

CURRICULUM VITAE Bernard S. Kay, Department of Mathematics, University of York

Education

King Edward VII Grammar School, Lytham, Lancashire 1961-69

Jesus College, Cambridge 1969-73. BA Natural Sciences 1972, Part III Maths 1973

King's College, London 1973-77, PhD Mathematics 1977 (supervisor Chris Isham, external examiner Ray Streater)

Academic Positions

August 1977 to May 1978 European Exchange Fellowship (Royal Society, Accademia dei Lincei) (1 year): International Centre for Theoretical Physics, Trieste, Italy.

May 1978 to May 1979 and again from October 1980 to February 1983 Research Assistant: Institute for Theoretical Physics, University of Berne, Switzerland

May 1979 to September 1980 Research Assistant (3-year Science Research Council contract) Dept. Theoretical Physics, Blackett Laboratory, Imperial College, London, England

March 1983 to August 1983 "McCormick Fellow" (2 year fellowship) Relativity Group, Enrico Fermi Institute, University of Chicago, USA

September 1983 to September 1989 "Oberassistent" Institute for Theoretical Physics, University of Zurich, Switzerland.

October 1989 to September 1992 SERC Advanced Fellowship (5 year contract) in the Relativity Group (directed by Stephen Hawking), Department of Applied Mathematics and Theoretical Physics, University of Cambridge

Department of Mathematics, University of York, Lecturer Grade B 1992-1999, Senior Lecturer 1999-2001, Reader 2001-2013, Professor October 2013-March 2016, Emeritus Professor March 2016 to present.

I taught a range of undergraduate courses at the University of York (1992-2016) (which included e.g. First Year Linear Algebra and Differential Equations, Second Year Mechanics, Third Year Special Relativity and Quantum Mechanics). Prior to that, I taught graduate level courses on Quantum Field Theory, Quantum Statistical Mechanics and General Relativity as a visiting lecturer at SISSA, Trieste, Italy (1982-1986) and on Quantum Field Theory in Curved Spacetime at the University of Zurich (during the years 1983-1989).

I have held visiting research positions and/or made brief research visits to a number of places including:

Institute for Advanced Study, Princeton (Visitor, April to June 1980) and SUNY at Buffalo, USA (Summer 1981 and 1982) on the invitation of Jonathan Dimock;

University of Rome I (October 1982 to January 1983) on the invitation of Sergio Doplicher and University of Rome II (November to December 1995 and September 1999) on the invitation of Roberto Longo and John Roberts;

Enrico Fermi Institute, University of Chicago, USA (March 1987 and September 1995) on the invitation of R.M. Wald;

Institute for Field Physics, University of North Carolina at Chapel Hill, USA (March and April 1987) on the invitation of James W. York Jr.;

Institute for Theoretical Physics, University of Berne, Switzerland (March to June 1991, April to July 1992 and July to August 1994) on the invitation of Petr Hajicek.

Instituto de Ciencias Nucleares, UNAM, Mexico City (November 2016, October 2018) on the invitation of Daniel Sudarsky.

I have authored or co-authored [more than 50 scientific papers](#). Many of these are on the mathematical and conceptual aspects of quantum field theory in curved spacetime including especially the Hawking effect (black hole evaporation) and the question whether it is possible in principle to manufacture a time-machine. Others are on the theory of the scattering of classical and quantum waves on black holes and on questions related to the classical stability of black holes. Others are on quantum gravity and include especially a number of papers arising out of my 1998 ‘matter gravity entanglement hypothesis’ which, I claim, offers a resolution to a number of puzzles related to the fundamental laws of physics including the black-hole information loss puzzle – and on which I continue actively to work. Some of these latter papers may be regarded as being contributions to the foundations of statistical mechanics – a topic on which I also continue actively to work.

My publications have attracted more than [2000 Google Scholar citations](#)

I have given more than 45 invited talks at international and major national conferences and around 100 invited research seminars in universities in Europe and North America about the above-described research.

I have supervised 11 PhD students (and co-supervised a few others) and a number of Masters theses etc. including:

Urban Studer (ETH Zurich, Switzerland) “Diplomarbeit” 1987-88
Title: “Quantum Mechanics and Quantum Field Theory on Spacetimes with Conical Singularities”
(Awarded Highest Grade (6) and led to joint publication.)

Giuseppe Gonnella (presently professor at University of Bari; I jointly supervised with Vittorio Gorini his 1988 Bari (Italy) PhD)

Rainer Verch (presently professor at University of Leipzig; I supervised his 1991 Cambridge Part III Maths essay)

Chris Fewster (presently professor at University of York; I supervised his 1994 Cambridge PhD, external examiner Chris Isham)

Stefan Hollands (presently professor at University of Leipzig; I supervised his 2000 York PhD, external examiner John Roberts)

Varqa Abyaneh (I supervised his 2005 York PhD, external examiner Roger Penrose)

Leonardo Ortiz (presently postdoc at Cinvestav, Mexico City; I supervised his 2011 York PhD, external examiner, Jorma Louko)

A full list of my 11 PhD students since 1994 is available [here](#) (with links to titles of theses)

I have also acted as internal or external examiner for around 15 UK PhDs as well as external for the SISSA, Trieste, PhD (1993) of Armando Bernui and for the Ecole Polytechnique PhD (2000) of Dietrich Häfner (Paris, France). I have acted as judge for an Oxford DSc.

Amongst various grants on which I have been PI or CI, I have obtained grant income to employ/supervise and/or host:

Tony Kakas (presently professor of Computer Science, University of Cyprus) and **John Barrett** (presently professor at the University of Nottingham) – who each had one-year positions during the years 1983-1989 while I was at the Institute for Theoretical Physics at the University of Zurich, Switzerland.

Marek Radzikowski (until recently assistant professor at the American University of Afghanistan) and **Chris Fewster** (presently professor at the University of York) who each had one to two year positions during the years 1994 to 1997 at the University of York.

I was awarded a **Leverhulme Research Fellowship** in York (to buy myself out of teaching so as to work on my matter-gravity entanglement hypothesis) from October 2002 to June 2003.

Since formally retiring on 31 March 2016, I have continued to be active in research. My recent publications include:

- Benito A Juárez-Aubry, Bernard S Kay, Daniel Sudarsky, Generally covariant dynamical reduction models and the Hadamard condition, *Phys. Rev. D* **97**, 025010 (2018) [[arXiv:1708.09371](https://arxiv.org/abs/1708.09371)]
- Bernard S. Kay, The matter gravity entanglement hypothesis, *Found Phys* **48**, 542–557 (2018) [[arXiv/1802.03635](https://arxiv.org/abs/1802.03635)]
- Bernard S. Kay, Editorial note to: Erwin Schrödinger, Dirac electron in the gravitational field I. *J. Gen. Rel. Grav.* (to appear) [[arXiv/1906.10765](https://arxiv.org/abs/1906.10765)]
- Bernard S. Kay, Remarks on matter-gravity entanglement, entropy, information loss and events. *Proceedings of Leipzig conference* (see below) to appear. [[arXiv/1909.04963](https://arxiv.org/abs/1909.04963)]

Recent conferences/workshops to which I've been invited to talk and/or write articles in the proceedings include:

- [18th UK and European Conference on Foundations of Physics](#), 16-18 July 2016, LSE, London, UK [Talk: “The matter-gravity entanglement hypothesis”]
- [Quantum fields, scattering and spacetime horizons: mathematical challenges 22-25 May 2018, Les Houches](#) [Talk: “Instability of Enclosed Horizons”]
- [Progress and Visions in Quantum Theory in View of Gravity: Bridging foundations of physics and mathematics October 01 - 05, 2018 Max Planck Institute for Mathematics in the Sciences, Leipzig.](#)
- [The Mysterious Universe: Dark Matter - Dark Energy - Cosmic Magnetic Fields, 20 May 2019 to 7 June 2019, Mainz Institute for Theoretical Physics, Johannes Gutenberg University](#) [Talk: “Remarks on (A) an approximate notion of ‘particle’ for curved spacetime (B) entropy, information loss and events.”]