIL - JUNE 2022 **Grant** of 3450 € awarded by the University of Bologna for the MARCOPOLO project to work at the GEPI laboratory at the Observatoire de Paris (France) with Dr. A. Mastrobuono-Battisti on “Mass loss in Magellanic Clouds Globular Clusters”.
- NOVEMBER 2019 **CO-I** of the PRIN INAF “Sub-parsec resolution simulations of globular clusters in a cosmological model” (PI F. Calura, INAF-OAS), awarded ~ 66k € for 2 years.
- JANUARY 2018 – SEPTEMBER 2019 **Scholarship** of 6000 € awarded by Collegio Universitario di Eccellenza “Luciano Fonda” for the master's degree.

CONFERENCES, WORKSHOPS AND SCHOOLS

13. **Invited Talk**, 2024 Alpbach workshop on clouds, star clusters & black holes, Alpbach, Austria. *June 10-14, 2024*
12. **Invited Talk**, EuroHPC Summit 2024, Antwerp, Belgium. *March 19, 2024*
11. **Invited Talk**, EuroHPC User Day 2023, Brussels, Belgium. *December 11, 2023*
10. Contributed talk, STARS (Across the Universe), Naples, Italy *October 16-20, 2023*
9. **Invited Talk**, A multi-wavelength view on globular clusters near and far: from JWST to the ELT, Sestri, Italy *July 3-7, 2023*
8. Contributed talk, Ramses User Meeting 2023, Oxford, United Kingdom *April 19-21, 2023*
7. Contributed talk, Wheel of star formation, Prague, Czech Republic *September 12-16, 2022*
6. Contributed talk, Star formation in different environments 2022, Quy Nhon, Vietnam *August 21-27, 2022*
5. Contributed talk, Journées scientifiques “Galaxies” du PNCG 2022, Strasbourg, France *June 20-22, 2022*
4. Contributed talk, EuroHPC Summit Week 2022, Paris, France *March 22-24, 2022*
3. Contributed talk, The 5th Azarquiel School of Astronomy *November 15-19, 2021*
2. Contributed talk, Ramses User Meeting 2021, Paris, France *September 27-29, 2021*

1. Contributed talk, Chemical evolution of galaxies: the next 25 years, Sexten, Italy *January 7-11, 2020*

TALKS AT SEMINARS

11. **Milky Way meeting** at MPA Garching, April 2024
10. **Ghent University**, November 2023
9. **Milky Way Group** at Observatoire de Paris-Meudon, October 2023
8. **Star formation Group** at Heidelberg University, October 2022
7. **Star Formation Talk** at Université Paris-Saclay, June 2022
6. **Paris Observatory Joint Galaxies and Cosmology Seminar** at Observatoire de Paris-Meudon, April 2022
5. **Cosmo/Astro India Group**, January 2022 (online)
4. **Star Formation/ISM Rendezvous** at Princeton University, December 15, 2021 (online)
3. **Galfor group** at University of Padua, December 2021 (online)
2. **Astrochronometry seminars** at University of Bologna, November 2021 (online)
1. **Demoblack group** at University of Padua, November 2021 (online)

SUPERVISION OF STUDENTS

2024	Co-supervisor of the master thesis “Effects of Type Ia Supernova feedback in young globular clusters” of Marco Donati, University of Bologna.
SUMMER 2022	Co-supervisor of two Indiana University data science graduate students working on visualization of hydrodynamical simulations of formation of multiple populations in globular clusters, who have been awarded of the Faculty Assistance in Data Science Grand Prize.

EXAMS COMMISSIONS

2019	Oral exams of Introduction to Astrophysics, Stellar Astrophysics, Stellar and Galactic Evolution at the University of Trieste (with Prof. Francesca Matteucci)
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OUTREACH AND SERVICE

2024	Interview at the EuroHPC Summit 2024.
2018	Organizing and volunteering at public physics events such as TriesteNext, Researcher Night.
2017-2019	Representative at the Physics Department Council at the University of Trieste.
2017	Volunteering, as part of the AISF (Italian Society of Physics Students), to the German Italian Physics Exchange program aimed at presenting the physics research centres in the area of Trieste.

ORGANIZATION OF CONFERENCES

2024	Splinter session on Computational Astrophysics at the German Astronomical Society meeting.
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IT KNOWLEDGE

Operating systems: Linux/Unix (very good), Mac OS (very good), Windows (good).

Programming languages: Python (very good), Fortran 77 and 90 (very good), bash (good), IDL (good), Arduino (basic).

Astronomical softwares: Aladin, DS9, GAIA, IRAF, Muniwin, McLuster, Topcat.

Other softwares: LaTeX (very good), Microsoft Office (very good).

Experience in parallel computing: usage of MPI and OpenMP in high-performance computing.

Codes: [RAMSES](#) (Adaptive Mesh Refinement for self-gravitating magnetized fluid flows), [PeTar](#) (N -body code)

LANGUAGE KNOWLEDGE

Italian (mother tongue), English (fluent), Spanish (basic), French (basic)