

# My Experience at NAOJ

*By: Anshul Kaushal*

During my research internship under the mentorship of Prof. Maria Giovanna Dainotti at the National Astronomical Observatory of Japan (NAOJ), I was fortunate to work at the convergence of two fields I am deeply passionate about: Computer Science and Astrophysics. This experience was both intellectually enriching and professionally transformative, marking a pivotal stage in my academic journey.

Our research focused on a central challenge in high-energy astrophysics—extracting meaningful insights from observational data of Gamma-Ray Bursts (GRBs), some of the most energetic events in the universe. The datasets involved were often incomplete, noisy, or sparsely sampled, limiting the reliability of physical interpretations. My primary responsibility was to apply and adapt advanced computational techniques—ranging from statistical modeling to modern machine learning algorithms—to reconstruct missing or corrupted data points. By minimizing temporal gaps and observational uncertainties, our work aimed to improve the robustness of the astrophysical parameters derived from GRB observations.

What made this project particularly unique was its international and interdisciplinary nature. I had the opportunity to collaborate closely with researchers from leading institutions across the USA, Poland, and Japan. These collaborations took the form of regular meetings, where we exchanged ideas, discussed experimental results, and refined our approaches based on collective feedback. This environment fostered critical thinking and exposed me to diverse scientific methodologies and perspectives.

Beyond the technical skills, the internship offered invaluable exposure to the collaborative process of academic publishing. I contributed significantly to two manuscripts that are in process of acceptance in high-impact peer-reviewed journals. Throughout this process, I learned how to rigorously validate scientific hypotheses, present results with clarity, and maintain high standards of reproducibility and integrity.

Prof. Dainotti's mentorship played a central role in my development. Her guidance extended far beyond the technical aspects of the research. She emphasized scientific precision, encouraged independent thinking, and instilled a deep respect for the peer review process. Her commitment to excellence and detail-oriented approach have left a lasting impact on my academic ethos.

This internship not only deepened my expertise at the intersection of computational techniques and astrophysical inquiry but also provided me with a clearer vision of the kind of interdisciplinary research I hope to pursue in the future. I am deeply grateful for the opportunity to have worked under Prof. Dainotti's mentorship and for the collaborative spirit of the entire research group.