Using Machine Learning to Uncover the Formation of Galaxies

Dr. Mark A. Norris (Senior Lecturer in Astrophysics, JHI, UCLan)

When studying galaxies more than a few million light years distant it is impossible to resolve the individual stars that compose the galaxy into distinct points of light. Hence, we must infer the properties of the galaxy based on the properties of its integrated light; the light of millions of stars all combined.

In recent years my group has had great success demonstrating that it is possible to decompose this light into spectra that represent the light of the individual bursts of star formation that occurred (see e.g. https://arxiv.org/pdf/2101.07072.pdf, https://arxiv.org/pdf/2108.06160.pdf). By doing this we are able to determine the entire star formation and chemical enrichment history of a galaxy, and even to work out what fraction of its stars originally formed in distinct galaxies which were then accreted by the current galaxy.

This project will apply state-of-the-art machine learning techniques to the study of astronomical spectra, in order to further enhance our ability to determine how, when and where the stars of galaxies are formed.

For more information on this project please contact Dr. Norris (MNorris2@uclan.ac.uk).

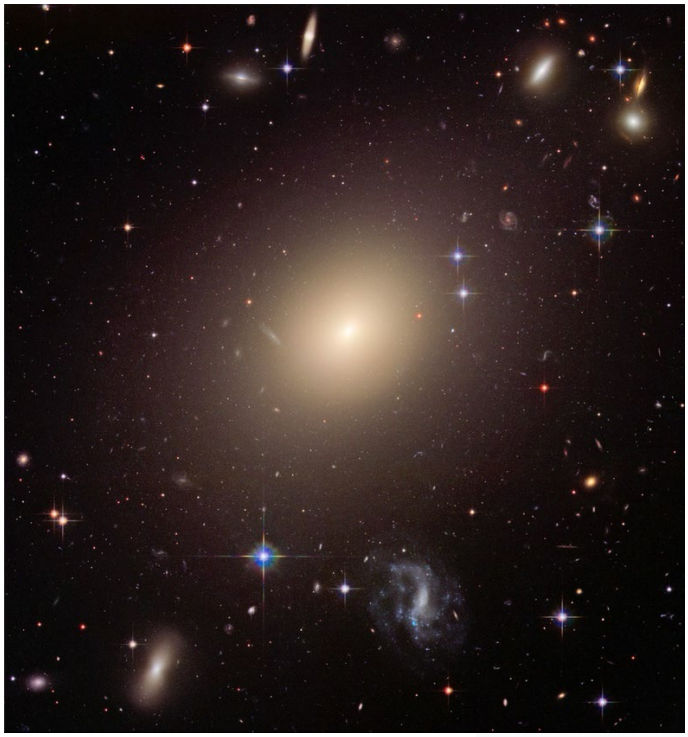

Figure: The Elliptical Galaxy ESO 325-G004. Credit: NASA, ESA, and The Hubble Heritage Team (STScI/AURA); J. Blakeslee (Washington State University)