

# N8 CIR Research Case Studies

## Chris Jewell



Dr. Chris Jewell

Chris Jewell is a computational epidemiologist, working primarily in statistical inference for stochastic dynamical infectious disease models.

Being a cross-disciplinary academic, he is really interested in providing software solutions that make complex statistical procedures available for application-domain researchers to use.

### Can you give us an overview of the project?

The current project is called 'GEM: Generalised Epidemic Modelling'. We are building a domain-specific modelling language for epidemics, aimed at bridging a skills gap between methods development and programming in computationally intensive statistics and applied research in outbreak investigation.

The aim is to make it easier for epidemiologists to access cutting-edge methods for working with epidemic models, and easier for methods developers to get their innovations into mainstream research use quickly.

### Did you work with an RSE from the beginning of the project?

To get the project off the ground, I've become, effectively, the chief RSE on the project. It's been a slow process, interweaving a lot of reading with other project commitments and my day job as an academic. I have an assistant coming online at the end of November funded for 10 months by a Wellcome Open Research Award.

### Once you started working with the data did you encounter any specific problems or challenges? How might an RSE have been a useful addition to the project?

Our challenge is computational complexity both in the size of dataset and the complexity of the algorithms which work on it.

Efficient use of available computational hardware is a key requirement so efficient programming in high-level languages is a must. I have enjoyed learning compiler design but an experienced RSE would have completed such tasks much more quickly.

### What tools and software did you use for your analysis? Is the software, code and data that you used available for others to reproduce your work?

Git/GitLab-CI, Python with Pycharm IDE, Pylint for code quality checking, unittest for testing. All the code is publicly available on our own GitLab instance: <http://fhm-chicas-code.lancs.ac.uk/GEM>

### Having worked with an RSE, will it change your approach in the future?

Getting RSE involvement early in the lifecycle of a project is something I'll definitely do in future.

### Can you tell us more about your current or any future research projects?

This project is all about drawing together applied researchers and developers in the epidemics research community. It's crucial for us to develop a clean, modular code base with both user and developer interfaces to ensure an easy to use high-quality product. Professional RSE support is invaluable in enabling this.

It is hoped that through GEM, the process of epidemic modelling will be easier, more reproducible, and more agile in responding to future outbreaks of a wide range of diseases in humans, animals, and plants.