Richard Chapling

Department of Applied Mathematics and Theoretical Physics,
Wilberforce Road, Cambridge, CB3 0WB
Phone +447766 034900 Email rc476@cam.ac.uk
Website https://rc476.user.srcf.net

Education

2012/10–present *Ph.D* Thesis title: *Bound States of the Schrödinger–Maxwell Equations*
Department of Applied Mathematics and Theoretical Physics, University of Cambridge
Supervisor: Dr David Stuart Expected completion: December 2020

2011/10–2012/06 *MMath* (Part III of the Mathematical Tripos)
Trinity College, University of Cambridge
Essay: $H \to \gamma\gamma$ (A discussion of methods of regularisation in the one-loop calculation of a standard-model Higgs boson decay into two photons)
Graduated 2012/06/28: *BA with MMath (Honours pass with Distinction)*

2008/10–2011/06 *BA in Mathematics*
Trinity College, University of Cambridge
First class attained in all three of Part IA, IB and II of Mathematics Tripos

Prizes and Scholarships

2014 Smith–Knight Prize, Group 5
2012 Trinity College Heilbronn Prize
2009–11 Junior Scholar, Senior Scholar at Trinity, Tripos Prizes for first-class examination results (2009,2010,2011)

Teaching Experience

Supervising in the Cambridge Mathematical Tripos:

Lent 2014 Part IB Pure, *Complex Analysis* (Trinity, 6 pairs, 18 hours)
Michaelmas 2014 Part IB Applied, *Variational Principles* and *Methods* (Trinity, 4 pairs, 24 hours)
Lent 2015 Part IB Pure, *Complex Analysis* (Trinity, 3 pairs, 9 hours)
Michaelmas 2015 Part II Applied, *Principles of Quantum Mechanics* (Trinity, King's, Robinson, Clare, Trinity Hall, St Catharine's, 5 pairs, 20 hours)
Lent 2016 Part II Applied, *Further Complex Methods* (Clare, Peterhouse, 3 pairs and 1 singleton, 16 hours)
Easter 2016 Part II Applied, Revision for *Further Complex Methods* and *Principles of Quantum Mechanics* (5 pairs and 2 singletons, 11 hours)
Michaelmas 2016 Part IB Applied, *Quantum Mechanics* (Girton, 4 pairs and 1 singleton, 15 hours)
Easter 2017 Part II Applied, Revision for *Quantum Mechanics* (Girton, 3 pairs, 3 hours)
Lent 2018 Part II Applied, *Asymptotic Methods* (Downing, Girton, Homerton, Magdalene, Pembroke, Queens', Selwyn, St Edmund's, 7 pairs, 22 hours)
Easter 2018 Part II Applied, Revision for *Asymptotic Methods* (Downing, Girton, Homerton, Magdalene, Pembroke, Queens', Selwyn, St Edmund's, 5 pairs and 3 singletons, 8 hours)
Michaelmas 2018 Part IA Applied, *Differential Equations* (Girton, 5 pairs, 20 hours)
Part IB Applied, *Variational Principles* (St. John's and St Edmund's, 8 pairs, 16 hours)
Lent 2019 Part IA Pure, *Probability* (Corpus Christi, King's, Selwyn, 9 pairs and 1 singleton, 40 hours)
Part IA Pure, *Analysis I* (Newnham, 2 pairs, 8 hours)
Part II Applied, *Asymptotic Methods* (Corpus Christi, Downing, Newnham, Pembroke, Queens', Selwyn, 5 pairs and 1 singleton, 18 hours)
Easter 2019 Part IA Applied, *Differential Equations* (Girton, 5 pairs, 5 hours)
Part IB Applied, *Variational Principles* (St. John's and St Edmund's, 6 pairs and 1 singleton, 7 hours)

	Part IA Pure, *Probability* (Corpus Christi, King's and Selwyn, 9 pairs, 9 hours) Part IA Pure, *Analysis I* (Newnham, 2 pairs, 1 hours) Part II Applied, *Asymptotic Methods* (Corpus Christi, Downing, Newnham, Pembroke, Queens', Selwyn, 1 pair and 4 singletons, 7 hours)
Michaelmas 2019	Part IA Applied, *Vectors and Matrices* (Selwyn, 2 pairs, 8 hours)
Lent 2020	Part IA Pure, *Probability* (Corpus Christi, King's and Selwyn, 9 pairs and 1 singleton, 40 hours) Part IA Pure, *Analysis I* (Sidney Sussex, 3 pairs and 1 singleton, 16 hours)
Easter 2020 (online)	Part IA Applied, *Vectors and Matrices* (Selwyn, 4 singletons, 4 hours) Part IA Pure, *Probability* (Corpus Christi, King's and Selwyn, 7 pairs and 3 singletons, 11 hours) Part IA Pure, *Analysis I* (Sidney Sussex, 3 pairs and 1 singleton, 4 hours)

Other teaching:

Lent 2016	Catch-up lectures in Part II course, *Asymptotic Methods* [2 lectures, one examples class]
Michaelmas 2017	Tutoring, preparation for Cambridge Computer Science entrance examinations [25 hours, one-on-one teaching]
Easter 2020	Introductory tutoring in university Mathematics [10 hours, one-on-one teaching, online via Zoom]

Publications

Published

- *Asymptotics of Certain Sums Required in Loop Regularisation*
  Mod. Phys. Lett. A Vol. **31**, No. 4 (2016) 1650030
  Preprint: arXiv:1601.04966
- *A Hypergeometric Integral with Applications to the Fundamental Solution of Laplace's Equation on Hyperspheres*
  SIGMA **12** (2016), 079
  Eprint: arXiv:1508.06689

Forthcoming

- *Bound States of the One-Dimensional Maxwell–Schrödinger Equations*
  Submitted August 2016 to *Lett. Math. Phys.*
  Preprint: arXiv:1608.02637
- *Elliptic Functions on the Wallpaper Groups*
  Submitted August 2016 to *Mathematika*
  Preprint: arXiv:1608.05677

Preprints

- *Note on Exact Forms for Irreducible Loop Integrals*
  arXiv:1608.05311
- *Symmetric Potentials Beget Symmetric Ground States*
  arXiv:1611.01813

In Preparation

- *Consistent Maxwell–Schrödinger Bound States on Compact Manifolds*
- *The Two-Dimensional Maxwell–Schrödinger Equations*
- *Mean Value Theorems and Their Generalisations*
  Book, first draft 60% complete.

Talks

2014/05/30	Existence of Solutions to the Maxwell–Schrödinger Equations with a Background Electric Charge (DAMTP, University of Cambridge)

2015/05 The Life and Work of Bernhard Riemann (History of Mathematics Seminar, University of Cambridge) [Two lecture series]

2016/05 So What Did Riemann Actually do? (History of Mathematics Seminar, University of Cambridge) [Two lecture series]

2016/11/11 Symmetric Potentials Beget Symmetric Ground States (London Mathematical Society Graduate Student Meeting)

2018/05 Everything you should know about Riemann in an hour ($+\varepsilon$) (History of Mathematics Seminar, University of Cambridge)

2019/02/23 G. H. Hardy, the leading mathematician in England (Trinity Mathematical Society Centenary Symposium, Trinity College, Cambridge)

2019/05/10 The roots of group theory: solving equations using permutations (History of Mathematics Seminar, University of Cambridge)

2019/05/17 We are all Riemannians now: how Riemann changed mathematics forever (History of Mathematics Seminar, University of Cambridge)

2020/05/27 Riemann and his geometries (History of Mathematics Seminar, University of Cambridge) [via Zoom]

2020/06/05 What the hell Galois was doing, and why it isn't Group Theory (History of Mathematics Seminar, University of Cambridge) [via Zoom]

Conferences Attended

2014/03 Cosmology and the Constants of Nature (Cambridge)

2015/04 South East Mathematical Physics Seminar 4 (Hertfordshire)

2016/04 South East Mathematical Physics Seminar 4 (Cambridge)

2016/11 LMS Graduate Student Meeting (London)

2019/02 Trinity Mathematics Society Centenary Symposium (Trinity College Cambridge)

2020/07 TUG 2020 (online via Zoom)

Employment

May 2013,'14,'15,'17 Cambridge Assessment: Marking of Sixth Term Examination Papers (STEP I, II, III)

Easter 2015,'16 Trinity College, Cambridge: Invigilator for University Examinations

Other Research Experience

2012/06–07 Summer Research Internship with Dr Piers Bursill-Hall, investigating the importance of Robert Woodhouse in Mathematics at Cambridge in the early Nineteenth Century.
Also, independent research on *An Approach to Combinatorial Conjectures in Quantum Field Theory Using Integrals* (subsequently published as part of first Loop Regularisation paper).

Languages

English (native)
Japanese (basic, equivalent to CEF A2)
Italian (basic, equivalent to CEF A2)
Latin (reading)
French (basic)

Last updated: 10 September 2020