

Department of Mathematics
 Huxley Building
 South Kensington Campus
 Imperial College London
 London SW7 2AZ, UK

Email: j.leahy@imperial.ac.uk
 ORCID ID: <https://orcid.org/0000-0003-4771-4476>

Appointments:

Imperial College London Research Associate in the Department of Mathematics	London, UK 2019 – present
University of Twente Affiliate Researcher in the Department of Applied Mathematics	Enschede, NE 2020 – 2021
Cornell Tech at Cornell University Postdoctoral Researcher in the School of Electrical and Computer Engineering	New York, NY, USA 2018 – 2019
University of Southern California Assistant Professor (NTT) of Mathematics	Los Angeles, CA, USA 2015 – 2018

Education:

University of Edinburgh Doctorate of Philosophy in Mathematics Advisor: Professor István Gyöngy Thesis: <i>On parabolic stochastic integro-differential equations: existence, regularity, and numerics.</i>	Edinburgh, UK 2010 – 2015
McGill University Master of Arts in Mathematics	Montreal, Québec, CA 2008 – 2011
Columbia University Master of Public Health in Epidemiology	New York, NY, USA 2006 – 2009
State University of New York at Binghamton Bachelor of Arts in Mathematics and Minor in Chemistry	Binghamton, NY, USA 2002 – 2006

Funding:

Rough-Path Fluid Dynamics (RPF_D), US AFOSR, Co-P with Darryl D. Holm, \$450,318 2021 – present

Publications and Preprints:

(with Bekzhan Kerimkulov, David Šiška, and Lukasz Szpruch) *Convergence of policy gradient for entropy regularized MDPs with neural network approximation in the mean-field regime*, arXiv:2201.07296, to appear in ICML, 2022.

(with Dan Crisan, Darryl D. Holm, and Torstein Nilssen) *Solution properties of the incompressible Euler system with rough path advection*, arXiv:2104.14933, 2021.

(with Dan Crisan, Darryl D. Holm, and Torstein Nilssen) *Variational principles for fluid dynamics on rough paths*, Adv. Math., Volume 404, Part A, 2022.

(with Theodore D. Drivas and Darryl D. Holm) *Lagrangian averaged stochastic advection by Lie transport for fluids*, J. Stat. Phys., 179:1304-1342, 2020.

(with Martina Hofmanová and Torstein Nilssen) *On a rough perturbation of the Navier-Stokes system and its vorticity formulation*, Ann. Appl. Probab., 31(2):736-777, 2021.

(with Martina Hofmanová and Torstein Nilssen) *On the Navier-Stokes equation perturbed by rough transport noise*, J. Evol. Equ., 19:203-247, 2019.

(with Remigijus Mikulevičius) *On classical solutions of linear stochastic integro-differential equations*, SPDEs: Anal. and Comp., 4(3):535-591, 2016.

(with Konstantinos Dareiotis) *Finite difference schemes for linear stochastic integro-differential equations*, Stoch. Anal. Appl., 126(10):3202-3234, 2016.

(with Remigijus Mikulevičius) *On degenerate linear stochastic evolution equations driven by jump processes*, Stoch. Anal. Appl., 125(10):3748-3784, 2015.

(with Remigijus Mikulevičius) *On some properties of space inverses of stochastic flows*, SPDEs: Anal. and Comp., 3(4):445-478, 2015.

Awards:

Principal's Career Scholarship at University of Edinburgh	2010 – 2015
Global Scholarship at the University of Edinburgh	2010 – 2015

Conference and Seminar Talks:

<i>TBD</i>	09/2022
Interacting Particle Systems and Applications	Trento, IT
<i>TBD</i>	09/2022
BIRS: New interfaces of Stochastic Analysis and Rough Paths (22w5116)	Vancouver, BC, CA
<i>Convergence of policy gradient for entropy regularized MDPs in the mean-field regime</i>	07/2022
The Thirty-ninth International Conference on Machine Learning	Baltimore, MD, USA
<i>Convergence of policy gradient for entropy regularized MDPs in the mean-field regime</i>	06/2022
9th colloquium on Backward Stochastic Differential Equations and Mean Field Systems	Annecy, France
<i>Fluid dynamics on geometric rough paths and variational principles</i>	06/2022
Stochastic Analysis & Mathematical Finance Seminars	Oxford, UK
<i>Fluid flow on geometric rough paths</i>	04/2022
15th STUOD Sandbox Workshop	London, UK
<i>Fluid flow on geometric rough paths</i>	09/2021
2021 Dynamical Systems and Control Theory Program Review	Shalimar, FL, USA

<i>Fluid equations with transport type rough path perturbations</i>	06/2021
PDE and Numerical Mathematics	Virtual
<i>The incompressible Euler system with rough path advection</i>	06/2021
Young Researchers Between Geometry and Stochastic Analysis 2021	Virtual
<i>On transport type rough fluid equations</i>	03/2021
Analyse stochastique trajectorielle et applications Pathwise Stochastic Analysis and Applications	Virtual
<i>On rough fluid equations</i>	01/2021
Berlin Rough paths, stochastic partial differential equations and related topics research unit	Virtual
<i>On fluid equations with rough transport noise</i>	12/2020
Oberwolfach New Directions in Rough Path Theory	Virtual
<i>Variational principles for fluid dynamics on rough paths</i>	08/ 2020
2020 Dynamical Systems and Control Theory Program Review	Virtual
<i>Variational principles for fluid dynamics on rough paths</i>	06/2020
13th Berlin-Oxford meeting	Virtual
<i>Variational principles for fluid dynamics on rough paths</i>	05/2020
Oxford and Alan-Turing Institute DataSig Seminar	Virtual
<i>Variational principles for fluid dynamics on rough paths</i>	04/2020 (postponed)
Cornell Probability Seminar	Ithaca, NY, USA
<i>On fluid equations with rough transport noise</i>	02/2020
Young researchers between geometry and stochastic analysis	Bergen, NO
<i>On the equations of incompressible fluids driven by rough transport noise</i>	01/2020
North British Probability Seminar	Edinburgh, UK
<i>On the equations of incompressible fluids driven by rough transport noise</i>	12/2019
AGM Meeting on Stochastic geometric mechanics: fluid models and uncertainty quantification	London, UK
<i>On the equations of incompressible fluids driven by rough transport noise</i>	07/2019
Workshop on Stochastic Parameterizations and Their Use in Data Assimilation	London, UK
<i>On the Navier-Stokes equation with rough transport noise</i>	01/2018
Southern California Probability Symposium (2017) at UC Irvine	Irvine, CA, USA
<i>On the Navier-Stokes equation with rough transport noise</i>	07/2017
International Workshop on BSDEs, SPDEs and their Applications	Edinburgh, UK
<i>On degenerate linear stochastic integro-differential equations</i>	04/2017
USC Probability and Statistics Seminar	Los Angeles, CA, USA
<i>On degenerate linear stochastic integro-differential equations</i>	09/2016
Conference on Stochastic Analysis in Honor of István Gyöngy's 65th Birthday	Edinburgh, UK

<i>On rough partial differential equations</i>	04/2016
Seminar in Probability at USC	Los Angeles, CA, USA
<i>Short course: An introduction to non-linear filtering</i>	Spring 2016
Seminar in Probability at USC	Los Angeles, CA, USA
<i>On degenerate linear stochastic evolution equations driven by jump processes</i>	10/2014
Maxwell Institute Graduate School on Evolution Equations	Edinburgh, UK
<i>On classical solutions of linear stochastic integro-differential equations</i>	07/2014
2nd Barcelona Summer School on Stochastic Analysis at the CRM	Barcelona, Spain
<i>Finite difference schemes for linear stochastic integro-differential equations</i>	06/2014
Statistics, Jump Processes, and Malliavin Calculus at the Barcelona GSE	Barcelona, Spain
<i>On classical solutions of linear stochastic integro-differential equations</i>	04/ 2014
Stochastic Differential Equations in Infinite Dimensional Spaces at KCL	London, UK

Academic Service:

Referee for Annals of Probability, Electronic Journal of Probability, Annals of Applied Probability, Computers and Fluids, Journal of Mathematical Analysis and Applications, Stochastics and Partial Differential Equations: Analysis and Computations, and the IMA Journal of Numerical Analysis

Teaching:

University of Southern California	Los Angeles, CA, USA
Instructor in the Department of Mathematics	2015 – 2018
Calculus III	Spring 2018
Calculus III (two sections)	Fall 2017
Fundamental Concepts of Analysis II	Spring 2017
Math for Physics and Engineering I (two sections)	Fall 2016
Math for Physics and Engineering II	Spring 2016
Elementary Probability and Statistics	Fall 2015
Math for Physics and Engineering II	Fall 2015

Visiting Positions:

Imperial College London	London, UK
Visiting Researcher at the Department of Mathematics	05/2019 – 09/2019
Imperial College London	London, UK
Visiting Researcher at the Department of Mathematics	07/2018 – 10/2018
Cornell University	New York, NY, USA
Visiting Researcher at the School of Electrical and Computer Engineering	06/2018

Technische Universität Berlin
Visiting Researcher at the Institut für Mathematik

Berlin, Germany
06/2017–07/2017

Université Paris Dauphine
Visiting Researcher at CEREMADE

Paris, France
05/2015 – 08/2015

University of Southern California
Visiting Researcher at the Department of Mathematics

Los Angeles, CA, USA
08/2013 – 12/2013

Other Employment:

Standard Life Investments
Intern for Quantitative Multi-Asset Investment Management Division

Edinburgh, UK
12/2014 – 04/2015

Wilshire Analytics
Intern for Applied Research Division

Los Angeles, CA, USA
07/2013 – 12/2013

Thomson Reuters
Intern for Investment Management Risk Division

New York, NY, USA
06/2011 – 12/2011

Cantor Fitzgerald
Intern for Life Market Division

New York, NY, USA
02/2007 – 12/2007