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To the selection committee,

Please find enclosed my application and proposal for the ESA Fellowship Post-Doctoral position. I am currently a 4th year PhD student at Lancaster University, UK, expecting to submit my thesis in Q1 of 2023. My research focuses on studying galaxy evolution in the context of galaxy interaction and merging, under the supervision of Dr Brooke Simmons.

My proposed project 'Towards a Statistical Understanding of Galaxy Evolution' combines the *Hubble Space Telescope* and JWST science archives with ESA Datalabs and Euclid to create and analyse the largest catalogue of galaxy morphology and ancillary data to date. I will use a convolutional neural network – *Zoobot* – to make morphological classifications of all objects existing in the *HST* and JWST archives. These morphological catalogues will then be combined with the first results of Euclid's *NISP* instrument to create a full ancillary catalogue of morphologies and galactic parameters. I will then conduct initial analysis of this catalogue, measure its selection effects and accuracy, and conduct an in depth use of it in the context of galaxy interaction.

The work of my PhD has made me best suited to take on this project. The work is primarily a continuation of an internship I conducted at the European Space Astronomy Centre (ESAC) in 2022. This internship gave me experience with ESA Datalabs – where I still have an active account – and with using *Zoobot*. These experiences will substantially reduce the ramp up required on this project.
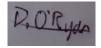
I anticipate the size of the catalogue from this project to be 100 million classified objects, at least. This estimate comes from the *HST* source catalogue containing 126 million extended sources. This will then be combined with source extraction from the JWST archives to find further objects. I have proposed four separate papers that will be released as a result of this project, with two further deliverables. These deliverables but will be of significant use to the community.

Due to this works proximity to the archives, ESA Datalabs and Euclid, I propose the following mentors for this project: Bruno Altieri (Euclid), Guido de Marchi (Data Archives) and Bruno Merin (ML techniques).

For the fully detailed proposal, timeline and how it links in to my previous research experience, please see my proposal documentation. In addition, please find enclosed my CV and full publication list. These contain links to my personal website and contact information. The following people have agreed to send reference letters on request: Brooke Simmons, Bruno Merin and Chris Lintott.

Thank you very much for your time. I am at your full disposal to discuss any aspects of my application and I look forward to hearing from you in due course.

Sincerely,

David O'Ryan