

# CURRICULUM VITAE

BERND JOHANNES SCHROERS

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Languages: German, English, Dutch, French

## Employment

since 2022	Head of the School of Mathematics, University of Edinburgh
since 2022	Professor of Matter and Motion, University of Edinburgh
2014-2017	Head of the Department of Mathematics, Heriot-Watt University
since 2012	Full Professor, Heriot-Watt University
2005-2012	Reader in Mathematical Physics, Heriot-Watt University
2000-2005	Lecturer and (until 2004) EPSRC Advanced Research Fellow at Heriot-Watt
1999-2000	EPSRC Advanced Research Fellow, University of Edinburgh
1995-1999	Senior Research Fellow, Institute for Theoretical Physics, University of Amsterdam
1992-1995	Postdoc, Institute for Particle Physics, Durham University

## Education

1993	PhD, University of Cambridge (Thesis: Quantised Soliton Interactions)
1989-1992	PhD student, DAMTP, University of Cambridge, supervised by Prof N Manton
June 1989	Certificate of Advanced Study in Mathematics (MASt), University of Cambridge
1988-1989	Part III of the Mathematical Tripos, University of Cambridge
Sept 1987	Physik Vordiplom, Bonn University
1985-1988	Study of Physics and Mathematics, Bonn University
June 1985	International Baccalaureat, United World College of the Atlantic, Wales

## Administration and Leadership (since 2010)

2019-2022	Co-chair of the Management Committee of the International Centre for Mathematical Sciences (ICMS)
2019-2021	Co-director of the Maxwell Institute for Mathematical Sciences
since 2018	Heriot-Watt representative on Steering Committee of the Glasgow-Maxwell School (GlaMS) for PhD training in Algebraic Structures
2003-2014	Director of Postgraduate Studies in the Department of Mathematics at Heriot-Watt

## Learned Societies

2021	Elected as Fellow of the Royal Society of Edinburgh
since 2018	Member of the European Mathematical Society
since 2006	Member of the London Mathematical Society
since 2002	Member of the Higher Education Academy
since 2000	Member of the Edinburgh Mathematical Society
since 1985	Member of Deutsche Physikalische Gesellschaft

### External Committees

since 2018	Committee on Developing Countries of the European Mathematical Society
since 2017	International Advisory Board at AIMS-Ghana
2012-2017	Chair of Academic Advisory Board for AIMS-Ghana
since 2009	Associate Faculty Member, AIMS-South Africa

### Grant Income (as PI)

In addition to the listed grants I have obtained a total of \$£32,100 of smaller grants (each under £5000) for travel and research collaborations.

2020	£5,050,000	EPSRC Additional Funding for the ICMS
2016-24	£3,730,000	EPSRC Grant for the ICMS
2013-15	£167,000	EPSRC responsive mode grant ‘Geometric Models of Matter’
2012-16	£200,000	Scottish Funding Council grant for teaching and research support at AIMS
2009	£9500	Perimeter Institute grant as teaching-buy out during research visit
2008	£6000	LMS grant for workshop Deformations of Special Relativity at the ICMS
2008	£7000	European Science Foundation grant for above workshop
2002-2004	£65,000	Marie Curie post doctoral fellowship for Joost Slingerland
1999-2004	£406,000	EPSRC Advanced Research Fellowship

### Research

I am a mathematical physicist with interests in topological solitons such as skyrmions or vortices, gauge theory and three-dimensional quantum gravity.

### PhD Students and Post Docs (all as first supervisor)

2020-2024	Juan Morales Parra	PhD	Dynamical $R$ -matrices and 3d Quantum Gravity
2018- 2023	Bruno Barton-Singer	PhD	Magnetic Skyrmions
2015-19	Calum Ross	PhD	Geometric Solitons
2012-20	Sergio Inglima	PhD	Non-commutative Wave Equations in Quantum Gravity (part time)
2012-21	Kim Smedley-Williams	PhD	Spectral Properties of Magnetic Dirac Operators (part time)
2013-15	Dr Guido Franchetti	post doc	Dynamics in Geometric Models of Matter (EPSRC funded)
2012-15	Rogelio Jante	PhD	Spin in Geometric Models of Matter
2008-12	P K Osei	PhD	Non-commutative Structures in 3d Quantum Gravity
2005-10	G Papageorgiou	PhD	Galilean Quantum Gravity in 2+1 Dimensions
2005-07	Dr Zoltan Kadar	post doc	3D Quantum Gravity (EU network)
2004-08	E de Vries	PhD	Supersymmetric Monopole Dynamics
2004-08	K Russell	PhD	Topological Solitons and their Excitations
2002-04	Dr J Slingerland	post doc	Non-abelian Duality and Symmetry Breaking (EU Marie-Curie scheme)
2002-04	C Meusburger	PhD	Classical Phase Space and Quantisation of 3d Gravity in the Chern-Simons Formulation

**Conference and Seminar Organisation (selection)**

(Principal organiser and all external funding obtained for events marked \*)

Sept 2012 Topological Solitons (Conference in Honour of Nick Manton), DAMTP, Cambridge  
 July 2008 Deformations of Special Relativity, ICMS, Edinburgh\*  
 2007-12 North British Mathematical Physics Seminars (NBMPS) \*  
 July 2003 Three-dimensional Quantum Gravity, ICMS, Edinburgh\*  
 since 1999 Founding member of the Edinburgh Mathematical Physics Group (EMPG)

**Invited Long-term Visits (one month or longer)**

April 2016 Perimeter Institute, Canada  
 July 2015 Isaac Newton Institute, Cambridge  
 October 2012 Institute for the Physics and Mathematics of the Universe, Tokyo  
 July 2012 Isaac Newton Institute, Cambridge  
 Oct 2011 Simons Center for Geometry and Physics, Stony Brook  
 April-July 2009 Perimeter Institute, Canada  
 April 2009 Erwin Schrödinger Institute, Vienna  
 Jan-March 2009 DESY Theory Group, Hamburg  
 Sept 2007 Perimeter Institute  
 Sept 2006 Isaac Newton Institute, Cambridge  
 April-May 2006 Kavli Institute for Theoretical Physics, Santa Barbara  
 April 2000 Max-Planck Institut für Mathematik, Bonn  
 Jan 1997 Isaac Newton Institute, Cambridge  
 August-Sept 1994 Isaac Newton Institute, Cambridge

**Invited Conference Talks (selection)**

Geometric of Matter, Leeds, August 2024  
 Advances in PDEs in Physics and Materials Science, FORTH, Crete, May 2024  
 Topological Solitons, Salamanca, April 2024  
 Variational Models in Materials Science, Naples, February 2024  
 13th International Symposium on Hysteresis Modeling and Micromagnetics , Vienna, June 2023  
 Soliton Interactions (SIG XI), Krakow, June-July 2023  
 Programme on Higher Algebraic Structures, KIAS, Seoul, 2022  
 The Unity of Mathematics: a Conference in Honour of Sir Michael Atiyah, INI, Sept 2021  
 Soliton Interactions (SIG IX), Krakow, June-July 2021  
 Invited plenary talk at British Mathematical Colloquium, Glasgow, April 2021  
 7th International Workshop on New Challenges in Quantum Mechanics, Benasque, Sept 2019  
 XIth International Symposium Quantum Theory and Symmetries, Montreal, July 2019  
 Dynamics of Topological Solitons, Krakow, June 2019  
 Low Energy Effective Dynamics of Skyrmions, Leeds, July 2018  
 Noncommutativity and Physics, Bayrischzell April 2018  
 The Sen Conjecture and Beyond, London, June 2017  
 Quantum Groups and Quantum Gravity, Waterloo, April 2016  
 Solitons: Topology, Geometry and Applications, Thessaloniki, April 2015  
 Pseudospectra of Operators, ICMS Edinburgh, September 2014  
 Max Born Symposium 'Noncommutative Geometry and Quantum Gravity', Wroclaw, July 2014  
 Loops 13, Perimeter Institute, Waterloo, July 2013

Four-manifolds and Matter, Stony Brook, October 2011  
 Geometry and Physics, Durham, September 2011  
 Geometry and Physics in Cracow, Cracow, September 2010  
 Non-commutativity and Non-relativistic Physics, Tours, June 2010  
 Symposium Sander Bais, Amsterdam, June 2010  
 Quantum Topology and Chern-Simons Theory, IRMA, Strasbourg, September 2009  
 Three-dimensional Quantum Gravity, Erwin Schrödinger Institute, Vienna, April 2009  
 Quantum Geometry and Quantum Gravity, Nottingham, July 2008  
 From Quantum to Emergent Gravity: Theory and Phenomenology, SISSA, Trieste, July 2007  
 Topological Phases and Quantum Computing, Kavli Insitute, Santa Barbara, May 2006  
 ENRAGE EU network meeting at ICMS, Edinburgh, April 2006  
 Classical and Quantum Gravity in Three Dimensions, Pisa, September 2005  
 Workshop on Chern-Simons theory, Marseille, April 2005  
 Large Many-Body Systems, Mathematics Research Centre, Warwick, August 2004  
 LMS symposium Topological Solitons in Physics and Biology, Durham, August 2004  
 Workshop on 2+1 dimensional Gravity, Albert-Einstein Insitute, Golm, July 2004  
 Geometry and Physics, CIRM, Luminy, France, October 2003

### Invited Seminars and Colloquia

Canada	Montreal, McMaster (Hamilton), Perimeter Institute
Finland	Helsinki
France	ENS Paris, Paris VI, Tours, Luminy, Lyon
Germany	Göttingen, Hamburg, Hannover, Humboldt University Berlin, Jena, DESY Hamburg, Albert-Einstein Institute Golm, Max-Planck Institut Bonn, Max Planck Institute Leipzig
Ghana	Accra, Cape Coast
Ireland	Trinity College Dublin
Italy	University of Torino
Japan	Kavli Institute for the Physics and Mathematics of the Universe, University of Tokyo
Luxemburg	University of Luxemburg
Netherlands	Amsterdam, Leiden, Utrecht
Poland	Wroclaw, Cracow
Spain	Madrid
South Africa	Stellenbosch
UK	Bath, Cambridge, Durham, Glasgow, Leeds, Nottingham, Imperial College, King's College London, Oxford, Plymouth, Swansea, York, UCL
USA	Harvard, Austin, Columbia, Stony Brook
Online	African Mathematics Seminar

### External Memberships and Refereeing

since 2000	Member of the EPSRC peer review college: member of assessment (8) and interview panels (1) and referee for EPSRC grant applications (5-10 per year).
since 1993	Regular refereeing of research articles for Class. Quant. Grav, JHEP, Commun. Math. Phys., Nonlinearity, J. Phys. A, Nucl. Phys. B Phys. Lett. B, Phys. Rev. D and Phys. Rev. Lett.

**Undergraduate Teaching since 2000**

(after 2022 at UoEdinburgh, before 2022 Heriot-Watt)

I initiated, designed and piloted courses marked \*

2022-2024	Honours Differential Equations
2017-21	Thermodynamics (4th year BSc Mathematics, 5th year MMath, 30 lectures)
2018-20	Fluid Mechanics (4th year BSc Mathematics, 5th year MMath, 30 lectures)
2012-19	Differential Geometry (4th year BSc Mathematics, 5th year MMath, 30 lectures)
2010-14	Mathematical Problem Solving* (1st year BSc Mathematics, 30 hours)
2009-11	Mathematics for Scientists (1st year mathematics for chemists, 33 lectures)
2008-09	Mathematics of Motion* (2nd year BSc Mathematics, 33 lectures)
2005-11	Quantum Computing* (4th year BSc Mathematics, 5th year MMath, 30 lectures)
2004-08	Oscillations and Waves* (2nd year BSc Mathematics, 18 lectures)
2004-08	Mathematics of Motion* (2nd year BSc Mathematics, 24 lectures)
2000-04	Methods of Applied Mathematics (3rd year BSc Mathematics, 24 lectures)
since 2000	Supervision of over 50 fourth year BSc projects in mathematics

**Postgraduate Teaching since 2000**

(AIMS = African Institute for Mathematical Sciences)

( SMSTC= Scottish Mathematical Sciences Training Centre)

2019-21	Geometry of Gauge Fields (Course leader on 10 week SMSTC course)
2018-21	Classical and Quantum Integrable Systems (Course leader on 10 week SMSTC course)
2019-20	Thermodynamics of the Atmosphere (30 hours), AIMS-Rwanda
2017-18	Problem Solving in Physics (30 hours), AIMS-Rwanda
2013-16	Differential Geometry (Six 2h lectures on SMSTC course)
Fall 2013	Introduction to Gauge Theory (Course leader on SMSTC course)
2012-13	Problem Solving in Physics (30 hours), AIMS-Ghana
April 2012	Workshop on Atiyah's Configuration Conjecture (12 hours), University of Ghana
2011-14	Quantum Computing (30 hours), AIMS-South Africa
Sept 2011	Mathematical Problem Solving (30 hours), AIMS-Sénégal
April 2010	Quantum Groups (12 hours), University of Ghana
2005-10	Differential Equations (30 hours), AIMS-South Africa
2003-04	Integrable Systems (10 hours), Heriot-Watt
2003-04	Seiberg-Witten Equations (6 hours), Heriot-Watt
2002-03	Poisson-Lie Groups (10 hours), Heriot-Watt

**External Examining since 2010**

2019	PhD	University of Waterloo, Canada
2014-15	Theoretical Physics (BSc, MSc)	King's College London
2012-14	Mathematical Tripos Part II	University of Cambridge
Feb 2014	PhD	University of Rome 'La Sapienza'
Aug 2012	PhD	University of Nottingham
Dec 2010	HDR	University of Tours
Oct 2010	PhD	University of Nottingham

### **Knowledge Transfer and Outreach**

Nov 2021	Hydrogen or Heat Pumps? Public Lecture at ICMS
since 2017	Member of the International Advisory Board for AIMS-Ghana
2012-2017	Chair of Academic Advisory Board for AIMS-Ghana
2010-12	Member of the Steering Committee for AIMS-Ghana
2009-12	Coaching of lecturers and researchers at the University of Ghana (annually)
Oct 2009	Workshop on Life and Work of Lord Kelvin, University of Glasgow
April 2008	Public lecture on Work of James Clerk Maxwell at the ICMS, Edinburgh
since 2005	Teaching at AIMS centres in Africa (one month each year since 2004)
Nov 2004	Workshop on James Clerk Maxwell at the DAAD UK head office, London
Nov 2004	Interdisciplinary workshop on Life and Work of James Clerk Maxwell at ICMS