UNIVERSITÀ DEGLI STUDI DI MILANO

TO MAGNIFICO RETTORE OF UNIVERSITA' DEGLI STUDI DI MILANO **ID CODE 4718**

I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of a type B fellowship at **Dipartimento di Economia, Management e Metodi Quantitativi**

Scientist-in-charge: Prof. Giancarlo Manzi

James Thompson

CURRICULUM VITAE

PERSONAL INFORMATION

Surname	Thompson
Name	James
Date of birth	17 November 1987

PRESENT OCCUPATION

Appointment	Structure
Postdoctoral Researcher	Department of Mathematics, University of Luxembourg

EDUCATION AND TRAINING

Degree	Course of studies	University	Year of achievement of the degree
Degree	Master of Mathematics	University of Warwick	2010
PhD	Mathematics	University of Warwick	2016

REGISTRATION IN PROFESSIONAL ASSOCIATIONS

Date of registration	Association	City
N/A	N/A	N/A

FOREIGN LANGUAGES

Languages	level of knowledge
English	Native speaker

Università degli Studi di Milano – Direzione Risorse Umane
Ufficio Contratti di formazione e Ricerca
Via Sant'Antonio 12 - 20122 Milano, Italia
Assegni.ricerca@unimi.it

AWARDS, ACKNOWLEDGEMENTS, SCHOLARSHIPS

Year	Description of award
2020	On 26th May 2020, I was awarded a grant of €50,000 from the Luxembourg National Research Fund (FNR) as part of their COVID-19 Fast-Track Call (COVID-19FT-2). This grant covers a period of 6 months, concluding at the end of December 2020.

TRAINING OR RESEARCH ACTIVITY

The ongoing coronavirus pandemic is the most disruptive event in recent history. It is of vital importance that we continue to build a rigorous understanding of how the SARS-COV-2 virus spreads and predict the impact of interventions. Since March 2020, my research has therefore focussed on the modelling and simulation of COVID-19, and since April 2020 I have been a member of the official Covid-19 Modelling Taskforce of Luxembourg. Since July 2020, I have had my own COVID-19 modelling project, funded by the FNR, for which I have employed two additional team members. One is a mathematician while the other is a software engineer. My team is building an agent-based model that simulates the complex interactions of agents according to daily and weekly routines, with a resolution of 10 minutes, over a procedurally generated random environment modelling the country or region in question. Thus far, our attention has focussed on the country of Luxembourg, however the model has been formulated in such a way that it could be easily adapted to other small regions, countries or even collections of countries. The model has been written in Python and is currently under development. My experience as a member of the Covid-19 Modelling Taskforce has informed the development of this model, and while it remains a work in progress, the basic layers are complete and it is now capable of producing detailed and remarkably realistic output. Following the end of this project, I would therefore like to continue the research, and hopefully make further developments and improvements to the model or others like it.

PROJECT ACTIVITY

Year	Project
2020	My current project, titled “AMBLUX”, is the COVID-19 modelling project described above.
2016-2020	My postdoctoral research has focussed primarily on the development and application of tools from stochastic analysis to the study of elliptic or parabolic partial differential equations on differentiable manifolds, aiming to advance deeper connections between probability and geometry.
2011-2015	My PhD project, titled “Submanifold Bridge Processes”, showed how certain key objects in Riemannian geometry, in particular heat kernels, can be described and analysed in terms of a special class of stochastic processes similar to the Brownian bridge.
2010	My Master’s project, titled “Optimal Vaccination”, presented an account of the basic models of mathematical epidemiology, focussing on infectious diseases of humans. The project introduced elementary SIR models before moving on to discuss more advanced stochastic models with heterogeneities. The project concluded with an investigation of the optimal allocation of doses of a vaccine, in the context of a pandemic spread by air travel.

PATENTS

Patent
N/A

Università degli Studi di Milano – Direzione Risorse Umane
Ufficio Contratti di formazione e Ricerca
Via Sant’Antonio 12 - 20122 Milano, Italia
Assegni.ricerca@unimi.it

CONGRESSES AND SEMINARS

Date	Title	Place
Feb 2020	“Submanifold Brownian Bridges”	Workshop on Manifold and Shape Stochastics, Sandbjerg Estate, Denmark
Feb 2020	“Exponential Integrability and Exit Times of Diffusions on sub-Riemannian and Metric Measure Spaces”	Young Researchers between Geometry and Stochastic Analysis, Bergen, Norway
Feb 2020	“Derivative Formulae for Heat Semigroups on Riemannian Manifolds”	The Third International Conference on Mathematics and Statistics, American University of Sharjah, UAE
July 2019	“Functional Inequalities for Feynman-Kac Semigroups”	Stochastic Processes and their Applications 2019, Northwestern University, USA
April 2019	“Dimension-free Harnack Inequalities for Feynman-Kac Semigroups”	Recent Progress in Path Integration on Graphs and Manifolds, Oberwolfach, Germany
July 2018	“Quantitative Gradient Estimates by Bismut Formulae”	Regularity Structures and Stochastic Systems 2018, Chinese Academy of Sciences, China
July 2018	“Derivative and Divergence Formula for Diffusion Semigroups”	IMS Annual Meeting on Probability and Statistics 2018, Vilnius, Lithuania
June 2018	“Quantitative Gradient Estimates By Bismut Formulae”	Stochastic Processes and their Applications 2018, Gothenburg, Sweden
May 2018	“Brownian Motion on a Riemannian Manifold”	Probability Seminar, Zhejiang University of Technology, China
Aug 2017	“Derivative and Divergence Formulae for Diffusion Semigroups”	Asymptotics for Stochastic Dynamical Systems, University of Swansea, UK
June 2016	“Heat Kernel Formulae and the Brownian Bridge to a Submanifold”	Belgian, Royal Spanish and Luxembourg Mathematical Societies, Logroño, Spain
Nov 2016	“Gradient Estimates for Brownian Bridges to Submanifolds”	Stochastic Analysis Seminar, Oxford-Man Institute of Quantitative Finance, UK

PUBLICATIONS

Books
N/A

Articles in reviews (with authors listed in alphabetical order, as is the convention in mathematics)
James Thompson. "Approximation of Riemannian measures by Stein's method." (preprint), arXiv:2001.09910, 2020.
Anton Thalmaier and James Thompson. "Exponential integrability and exit times of diffusions on sub-Riemannian and metric measure spaces." Bernoulli, 26(3):2202—2225, 2020.
James Thompson. "Functional inequalities for Feynman-Kac semigroups." Journal of Theoretical Probability, 33(3):1523—1540, 2020
Anton Thalmaier and James Thompson. "Derivative and divergence formulae for diffusion semigroups." Annals of Probability, 47(2):743--773, 2019.
James Thompson. "Derivatives of Feynman-Kac semigroups." Journal of Theoretical Probability, 32(2):950--973, 2019.

Università degli Studi di Milano – Direzione Risorse Umane
Ufficio Contratti di formazione e Ricerca
Via Sant’Antonio 12 - 20122 Milano, Italia
Assegni.ricerca@unimi.it

Li-Juan Cheng, Anton Thalmaier, and James Thompson. "Quantitative C^1-estimates by Bismut formulae." Journal of Mathematical Analysis and Applications, 465(2):803--813, 2018.
Li-Juan Cheng, Anton Thalmaier, and James Thompson. "Uniform gradient estimates on manifolds with a boundary and applications." Analysis And Mathematical Physics, 8(4):571--588, 2018.
Li-Juan Cheng, Anton Thalmaier, and James Thompson. "Functional inequalities on manifolds with non-convex boundary." Science China Mathematics, 61(8):1421--1436, 2018.
Xue-Mei Li and James Thompson. "First order Feynman-Kac formula." Stochastic Processes and their Applications, 128(9):3006--3029, 2018.
James Thompson. "Brownian bridges to submanifolds." Potential Analysis, 49(4):555--581, 2018.
James Thompson. "Brownian motion and the distance to a submanifold." Potential Analysis, 45(3):485--508, 2016.

Congress proceedings
N/A

OTHER INFORMATION

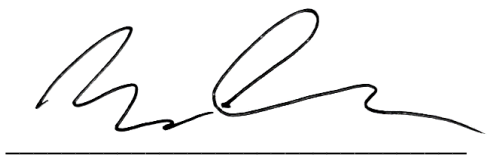
Teaching experience: As a PhD student at the University of Warwick, I supervised undergraduate students on a range of mathematical topics including: linear algebra, real analysis, differential equations, number theory, vector calculus and probability theory. As a postdoctoral researcher at the University of Luxembourg, I have supervised two undergraduate projects, both on Markov chain Monte Carlo methods, and I have lectured two undergraduate level courses, “Markov Chains” and “Analysis III”, and one postgraduate level mini-course, “Stochastic Differential Equations on Manifolds”.

Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

Place and date: University of Luxembourg, 06 October 2020

SIGNATURE



Università degli Studi di Milano – Direzione Risorse Umane
Ufficio Contratti di formazione e Ricerca
Via Sant’Antonio 12 - 20122 Milano, Italia
Assegni.ricerca@unimi.it