

Stephen McCormick

Matematiska institutionen, Uppsala universitet, 752 36 Uppsala, Sweden.

✉ stephen.mccormick@math.uu.se | 🏠 www.quasilocal.com

Education

PhD in Mathematics

Monash University, Australia

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

2014

- Supervisor: Professor Robert Bartnik

Bachelor of Science (Honours)

Monash University, Australia

SPECIALISATION: MATHEMATICS

2008

Bachelor of Science

Monash University, Australia

SPECIALISATION: MATHEMATICS & PHYSICS

2007

Academic appointments

Uppsala University

Uppsala, Sweden

RESEARCHER
POSTDOCTORAL RESEARCH FELLOW

*December 2019 – Present
December 2017 – December 2019*

KTH Royal Institute of Technology

Stockholm, Sweden

POSTDOCTORAL RESEARCH FELLOW

August 2016 – December 2017

University of New England

Armidale, Australia

POSTDOCTORAL FELLOW

June 2014 – June 2017

Teaching experience

Uppsala University

Sweden

- COURSE RESPONSIBLE TEACHER FOR MULTIPLE COURSES
- SUPERVISION OF ONE BACHELOR'S THESIS
- OTHER TEACHING DUTIES INCLUDING GRADING AND EXERCISE SESSIONS

2017 – Present

University of New England

Australia

- COURSE RESPONSIBLE TEACHER FOR MULTIPLE COURSES
- SUPERVISION OF TWO HONOUR'S THESIS (SECOND CYCLE)
- OTHER TEACHING DUTIES INCLUDING GRADING AND EXERCISE SESSIONS

2014 – 2017

Monash University

Australia

- LECTURER FOR LARGE UNDERGRADUATE COURSE
- LUNCHTIME DROP-IN HELP STAFF MEMBER
- PHYSICS LABORATORY TEACHER
- OTHER TEACHING DUTIES INCLUDING GRADING AND EXERCISE SESSIONS

2007 – 2014

Research funding

Funding under Australia-Germany Joint Research Cooperation Scheme

Universities Australia/DAAD

- PROJECT: ON BARTNIK'S QUASI-LOCAL MASS FUNCTIONAL APPROXIMATE VALUE OF €12500; JOINTLY FUNDED WITH PROF. DR. CARLA CEDERBAUM (TÜBINGEN).

2016-2017

UNE Research Seed Grant

University of New England, Australia

- PROJECT: THE YAMABE PROBLEM OUTSIDE A BALL AND THE BARTNIK MASS VALUE OF APPROX. €3300.

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

Miscellaneous

Outreach

Interview for Cosmos Magazine and associated video

PROMOTIONAL PIECE FOR UNE (LINK: [HTTPS://GOO.GL/DKH56C](https://goo.gl/DKH56C))

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 (LINK: [HTTPS://GOO.GL/8MFQE6](https://goo.gl/8MFQE6))

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 PROGRAM 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

REPRESENTATIVE FOR THE SCHOOL OF MATHEMATICAL SCIENCES

Monash University, Australia

July 2010 – March 2014

Council of the Australian Mathematical Society

STUDENT OBSERVER (NON-VOTING MEMBER)

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/

Publications and preprints

- 202x **Chen, P.-N.; McCormick, S.**, Quasi-local Penrose inequalities with electric charge, *Int. Math. Res. Not.* (To appear)
- 2021 **Alaee, A.; Cabrera Pacheco, A. J.; McCormick, S.**, Stability of a quasi-local positive mass theorem for graphical hypersurfaces of Euclidean space, *Trans. Amer. Math. Soc.*, **374**
- 2021 **McCormick, S.**, The Hilbert manifold of asymptotically flat metric extensions, *Gen. Relativ. Gravit.* **53**(14).
- 2020 **McCormick, S.**, Gluing Bartnik extensions, continuity of the Bartnik mass, and the equivalence of definitions, *Pacific J. Math.*, **304**(2).
- 2019 **McCormick, S.**, On the charged Riemannian Penrose inequality with charged matter, *Class. Quantum Gravity*, **37**(1).
- 2019 **McCormick, S.; Miao, P.**, On the evolution of the spacetime Bartnik mass, *Pure Appl. Math. Q.* **15**(3).
- 2019 **McCormick, S.; Miao, P.**, On a Penrose-like inequality in dimensions less than eight, *Int. Math. Res. Not.*, **2019**(7).
- 2018 **Cabrera Pacheco, A. J.; Cederbaum, C.; McCormick, S.**, Asymptotically hyperbolic extensions and an analogue of the Bartnik mass, *J. Geom. Phys.*, **132**.
- 2018 **McCormick, S.**, On a Minkowski-like inequality for asymptotically flat static manifolds, *Proc. Am. Math. Soc.*, **146**(9).
- 2017 **Cabrera Pacheco, A. J.; Cederbaum, C.; McCormick, S.; Miao, P.**, Asymptotically flat extensions of CMC Bartnik data, *Class. Quant. Grav.* **34**(10).
- 2017 **McCormick, S.**, The asymptotically flat scalar-flat Yamabe problem with boundary, *J. Geom. Anal.*, **27**(3).
- 2015 **McCormick, S.**, A note on mass-minimising extensions, *Gen. Rel. Grav.* **47**(12).
- 2014 **McCormick S.**, First Law of Black Hole Mechanics as a Condition for Stationarity, *Phys. Rev. D* **90**, 104034.
- 2014 **McCormick S.**, The Phase Space for the Einstein-Yang-Mills Equations and the First Law of Black Hole Thermodynamics, *Adv. Theor. Math. Phys.* **18**(4).

Conferences & workshops (Since 2014)

- 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