COURTNEY BRELL

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(last updated: June 2022)

EDUCATION

MPhil/PhD Economics University College London | 2020 – present
Supervisor: *Prof. Christian Dustmann*

MRes Economics University College London | 2019 – 2020
Grade: *Distinction*
Thesis: *A dynamic discrete choice model of vintage human capital investment*
Supervisor: *Prof. Christian Dustmann*

MSc Economic Policy University College London | 2017 – 2018
Grade: *Distinction*
Thesis: *The effect of composition on gender wage gaps across the modern German labor market*
Supervisor: *Prof. Christian Dustmann*

Grad. Dip. In Economics University of London | 2013 – 2016
Grade: *Distinction*

PhD in Physics University of Sydney | 2009 – 2014
Thesis: *Many-body models for topological quantum information*
Supervisor: *Prof. Stephen Bartlett*

BSc (Adv) (Hons) in Physics University of Wollongong | 2005 – 2008
Grade: *Class I*
Thesis: *Electron-photon-phonon resonance in the presence of Rashba spin-orbit coupling in two dimensional electron gases*
Supervisor: *Prof. Chao Zhang*

RESEARCH POSITIONS HELD

Research Assistant in Economics Oct 2018 – Aug 2019
Centre for Research and Analysis of Migration, University College London, UK

Postdoctoral Fellow in Physics Sept 2016 – Aug 2017
Perimeter Institute for Theoretical Physics, Canada

Postdoctoral Researcher in Physics Sept 2013 – Aug 2016
Leibniz Universität Hannover, Germany

Visiting Graduate Fellow in Physics May 2012 – Oct 2012
Perimeter Institute for Theoretical Physics, Canada

ACADEMIC AWARDS & SCHOLARSHIPS

ESRC Studentship, *University College London – 2020-2023*
Dean's List, *University College London – 2020*
Best Dissertation Prize, *University College London – 2019*
in MSc Economic Policy (jointly)
CISRA Postgraduate Physics Prize, *University of Sydney – 2011*
for best publication
Postgraduate Research Prize, *University of Sydney – 2011*
for outstanding academic achievement
Denison Merit Award, *University of Sydney – 2009-2013*
Australian Postgraduate Award, *University of Sydney – 2009-2013*
Postgraduate Research Support Scheme, *University of Sydney – 2009, 2011*
University Medal, *University of Wollongong – 2008*
for faculty valedictorian
Australian Institute of Physics Prize, *University of Wollongong – 2008*
for best overall performance in a physics course
Kittel-Lewis Prize for Solid State Physics, *University of Wollongong – 2008*
Dean's Merit List, *University of Wollongong – 2005, 2006, 2007, 2008*
School of Physics Honours Scholarship, *University of Wollongong – 2008*
Best in 4th Year Physics, *University of Wollongong –2008*
Best in 3rd Year Physics, *University of Wollongong – 2007*
School of Physics Summer Research Scholarship, *University of Wollongong – 2006, 2007*
West's Illawarra Youth Achievement Award – *2006*
for outstanding academic achievement
Best in 1st Year Physics, *University of Wollongong – 2005*
University of Wollongong Entrance Scholarship – *2005-2007*

ACADEMIC PUBLICATIONS

In Economics:

The Labor Market Integration of Refugee Migrants in High Income Countries
with C Dustmann & I Preston; *J. Econ. Perspect.,* 34(1) 94-121, (2020)
Immigration and Wage Growth: The Case of Australia
with C Dustmann; In *Low Wage Growth,* Reserve Bank of Australia, (2019)

In Physics:

Topological quantum error correction in the Kitaev honeycomb model
with Y-C Lee and S Flammia; *J. Stat. Mech*., 083106, (2017)
Classical Simulation of Quantum Error Correction in a Fibonacci Anyon Code
with S Burton and S Flammia; *Phys. Rev. A*, 95, 022309, (2017)
A proposal for self-correcting stabilizer quantum memories in 3 dimensions
sole author; *New J. Phys*., 18, 013050, (2016)
Generalized Cluster States Based on Finite Groups
sole author; *New J. Phys*., 17, 023029, (2015)
Generalized Color Codes Supporting Non-Abelian Anyons
sole author; *Phys. Rev. A*, 91, 042333, (2015)
Thermalization, Error-Correction, & Memory Lifetime for Ising Anyon Systems
with S Burton, G Dauphinais, S Flammia and D Poulin; *Phys. Rev. X*, 4, 031058, (2014)
Perturbative 2-body Parent Hamiltonians for Projected Entangled Pair States
with S Bartlett and A Doherty; *New J. Phys*., 16, 123056, (2014)
Toric codes and quantum doubles from two-body Hamiltonians
with S Flammia, S Bartlett, and A Doherty; *New J. Phys*., 13, 053039, (2011)

ACADEMIC PRESENTATIONS

Presented talks at the following conferences (invited talks marked with *):

*What is topological order?
Sydney Quantum Information Theory Workshop 2017 (Australia)

Open problems in topological codes and anyons (discussion chair)
Fault-Tolerant Quantum Technologies 2016 (Spain)

Self-correcting stabilizer quantum memories in 3 dimensions or (slightly) less
Central European Quant. Information Processing 2015 (Czechia)

Self-correcting stabilizer quantum memories in 3 dimensions or (slightly) less
Quantum Information Processing 2015 (Australia)

Many-body models based on quantum double algebras
Benasque Symposium on Topological Quant. Information 2013 (Spain)

*Many-body models based on quantum double algebras
Sydney Quantum Information Theory Workshop 2013 (Australia)

Universal Topologically Protected Adiabatic Cluster State Quant. Computation
Australian Institute of Physics Congress 2012 (Australia)

*Approximating quantum double models by 2-body Hamiltonians
Sydney Quantum Information Theory Workshop 2010 (Australia)

Presented seminar talks at institutes including:

- California Institute of Technology
- Freie University Berlin
- Imperial College London
- Max Planck Institute for Quantum Optics
- Perimeter Institute for Theoretical Physics
- RWTH Aachen
- University College London
- University of Basel
- University of British Columbia
- University of Copenhagen
- University of Leeds

Presented posters at the following conferences:

- Quantum Information Processing 2014 (Spain)
- Deutsche Physikalische Gesellschaft Annual Meeting 2014 (Germany)
- Quantum Information Processing 2013 (China)
- Center for Engineered Quantum Systems Meeting 2012 (Australia)
- Quantum Information Processing 2012 (Canada)
- Quantum Error Correction 2011 (USA)
- Quantum Information in Quantum Many-Body Physics 2011 (Canada)
- Quantum Information Processing 2011 (Singapore)
- Australian Institute of Physics Congress 2010 (Australia)
- Quantum Communication, Measurement and Computation 2010 (Australia)
- Condensed Matter and Materials Meeting 2008 (Australia)

TEACHING & OUTREACH ROLES

Teaching assistant University College London | 2020-present
Undergraduate & graduate economics tutorials

Group Mentor International Summer School for Young Physicists | 2017
Held at the Perimeter Institute for Theoretical Physics

Outreach Scientist Ask a Scientist lecture series | 2017
Held at the Perimeter Institute for Theoretical Physics

Research Supervision Leibniz Universität Hannover | 2014 – 2016
Daniel Borcherding – MSc 2015
Thomas Brockt – MSc 2015
Ivana Kurecic – MSc 2015-2016
Marius Lewerenz – PhD 2014-2016

Lecturer Leibniz Universität Hannover | 2016
Designed and delivered graduate lecture course "Topological Quantum Systems"

Senior tutor and assistant lecturer Leibniz Universität Hannover | 2015
Graduate lecture course "Advanced Quantum Mechanics"

Authored popular article University of Sydney alumni newsletter | 2011
Front page article: "Weird quantum things"

Laboratory supervisor University of Sydney | 2010-2013
Undergraduate physics laboratories

Laboratory demonstrator University of Sydney | 2009-2013
Undergraduate physics laboratories

Peer-Assisted Study Program leader University of Wollongong | 2007-2008
In computer science, mathematics, and physics

Foundations tutor and demonstrator University of Wollongong | 2007-2008
In physics

Laboratory demonstrator University of Wollongong | 2008
Undergraduate physics laboratories

Opportunity Program mentor University of Wollongong | 2008
For engineering students