

Dear Maria,

I am Biagio De Simone, your Ph.D. student from the University of Salerno. I hope this letter finds you well and I would like to take the chance here to thank you for everything you did for me during these four years of my professional life since I am approaching the end of my Ph.D.

I remember when I first met with you in March 2020, at the end of my Master's thesis studies. You were advised to me by my supervisor Prof. Gaetano Lambiase and Prof. Salvatore Capozziello who held the Astrophysics and Cosmology course. During that period, I was supposed to visit you at the Jagiellonian University in Krakow, the institute where you were enrolled before your move to Japan. Despite the complications and uncertainties that arose from the COVID-19 emergency, I was happy to see that you kept your availability to work online and then transformed the visiting period into an online Internship from which I could also benefit from writing my thesis work. In such a period of great uncertainties and many bureaucratic procedures still under discussion, the difficulties with the offices at the University of Salerno and the Jagiellonian University led us to worry about the submission of the documents that certified the Internship period training. Nevertheless, you proved to be very reactive and patient in dealing with the forms to be submitted and signed. During this Internship, I deepened my knowledge about Gamma-Ray Bursts (GRBs) astrophysics and correlations, the research field in which you have a strong expertise recognized all over the scientific community.

At the end of the Internship period in September 2020, I started together with you my first research job concerning the Hubble constant tension in the Supernovae Ia (SNe Ia) Pantheon sample. Thanks to your dedication and continuous support, we completed the preliminary analysis that constituted my Master's Thesis topic and I successfully graduated with a Master's in Physics in December 2020.

After my Master's studies, I spent the first half of the year 2021 preparing myself for the 3-year Ph.D. program admission exam that was held at the University of Salerno in July 2021: thanks to the work we made together, I managed to build a robust curriculum and expertise that allowed me to be part of the top 3 candidates for that admission call. Indeed, in this period, we published two papers in collaboration: the former represented the continuation of my Master's thesis work, while the latter focused on the study of the GRB closure relationships. Thanks to all this experience and curriculum, I was the first one in my family to start a Ph.D. program.

In September 2021, I started my Ph.D. at the University of Salerno under the constant guidance and supervision of you and Prof. Gaetano Lambiase. In the first period of my Ph.D., up to the first half of 2022, we published together other two: the former concerning the Hubble constant tension in SNe Ia with a novel analysis that expanded the parameters of space fitting and another one that relates to the quest of correlations among GRB and SN parameters in the so-called GRB-SNe associations, namely, a class of rare and particular transients that arise the scientific community interest as promising standardizable candles.

From the second half of 2022, I had the honor to work with you and a large group of co-authors on the long-term project of the optical GRB catalog that you patiently led as first and corresponding author: we collected 535 GRB optical light curves with redshift from the literature, papers, General Coordinates Network (GCN), and private co-authors data for a total of more than 64000 data points. In such a huge effort, we also investigated the color evolution behavior for the GRBs present in our catalog and we provided to the scientific community not only the data gathered in a unified format but also the grbLC, a Python-based tools package that aims to ease the inspection and analysis of the light curves. This huge work was recently accepted for publication and will surely represent an aid for the GRB researchers community. It is also remarkable that, during the time of this research project, we

entered into a collaboration with a network of Italian amateur and professional observatories who focused on the research for GRB optical afterglows right after the Swift trigger: the GRB/UAI - Gamma-ray Burst section of Unione Astrofili Italiani.

In the current period and, until the end of my Ph.D., I am focusing on the analysis of the Hubble tension in the novel SNe Ia data releases such as the Dark Energy Survey and the contribution of GRBs in the testing of cosmological models: we expect to have four new papers from these research topics to be submitted to refereed journals and I am looking forward to achieving new promising results with you in these fields.

According to my experience, I can say that working with you opened many doors in the research world. The thing that strikes me the most is your great capability of enduring restlessly with many works and papers at the same time. You have lots of energy and passion and this reflects also on the fact that you are very enthusiastic about every single research project you carry on, either as first author or as a co-author.

I had the chance to witness how you enjoy interacting with many students, no matter if they are very young and still inexperienced. I was impressed when I had the chance to collaborate with students who still had to start their university courses: we worked together on research projects that would have then ended in a publication in refereed journals of high significance. You proved an incredible capability in valorizing the knowledge and skills of all the students we met, improving them when needed, and prizing them when remarkable. All of this is possible thanks to the inclusivity and the proactiveness that characterize you. In the interactions with you and all the other students from all over the world, not only I was able to ease the workload but also had the chance to learn many things about dealing with younger students who show more passion for research than we could ever imagine. It's not a shame for me to admit that I often learned many things from students younger and much more skilled than me, and such an honest interaction could never have happened if it was not for your team-building approach.

I am grateful that you pushed me to have lots of different experiences abroad, not only from many conferences all over the world (Northern Italy, La Reunion, Japan, United States of America) but also in advertising me for visiting periods through your previous institute in Poland (converted into an online Internship due to the COVID-19 emergency) and your current institute in Japan, namely, the National Astronomical Observatory of Japan (NAOJ, Mitaka, Tokyo). This latter destination is particularly important for me since I had the chance to visit such an important scientific center in a wonderful place of the world for one entire year: during this year, you and I had close contact to work together on the very hard construction and analysis of the GRB optical catalog. I also had the chance to discuss many different topics in modern astrophysics and cosmology thanks to the seminars and the interactions with your colleagues at the NAOJ and the variety of scientific topics I witnessed surely improved my general knowledge in astrophysics and cosmology.

In conclusion, I am really happy and grateful for all the work and life experience I spent with you since March 2020. Working and being in contact with you allowed me to improve my knowledge in astrophysics and cosmology and also helped me develop important skills such as communication skills, the team-working with very large and variegated groups of people, the critical sense development that allows pointing to the important aspects of every research project, the patience in dealing with long-term projects, the self-critic process for which every error I committed was then re-analyzed to avoid its future occurrence, and the human improvement that is required to a person who is willing to grow up from the scientific and professional point of view. I am sure that what I obtained during these four years is of invaluable importance and without your continuous, patient, and passionate support I doubt that I would've reached such a personal and professional development.

I will never thank you enough for everything you did for me, and I hope that I managed to return to you in favor of at least a small amount of what you spent on my development during these years. I wish you all the best for your personal and professional life.

30th August 2024

Yours sincerely,

*Bigio de
Limone*