

Richard Chapling

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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: $H \rightarrow \gamma\gamma$ (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)

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| | Part IA Pure, <i>Probability</i> (Corpus Christi, King's and Selwyn, 9 pairs, 9 hours) |
| | Part IA Pure, <i>Analysis I</i> (Newnham, 2 pairs, 1 hours) |
| | Part II Applied, <i>Asymptotic Methods</i> (Corpus Christi, Downing, Newnham, Pembroke, Queens', Selwyn, 1 pair and 4 singletons, 7 hours) |
| Michaelmas 2019 | Part IA Applied, <i>Vectors and Matrices</i> (Selwyn, 2 pairs, 8 hours) |
| Lent 2019 | Part IA Pure, <i>Probability</i> (Corpus Christi, King's and Selwyn, 9 pairs and 1 singleton, 40 hours) |
| | Part IA Pure, <i>Analysis I</i> (Sidney Sussex, 3 pairs and 1 singleton, 16 hours) |
| Other teaching: | |
| Lent 2016 | Catch-up lectures in Part II course, <i>Asymptotic Methods</i> [2 lectures, one examples class] |
| Michaelmas 2017 | Tutoring, preparation for Cambridge Computer Science entrance examinations [25 hours, one-on-one teaching] |

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

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| 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) |

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| 2018/05 | Everything you should know about Riemann in an hour ($+\epsilon$) (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) |

Conferences Attended

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| 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 | TMS Centenary Symposium (Trinity College Cambridge) |

Employment

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| 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

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| 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 <i>An Approach to Combinatorial Conjectures in Quantum Field Theory Using Integrals</i> (subsequently published as part of first Loop Regularisation paper). |
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Languages

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

Last updated: 1 April 2020