Fintan Hegarty

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Production Editor — Mathematical Sciences Publishers, University of California, Berkeley *2016–present*

Journals I work on: *Rocky Mountain Journal of Mathematics*, *Journal of Integral Equations and Applications*, *Pacific Journal of Mathematics*, *Journal of Software for Algebra and Geometry*, *Involve*, *Algebraic and Geometric Topology*, *Geometry and Topology*, *Innovations in Incidence Geometry*, and *The Open Book Series*.

- Recruit and train new production editors.
- Assign workload to editors working on journals for which I am the project manager.
- Disruption minimisation and confidence restoration for one set of newly acquired journals abandoned by their previous production team.
- Liaise with managing editors, authors, graphic designers, printers.
- Edit and proofread peer-reviewed mathematical and computer science articles prior to publication.
- Format manuscript typesetting (in Latex) to conform to journals' styles.
- Write computer scripts (in Perl, Python, bash, Vim) to automate and improve certain editing tasks.
- Write documentation for code tutorials and standardised style guides.
- Monitor metadata and bibliographic content.

Freelance Contractor *2017–2019*

Various online contracts: editing books, theses, research papers, and resumés. Writing reviews. Some mathematical consulting, including writing computer programs (in Javascript, MySQL).

Lecturer — University of Limerick *2016*

Lectured on the University of Limerick's "Professional Diploma in Mathematics for Teachers", a postgraduate course which qualified second-level teachers with non-mathematical backgrounds to teach mathematics to pre-university level.

- Taught a class of around thirty teachers, explaining material, working through questions, etc.
- Monitored relevant online discussion forum and responded to queries.
- Administrated and marked assignments and exam scripts.

Postdoctoral Research Fellow — University of Birmingham *2013-2015*

Worked on a branch of signal processing as a member of the Theoretical and Computational Optimization Research Group. My specific area of research was in compressed sensing.

- Wrote algorithms (in Matlab) for manipulation and analysis of a certain type of sensing matrix.
- Coauthored a research paper displaying the benefits of my approach: increased speed and accuracy.
- Attended regular meetings to discuss group members' research and present my own findings.
- Attended relevant conferences around the country and presented my research abroad.
- Reviewed other group members' manuscripts prior to journal submission.

Tutor of Mathematics — National University of Ireland, Galway *2008–2011*

Worked as a tutor in the School of Mathematics, Statistics and Applied Mathematics, while doing my PhD. Courses taught were: *Mathematics and Statistics for Business* for Commerce, *Mathematics* for Science, and *Quantitative Techniques for Business* for Business Information Studies undergraduates.

- Taught a wide range of topics to classes of up to sixty students.
- Was responsible for online course component (Blackboard, MyMathLab) for four hundred students.
- Provided supplementary support for struggling and non-traditional students.
- Invigilated and marked exams.

Private Tutor *2007–2018*

I have, at various intervals, provided extra-curricular mathematics instruction to a range of individuals and small groups; Leaving Certificate students and Commerce, Computer Science, Engineering, and Science undergraduates.

Chess Teacher *2004–present*

- Taught chess in junior and university clubs.
- Organised and arbitrated an annual competition with about 150 participants, and coordinated teams to travel nationally and internationally.
- Served in secretarial and webmaster roles (using HTML and Wordpress) for three chess clubs.

Public Engagement

- During my doctoral studies, I founded a monthly newsletter for which I wrote mathematical puzzles and collated and edited fun science articles from my peers. These were distributed around campus, with the aims of subtly educating the reader, and more importantly, distracting the writers from their theses.
- I organised a series of open-air "guerilla" lectures aimed at the general public, where, armed with a whiteboard and a marker, researchers would attempt to educate random passers-by on topics ranging from juggling to astrophysics.
- Served on the University Societies Coordination Group, which oversees all university society activity; budgeting, dispute resolution, liaising with university staff and the public, annual awards, etc.
- Partook in "Bright Club"—an event for presenting research through the medium of stand-up comedy.

Education

Higher Diploma in Computer Science/Data Analytics, Galway-Mayo Institute of Technology *2019–present*

Ph.D. Mathematics, National University of Ireland, Galway *2008–2013*

Completed my thesis, *Computational Homology of Cubical and Permutahedral Complexes*, under the supervision of Prof. Graham Ellis.

- Developed theory for novel computational homology methods in topological data analysis, using tesselations based on analogues of an n-dimensional hexagon, as opposed to the traditional square. This led to speed-up in many cases, and allowed for the analysis of higher-dimensional data.
- Created an open-source software package (using the C based GAP system for discrete computational algebra) for the analysis of data based on this hexagonal-analogue tesselation, implemented for image data in up to four dimensions.
- Coauthored a research paper on the main aspects of my thesis.

Further details, along with some toy examples, are available on my webpage.

B.Sc. (Hons) Financial Mathematics and Economics, National University of Ireland, Galway *2004–2008*

Final Year Project: *Understanding the Riemann Hypothesis:* A layman's explanation of (but unfortunately no solution to) possibly the most important unresolved problem in pure mathematics.

Diploma in Irish, National University of Ireland, Galway *2004–2006*
European Computer Driving Licence Certificate, Magh Ene College, Donegal *2003–2004*
Leaving Certificate, Magh Ene College, Donegal (highest mark in the college that year) *2001–2003*

Publications

Sparsification of matrices and compressed sensing, F. Hegarty, P. Ó Catháin, Y. Zhao, *Irish Mathematical Society Bulletin*, 2018.

Computational homotopy of finite regular CW-spaces, G. Ellis and F. Hegarty, *Journal of Homotopy and Related Structures*, May 2013

Computational homology of cubical and permutahedral complexes, Ph.D. thesis, submitted September 2012, supervised by Prof. Graham Ellis.