

Stephen M. McCormick

✉ stephen.m.mccormick@gmail.com | 🏠 www.quasilocal.com

Education

PhD in Mathematics

THE PHASE SPACE FOR THE EINSTEIN–YANG–MILLS EQUATIONS, BLACK HOLE MECHANICS,
AND A CONDITION FOR STATIONARITY

- Supervisor: Prof. Robert Bartnik

Monash University, Australia

2014

Bachelor of Science (Honours)

SPECIALISATION: MATHEMATICS

Monash University, Australia

2008

Bachelor of Science

SPECIALISATIONS: MATHEMATICS & PHYSICS

Monash University, Australia

2007

Academic appointments

University of Regensburg

RESEARCHER

Regensburg, Germany

March 2022 – present

Uppsala University

RESEARCHER

POSTDOCTORAL RESEARCH FELLOW

Uppsala, Sweden

December 2019 – December 2021

December 2017 – December 2019

KTH Royal Institute of Technology

POSTDOCTORAL RESEARCH FELLOW

Stockholm, Sweden

August 2016 – December 2017*

University of New England

POSTDOCTORAL FELLOW

Armidale, Australia

June 2014 – June 2017*

*Concurrent appointments at 50% for a period.

Teaching experience

Uppsala University

- FULL TEACHING RESPONSIBILITY FOR SEVERAL BACHELOR'S COURSES
- SUPERVISION OF ONE BACHELOR'S THESIS
- OTHER TEACHING DUTIES INCLUDING GRADING AND EXERCISE SESSIONS

Uppsala, Sweden

2017 – 2021

University of New England

- FULL TEACHING RESPONSIBILITY FOR SEVERAL BACHELOR'S COURSES
- SUPERVISION OF TWO BACHELOR'S PROJECTS
- OTHER TEACHING DUTIES INCLUDING GRADING AND EXERCISE SESSIONS

Armidale, Australia

2014 – 2017

Monash University

- LECTURER FOR A BACHELOR'S COURSE
- LUNCHTIME DROP-IN HELP STAFF MEMBER
- OTHER TEACHING DUTIES INCLUDING GRADING AND EXERCISE SESSIONS

Melbourne, Australia

2007 – 2014

Research funding

Funding under Australia–Germany Joint Research Cooperation Scheme

- PROJECT: ON BARTNIK'S QUASI-LOCAL MASS FUNCTIONAL
APPROXIMATE VALUE OF €12,500; JOINTLY FUNDED WITH PROF. DR. CARLA CEDERBAUM (TÜBINGEN).

Universities Australia/DAAD

2016-2017

UNE Research Seed Grant

- PROJECT: THE YAMABE PROBLEM OUTSIDE A BALL AND THE BARTNIK MASS
APPROXIMATE VALUE OF €3,300.

University of New England, Australia

2015

Languages

English: Native.

Swedish: Good working knowledge.

German: Elementary communication.

Extended research programmes

Institut Mittag-Leffler

GENERAL RELATIVITY, GEOMETRY, AND ANALYSIS: BEYOND THE FIRST 100 YEARS AFTER EINSTEIN

Djursholm, Sweden

September – December 2019

Erwin Schrödinger Institute

GEOMETRY AND RELATIVITY PROGRAM

Vienna, Austria

July – August 2017

Institut Henri Poincaré

MATHEMATICAL GENERAL RELATIVITY PROGRAM

Paris, France

September – November 2015

Mathematical Sciences Research Institute (MSRI)

MATHEMATICAL GENERAL RELATIVITY PROGRAM

Berkeley, USA

November 2013

Selected talks

Gluing collars to manifolds; how and why

FHST MEETING ON GEOMETRY AND ANALYSIS

Universität Freiburg

January 2020

Gluing collars to manifolds; how and why

GENERAL RELATIVITY, GEOMETRY, AND ANALYSIS: BEYOND THE FIRST 100 YEARS AFTER EINSTEIN

Institut Mittag-Leffler, Sweden

November 2019

Bartnik's quasi-local mass

MATHEMATICAL RELATIVITY: A RIEMANNIAN APPROACH

CIMAT (Guanajuato), Mexico

May 2019

Some recent developments on Bartnik's quasi-local mass

INVITED SEMINAR

Queen Mary University of London, UK

March 2019

Some recent results pertaining to Bartnik's quasi-local mass

INVITED SEMINAR

University of Miami, USA

October 2018

Asymptotically hyperbolic extensions and estimates for an analogue of the Bartnik mass

WORKSHOP ON ASYMPTOTICALLY HYPERBOLIC MANIFOLDS

Banff International Research Station, Canada

May 2018

A Penrose-like inequality in dimensions less than eight

INTERNATIONAL CONFERENCE ON PDES, GEOMETRIC ANALYSIS AND FUNCTIONAL INEQUALITIES

University of Sydney, Australia

March 2017

The first law of black hole mechanics as a condition for stationarity and staticity

STATIC METRICS AND BARTNIK'S QUASI-LOCAL MASS CONJECTURE. (CONFERENCE)

Universität Tübingen, Germany

May 2016

Killing vectors as Lagrange multipliers

WORKSHOP ON ANALYSIS, GEOMETRY AND MATHEMATICAL RELATIVITY:
A CELEBRATION OF ROBERT BARTNIK'S 60TH BIRTHDAY

Monash University, Australia

February 2016

The Phase Space for the Einstein-Yang-Mills Equations,

INVITED SEMINAR

Universität Regensburg, Germany

October 2015

The First Law of Black Hole Mechanics as a Condition for Stationarity

INVITED SEMINAR

ICMAT, Spain

October 2015

The Phase Space for the Einstein-Yang-Mills Equations and the First Law of Black Hole Thermodynamics

MINI-WORKSHOP ON NONLINEAR PDES

University of New England, Australia

October 2014

The Phase Space for the Einstein-Yang-Mills Equations and the First Law of Black Hole Thermodynamics

INVITED SEMINAR

University of Wollongong, Australia

September 2014

Conferences & workshops (Since 2014)

- Jan. 2020 **2nd FHST Meeting on Geometry and Analysis**, Freiburg, Germany
- Jun. 2019 **Geometric Analysis and General Relativity: A conference in honour of Gerhard Huisken's 60th birthday**, ETH Zürich, Switzerland
- May 2019 **Mathematical Relativity: A Riemannian Approach**, CIMAT (Guanajuato), Mexico
- Aug. 2018 **Mathematical General Relativity**, Mathematisches Forschungsinstitut Oberwolfach, Germany
- May. 2018 **Asymptotically Hyperbolic Manifolds**, Banff International Research Station, Canada
- Apr. 2018 **Mass in General Relativity**, Simons Center for Geometry and Physics, NY, USA
- Jul. 2017 **Between Geometry and Relativity**, Erwin Schrödinger Institute, Vienna, Austria
- Mar. 2017 **International Conference on PDEs, Geometric Analysis and Functional Inequalities**, University of Sydney, Australia
- May 2016 **Static metrics and Bartnik's quasi-local mass conjecture**, Universität Tübingen, Germany
- Feb. 2016 **Workshop on Analysis, Geometry and Mathematical Relativity: a celebration of Robert Bartnik's 60th birthday**, Monash University, Australia
- Nov. 2015 **General Relativity: A Celebration of the 100th Anniversary**, Institute Henri Poincaré, France
- Oct. 2015 **Dynamics of Self-Gravitating Matter**, Institute Henri Poincaré, France
- Sep. 2015 **Geometric Aspects of Mathematical Relativity**, Université de Montpellier, France
- Sep. 2015 **Recent Advances in General Relativity**, Institute Henri Poincaré, France
- Mar. 2015 **Andrejewski Days: 100 years of General Relativity**, Brandenburg an der Havel, Germany
- Oct. 2014 **Mini-Workshop on Nonlinear PDEs**, University of New England, Australia
- Sep. 2014 **Mini-Workshop on Geometric Analysis**, University of Wollongong, Australia
- Jul. 2014 **AMSI/AustMS Conference on Geometric Analysis and Stochastic Methods in Geometry**, University of Queensland, Australia

Miscellaneous

Outreach

Interview for Cosmos Magazine and associated video

PROMOTIONAL PIECE FOR UNE (LINK: [HTTPS://BIT.LY/3G3RE1P](https://bit.ly/3G3RE1P))

2016

Talk – Complicated ideas in less than 140 characters

PART OF A SERIES TO GET STAFF AT UNE INVOLVED IN SCIENCE COMMUNICATION (LINK: [HTTPS://GOO.GL/8WKWHU](https://goo.gl/8wkWHU))

2016

Presenter for Far Out Science at UNE

A PROGRAMME FOR SCHOOL STUDENTS TO BE INTRODUCED TO FUN SCIENCE

2015 – 2016

Multiple radio interviews

I WAS INTERVIEWED ON ABC RN TAMWORTH (NEW ENGLAND RADIO) ON A FEW OCCASIONS TO SPEAK ABOUT MATHEMATICS, PHYSICS AND SCIENCE COMMUNICATION

2015 – 2016

Presenter for the Science Experience at Monash University

A PROGRAMME FOR SCHOOL STUDENTS TO BE INTRODUCED TO FUN SCIENCE (LINK: [HTTPS://GOO.GL/KNRJnH](https://goo.gl/kNRJnH))

2012 – 2014

Casual Calculations

A (NOW OUTDATED) BLOG AIMED AT PRESENTING TOPICS RELATED TO MATHEMATICS AND MATHEMATICS EDUCATION TO THE AVERAGE INTERESTED READER (LINK: [HTTPS://GOO.GL/4P12GM](https://goo.gl/4P12GM))

2013 – 2014

Elected positions

Faculty of Science Postgraduate Committee

ROLE: REPRESENTATIVE FOR THE SCHOOL OF MATHEMATICAL SCIENCES

Monash University, Australia

July 2010 – March 2014

Council of the Australian Mathematical Society

ROLE: STUDENT OBSERVER

Australia

2011 – 2012

Conference organisation

Oct. 2014 **Mini-Workshop on Nonlinear PDEs,**

Jul. 2013 **2nd Annual Australian Mathematical Sciences Students' Conference,**

Jul. 2011 **Inaugural Australian Mathematical Sciences Students' Conference*,**

I was the primary organiser of this conference

**The Australian Mathematical Sciences Students' Conference has now become a regular event.*

Website: www.amssc.org/

Reviewing

I recent years I have reviewed for the following journals:

Annals of Global Analysis and Geometry,

Communications in Contemporary Mathematics,

Classical and Quantum Gravity,

Forum Mathematicum

International Mathematics Research Notices,

Journal of Geometric Analysis,

Journal of Mathematical Physics,

Mathematische Nachrichten,

SIGMA (Symmetry, Integrability and Geometry: Methods and Applications).