



Student thesis and dissertation topics

My work is in [computational magnetohydrodynamics](#), and students working with me on a Master's and especially a Ph.D. project will contribute toward the development of [AZEuS](#), the 3-D, AMR (adaptive mesh refinement) version of [ZEUS-3D](#) that the student will need to perform their simulations. At some point when [AZEuS](#) has been sufficiently developed, it would be released into the public domain, much like [ZEUS-3D](#) is currently.

General ideas for thesis and dissertation topics include:

1. Protostellar jets

- i* What can observed protostellar jets tell us about the conditions at the protostellar accretion disc from which it is launched?
- ii* What role does magnetism play in the formation and propagation of protostellar jets?
- iii* What is the origin of the knots in protostellar jets (*a.k.a.* HH objects)? Are they instigated by perturbations from where the jet was launched, or are they triggered by the environment through which the jet propagates?

2. Collapse of giant molecular clouds

- i* How does magnetism affect the fragmentation of a molecular cloud into cloud cores?
- ii* What is the role of (super-Alfvénic) turbulence in the transition between a cloud core, a protostellar envelope, and finally a protostar?
- iii* And here is the “biggie”: accretion-ejection. Can we launch a jet self-consistently from a collapsing protostellar envelope?

Potential students wishing to discuss any of these ideas further are certainly welcome to [contact me](#) directly, though application for entrance into our graduate programme must be done through our [Faculty of Graduate Studies and Research \(FGSR\)](#), and not through me.