




# EOGHAN STAUNTON

PhD Student

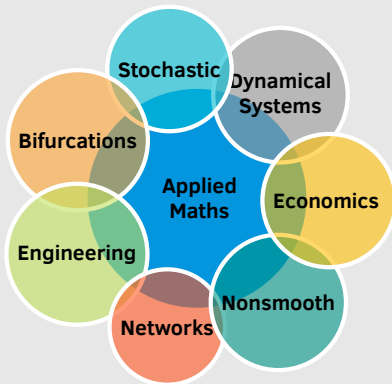
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## Research Interests



## Skills Profile



## Computing Proficiency

MATLAB •  $\LaTeX$  • Office

GEPHI • InkScape

HTML • Python




















## Languages

English - *Native Speaker*

Irish - *Fluent*

French - *Reading Knowledge*

## Education and Selected Academic Achievements

-  2015-2019 **PhD. Applied Mathematics** (In Progress) NUI Galway
-  2013-2015 **Research MSc. Applied Mathematics** NUI Galway
-  2009-2013 **BSc. Financial Mathematics & Economics** (92%) NUI Galway
-  2009-2011 **Dioplóma sa Ghaeilge (C1)** (77%) NUI Galway
-  2003-2009 **Leaving Certificate** (6 Higher A1s - max pts) Coláiste Iognáid
-  2015-2019 **GoI Postgraduate Scholarship** (GOIPG/2015/3500) Irish Research Council
-  2015-2019 **Hardiman Scholarship** (Declined) NUI Galway
-  2018 **NOLTA Best Student Paper Award** (NOLTA 2018) NOLTA Society
-  2018 **SIAM Student Travel Award** (AN18) SIAM
-  2018 **SIAM Student Chapter Certificate of Recognition** SIAM
-  2018 **2nd Prize School Research Day Poster** School of Mathematics
-  2017 **1st Prize School Research Day Poster** School of Mathematics
-  2017 **1st Prize NUIG-UL Research Day Poster** NUIG-UL Alliance
-  2013-2015 **Research MSc. Scholarship** NUI Galway
-  2014 **Runner Up Prize UL-NUIG Thesis in Three** UL-NUIG Alliance
-  2013 **First Derivatives Best in Class** (Fin. Math. & Econ.) NUI Galway
-  2012 **Hamilton Prize** Royal Irish Academy
-  2010, 11, 12 **University Scholar Award** (Every Undergraduate Year) NUI Galway
-  2009 **Academic Entrance Scholarship** NUI Galway

## Research Experience

### 2015-2019 PhD. Appl. Math. *Nonsmooth Dynamical Systems with Noise*

Noise has been shown to have a large effect on smooth but nonlinear dynamical systems, especially close to bifurcation points, however there has so far been limited study of the effect of noise on nonsmooth systems. Our work investigates the complicated effect noise can have on nonsmooth systems with a particular focus on the effect close to discontinuity induced bifurcations, bifurcations which do not occur in the smooth setting.

**Supervisor** Dr. Petri Piiroinen Mathematics, Statistics and Applied Mathematics, NUIG

### 2013-2015 MSc. Appl. Math. *Dynamic Spatial Networks & Economic Development*

Spatial agglomeration of economic activities and unequal growth of urban centres are a major topic of economic interest. This interdisciplinary project modelled and analysed uneven spatial economic dynamics by setting up an agent-based simulation environment composed of multiple overlapping networks in space and time.

**Supervisors** Dr. Petri Piiroinen Mathematics, Statistics and Applied Mathematics, NUIG  
Dr. Srinivas Raghavendra Business Public Policy & Law, NUIG  
Dr. Jim Duggan Engineering & Informatics, NUIG

### 2012-2013 BSc. Final Year Project *Infinitesimals, Nonstandard Analysis and Applications to Finance*

An infinitesimal is a number that is smaller in magnitude than every positive real number. We learn early on in our study of standard analysis that nonzero infinitesimals cannot exist. It is also true however that many people use the intuitive notion when trying to understand basic concepts in analysis and calculus such as derivatives or integrals. This project introduced the world of nonstandard analysis, a world in which infinitesimals exist, in a rigorous but accessible manner.

**Supervisor** Dr. Raymond Ryan Mathematics, Statistics and Applied Mathematics, NUIG

### Summer 2012 School of Mathematics Intern *The Jacobi Equation*

This project investigated the phenomenon of multiple conjugate points along a geodesic in the context of the Jacobi equation, a second order ordinary differential equation, which captures precisely the geometry of conjugate points on surfaces.

**Supervisor** Dr. John Burns Mathematics, Statistics and Applied Mathematics, NUIG

## Journal Articles

[1] J.M. Burns, E. Staunton, D.J. Wraith, On the Jacobi Equation and Manifolds with Multiple Conjugate Points, *Mathematical Proceedings of the Royal Irish Academy*, 113(1):19-30, 2013

[2] E.J. Staunton, P.T. Piironen, The Effects of Noise on Multistability in the Square Root Map, *Physica D: Nonlinear Phenomena*, 380-381:31-44, 2018

[3] E.J. Staunton, P.T. Piironen, Noise Induced Multistability in the Square Root Map, *Nonlinear Dynamics*, 95:769-782, 2019

[4] E.J. Staunton, P.T. Piironen, Linearising Piecewise-Smooth Flows with Stochastic Discontinuity Boundaries, *In Preparation*

## Mathematics Education, Organisation and Outreach

### 2014-Present Society for Industrial and Applied Mathematics, NUI Galway Student Chapter

- I am a founding member and a former president (17-18) of Ireland's first SIAM Student Chapter.
- I have been involved in organising several events with the chapter including postgraduate conferences in **2014**, **2015** and as president in **2017**. A comprehensive list of events is available [here](#).
- As chapter secretary (16-17) I was also heavily involved in the organisation of the 6th National Student Chapter Conference of the UKIE Section of SIAM held in NUIG in **May 2017**.

### 2015-2019 NUI Galway Postgraduate Modelling Research Group

- From September 2015 - January 2019 I was the auditor of the **Postgraduate Modelling Research Group**.
- I organised weekly seminars with presentations by NUI Galway PhD students or external guest speakers.

### 2015,16,17 Stokes Modelling Workshops, NUI Galway

- I worked organise workshops aimed at undergraduates in **2015** and **2016**, and at postgraduates in **2017**.
- In **2016** I mentored a group of five undergraduates modelling the spread of infectious diseases.

### 2010-Present Education and Teaching

- **2019-Present:** Applied Mathematics Lecturer at NUI Galway  
I am the current lecturer for the Modelling, Analysis and Simulation module in NUI Galway. This interdisciplinary module teaches mathematical modelling, simulation and analysis of dynamical systems in the context of economic modelling.
- **2013-Present:** Mathematics Tutor at NUI Galway  
I have worked as a tutor for many mathematics, applied mathematics and statistics modules at NUI Galway.
- **2010-Present:** Grinds Teacher.  
I work independently tutoring mathematics students of all levels. During the academic year 2010 I was also employed at the Grinds Academy, Oranmore, Galway, teaching mathematics and physics classes.
- **Summer 2011:** Intern at the School of Mathematics, NUI Galway.  
I worked to set up a digital repository of traditional and online problems for the first year mathematics courses in NUI Galway under my supervisor Dr. Graham Ellis.

## Skills Profile

**Problem Solving:** I have undertaken many problem solving projects and learned to take a systematic approach to research during my internships and my current studies. I believe my academic results are evidence of these abilities.

**Leadership & Management:** I am a former president of the NUIG SIAM Student Chapter and I have captained many of the sports teams I have been involved in, developing good leadership skills. I won best CEO in the All-Ireland BlastBeat competition in 2007 for my role in leading our mini multimedia and music company to third place in the overall competition. I have experience managing teams and organising large events such as All-Ireland sporting competitions and academic conferences.

**Teamwork:** I developed the ability to work efficiently as a member of a group or team by being involved in many team sports and also undertaking group projects in university. In particular I developed the high level of teamwork skills necessary to win All-Ireland medals while rowing for Coláiste Iognáid Rowing Club, to represent Ireland at the European Championships of Beach Ultimate in Calafell, Spain in 2013 and the World Championships of Beach Ultimate in Dubai in 2015 and to win two NUIG sports awards, for my role as kayak polo team captain in 2015 and Irish ultimate frisbee international player in 2016.

**Communication & Instruction:** I have developed good communication and instruction skills; both written and oral through my academic teaching roles and working as a kayaking instructor and an ultimate frisbee coach. I have also completed the NUIG Centre for Excellence in Learning and Teaching GS506 Teaching & Learning module. I have experience presenting my research at conferences nationally and internationally and I have won several awards for research communication.

**Computing:** I have worked extensively with LaTeX, Matlab, GEPHI and Excel during the course of my research. I also have knowledge of Python, HTML and Maple.

**Graphic Design & Video Editing:** I have a keen interest in graphic design and in video editing. I have designed multiple sports uniforms and posters using open source software such as Inkscape and GIMP. I have also shot and edited several videos using Shotcut. These include a video for the NUIG SIAM Student Chapter which was shown at the SIAM Annual Meeting in Pittsburgh in 2017.