

# Mark D. Brooke

More detail and current research available at [markdbrooke.com](http://markdbrooke.com)

markdanielbrooke@gmail.com  
markdbrooke.com

## SELECTED EXPERIENCE

### Mirada Medical, Oxford — Research Scientist Intern

JUN 2019 - PRESENT

Design and implement scientific and mathematical methods, including deep learning, for use in the development of Mirada's clinical imaging products.

### Maths Learning Centre, Adelaide — Mathematics Tutor

AUG 2015 - SEP 2017

Helped students from a variety of backgrounds and disciplines to improve their mathematical ability. First to Third Year mathematics, engineering and physics.

### University of Adelaide — Research Assistant

DEC 2015 - FEB 2016

Implemented a new algorithm for the optimisation of treatment planning in radiation therapy. Resulted in a publication: *Penfold, Scott et al., Physics in medicine and biology 62 9 (2017): 3599-3618.*

### Queen Mary Hospital, Hong Kong — Intern

JUN 2015 - AUG 2015

Under Prime Minister's Australia Asia Award. Created a computer program to easily check radiotherapy calculations. Observed a variety of clinical procedures, including surgical, laboratory work, radiotherapy and treatment planning.

### University of Adelaide — Research Assistant

DEC 2013 - FEB 2014

Describing and visualising systems of coupled quantum oscillators. Investigating the quark structure of the proton through lattice-based quantum chromodynamics simulations.

## EDUCATION

### University of Oxford — DPhil Oncology

SEP 2017 - PRESENT

Thesis project: incorporating biological factors in radiation therapy treatment planning.

### University of Adelaide — Hon.BSc(HPCPhy)

2012 - 2016

Honours Bachelor of Science in High Performance Computational Physics. First Class Honours. GPA: 6.857 / 7.00.

### University of Hong Kong — BSc (Exchange)

AUG 2014 - MAY 2015

Courses included computational physics, quantum and nuclear physics, Cantonese, and Swedish.

## SKILLS

Radiotherapy physics

Computational physics

Monte Carlo simulation

Optimisation and inverse problems

Programming (C++, Python, MATLAB, Javascript, HTML & CSS, LaTeX, Geant4, TOPAS)

## AWARDS

2018 Ideas to Impact Fellow, Saïd Business School

2017 John Monash Scholar

2017 Cancer Research UK Oxford Centre DPhil Prize Studentship

2017 Clarendon Scholar

2014 Prime Minister's Australia Asia Award

2014, 2013, 2012 Faculty of Sciences Outstanding Academic Achievement Award

2012 University of Adelaide Undergraduate Scholarship

2012 University of Adelaide Principal's Scholarship

2011 Candidate for Governor of South Australia SACE Award

2011 Bragg Medal Certificate in Physics

2011 Australian Student Prize

2011 Australian Tertiary Admissions Rank (ATAR) of 99.95

2011 Royal Australian Chemical Institute Medallion

2011 Valedictorian of Immanuel College

## LANGUAGES

English (native), French (limited)

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23 Juxon Street  
Oxford, OX2 6DL  
(+44) 779-8588-086  
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## LEADERSHIP & VOLUNTEERING

### Clarendon Scholars Association — *President*

DEC 2017 - JAN 2019

Oversaw the day-to-day operation with the aim of facilitating professional, academic and social development opportunities through an intellectually and socially interactive community. Approximately 400 active members and over 2,000 alumni. Was successful in lobbying for a 60% budget increase for 2019.

### Peer Assisted Study Sessions (P.A.S.S.) — *Session Leader*

JUN 2015 - AUG 2015

Led the Physics program in its inaugural year. Received student leadership training. Guided students through understanding the lecture material and solving problems in first year Physics.

### Physics Staff Student Liaison Committee — *Representative*

2012 - 2014

Represented the student cohort in meetings with lecturers and course coordinators with the goal of improving the undergraduate physics experience at the University of Adelaide.

### OTHER VOLUNTEERING ROLES:

- *Tennis coaching assistant*
- *Peer mentor*, Faculty of Science, University of Adelaide
- *Sample solutions author*, Adelaide University Mathematics Society

## PUBLICATIONS & PRESENTATIONS

**On Quenching of GafChromic Film response in proton therapy**, PTCOG 58, F. Van den Heuvel, M. Brooke & F. Fiorini, 10-Jun-2019, Manchester, United Kingdom

**Investigating the mechanism behind FLASH radiation effects**, F Van den Heuvel & M Brooke, 21-May-2019, 1st International Biophysics Collaboration Meeting, Darsmatdt, Germany

**Quantification of DNA damage and variable RBE in hadron therapy**, IEEE Conference 2018, M. Brooke & F. Van den Heuvel, 13-Nov-2018, International Convention Centre, Sydney, Australia

**The most likely path of protons in heterogeneous media and its application to proton computed tomography**, M. Brooke & S. Penfold, EPSM 2018 Conference, 29-Oct-2018, Adelaide Convention Centre, Adelaide, Australia

**Sparsity constrained split feasibility for dose-volume constraints in inverse planning of intensity-modulated photon or proton therapy**, Penfold, Scott et al. *Physics in medicine and biology* 62 9 (2017): 3599-3618

**A New Most-Likely-Path Formalism for Proton Computed Tomography**, M Brooke & S Penfold, 01-Aug-2018, arXiv:1808.00122

## Certificates

Ideas to Impact  
University of Oxford

Physics for Modern Radiotherapy  
ESTRO

Certificate in First Year German  
University of Adelaide

Certificate in First Year Chinese  
(Mandarin)  
University of Adelaide

## INTERESTS

Tennis

Sport

Travel

Languages

Technology

Science

Please feel free to find more detail, and read about my research interests, at my website:

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Visit my student and scholar profiles at the links below:

**[General Sir John Monash Foundation profile](#)**

**[Cancer Research UK profile](#)**

**[Department of Oncology profile](#)**