Andrew T. Hannington

Cardiff University

Star Formation

Project title:

Star Formation in Filamentary Molecular Clouds

Science/research area:

I am currently working on developing synthetic observational Big Data of Filamentary Molecular Clouds using Monte Carlo Radiative Transfer techniques. Once this has been completed, I hope to use this data to train some form of Machine Learning algorithm (likely a Neural Network) to extract data about the fundamental parameters of these filaments (such as density profile, temperature, width etc.).

There exists large repositories of observational data of filaments, but extracting information about them is currently a laborious, difficult, manual task. It is my hope that with Machine Learning we can learn more about these astronomical phenomena, and in turn, learn more about the fundamental process of Star Formation.

About me:

I was born in North East Wales, and grew up with a passion for science and computing. This interest lead me to studying A-levels in Physics, Chemistry, Maths and Further Maths.

In 2012 I moved to St Andrews, Scotland, to pursue my undergraduate degree, a Masters in Theoretical Physics. In 2018 I graduated from St Andrews, and moved to Cardiff to start a PhD in Theoretical Astrophysics and Data Science. This was quite the jump from my undergraduate degree in mostly Quantum and Condensed Matter Physics, but I knew Astronomy and the Cardiff, Bristol, Swansea CDT would provide un-paralleled opportunities to pursue interesting science, and learn fantastic computational techniques. This, coupled with the opportunity to interact with world-class industry partners made accepting my Cardiff offer an easy choice.

In my spare time I love to cook, read, crochet, swim, walk, and play the violin (at beginner level).

Please see my Linked-In profile at:
https://www.linkedin.com/in/athannington94/

Data Intensive Research Skills and Interests etc.

Skills: Fortran 90, Python, (rudimentary level) SQL and R. Machine Learning, Monte Carlo Radiative Transfer, Data Analysis, Hydrodynamical Simulation (primarily Eularian Grid, but some experience of Lagrangian Smoothed Particle Hydrodynamics (SPH)). (Rudimentary level) BASH, Open-MPI and Git.
Interests: Computational physics, numerical simulations, data science and programming. In particular, applying computational techniques to coupled systems (such as those found in astronomy); learning more about combined numerical techniques, such as Radiative Hydrodynamics, and Magnetohydrodynamics; and learning more about Data Intensive Science techniques.