

# Samuel Hinton

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## Education

- 2016–2020 **Doctor of Philosophy** University of Queensland  
Analysing supernovae in the Dark Energy Survey using Hierarchical Bayesian models to help constrain the nature of dark energy.
- 2010–2015 **Bachelor of Science** (Physics)(Hons, 1<sup>st</sup>) University of Queensland  
Thesis: Analysed the Baryon Acoustic Oscillation signal imprinted in the large scale structure of the universe using the WiggleZ survey. Won the Astronomical Society of Australia's award for best Australian Astrophysics honours thesis of the year.
- 2010–2014 **Bachelor of Engineering** (Software)(Hons, 1<sup>st</sup>) University of Queensland  
Thesis: Created the first online client-only web-application to compute redshifts from telescope spectra. Won the GroudProbe prize, IEEE student thesis prize and IET student prize.

## Experience

- 2020 **COVID-19 Critical Care Consortium** Brisbane, Queensland, Australia  
*Lead Data Analyst*  
Technical lead for the COVID-19 Critical Care Consortium. Created the data pipeline to automatically produce machine-learning-ready data products for use in the study. Created reports for clinical staff and hosted a dashboard for use in hospital sites to provide insights from the data products.
- 2020 **University of Queensland** Brisbane, Queensland, Australia  
*Postdoctoral Researcher*  
Continued research in the areas of supernova cosmology and large scale structure, focusing heavily upon analysis pipelines and systematics control through efficient use of simulations and mocks.
- 2019 **SuperDataScience** Sunshine Coast, Queensland, Australia  
*Course Instructor*  
Created a course on statistical analysis in Python for students. Focused on applied statistics and utilisation of modern code packages, with attention given to visual output and workflows for continuous validation of methodology.
- 2017, 2016 **Lawrence Berkeley National Laboratory** Berkeley, California  
*Research Fellowship*  
Research fellowship to work on Bayesian Hierarchical Modelling and its applications to Supernova Cosmology. Specifically, investigating how to use high dimensional hierarchical models to model individual supernova instead of populations to provide better constraints on cosmology using supernova discovered by the Dark Energy Survey.
- 2015–2016 **Gemini & Australian Astronomical Observatory** La Serena, Chile  
*Research Intern*  
Utilised photometric data of Maffei 1 to determine globular cluster candidates and their properties for spectroscopic follow-up. Utilised data reduction pipelines, automated analysis methods in Python, and applied machine learning techniques to perform object classification.
- 2010–2014 **GBST** Brisbane, Queensland, Australia  
*Software Developer*  
Developed business intelligence reporting solutions, designing and developing server and client based web application code, creation of large scale SQL queries, optimising queries, databases and applications for network, processing and memory constraints, developed back-end server code and front-end web applications.

## Noteable Awards

2019	<b>Lindau Nobel Laureate Delegate</b>	Representing Australia at LINO19.	Australian Academy of Science
2019	<b>Future Superstar Award</b>	Science's highest performing PhD student.	University of Queensland
2016	<b>Bok Prize</b>	Best astrophysics honours thesis in Australia.	Astronomical Society of Australia
2016	<b>Australian Postgraduate Award</b>		Australian Government
2016	<b>Science Faculty Graduate of the Year</b>		University of Queensland
2016	<b>Australian Institute of Physics Prize</b>	Top physics graduate.	University of Queensland
2016	<b>University Medal (Science)</b>		University of Queensland
2015	<b>Australian Gemini Undergraduate Summer Studentships</b>		Australian Astronomical Observatory
2015	<b>AAO Honours Scholarship</b>		Australian Astronomical Observatory
2015	<b>University Medal (Engineering)</b>		University of Queensland

## Other Awards

2015	<b>Rhodes Scholarship Finalist</b>		Oxford University
2015	<b>A.W. Oakes Scholarship</b>		St John's College
2015	<b>Harriet Marks Bursary</b>	Academic merit in science honours.	University of Queensland
2015	<b>10x Deans Commendation</b>		University of Queensland
2015	<b>Helen Thompson Prize for All Round Excellence</b>		St John's College
2015	<b>IET Student Prize</b>	Outstanding academic success.	The Institution of Engineering and Technology
2015	<b>David Andrew Krnak Memorial Prize</b>	Top engineering graduate.	University of Queensland
2014	<b>UQ Future Leader</b>		University of Queensland
2014	<b>IEEE Student Thesis Prize</b>	Best final year thesis.	IEEE
2014	<b>GroundProbe Prize</b>	Best final year thesis.	University of Queensland
2014	<b>RWH Hawken Scholar</b>		University of Queensland
2014	<b>UQ Summer Research Scholarship</b>		University of Queensland
2012	<b>Walter Bruce Darker Scholarship</b>		University of Queensland
2012	<b>Exxon Mobil Achievement Award</b>	Top mechanical engineering student.	University of Queensland
2011	<b>Alstom Prize</b>	Top electrical engineering student.	University of Queensland
2010	<b>UQ Academic Excellence Scholarship</b>		University of Queensland
2010	<b>ICT Enabling Scholarship</b>		University of Queensland
2010	<b>John Black Prize</b>		University of Queensland

## Communication

2020	<b>Scientific Correspondent</b>	Acted as a scientific correspondent for multiple organisations to break down complicated scientific research into everyday terms.	CNET, CBS
2020	<b>Coding@Home Industry Partner</b>	Shared the modern and future role of coding and machine learning from the perspective of an astronomer and scientist.	Queensland Education, Coding@Home
2020	<b>FameLab National Finalist</b>	National finalist in the FameLab program, with topic "Can you hear the Big bang?"	British Council
2020	<b>Science Friction Guest</b>	Discussed the huge transition from astrophysics to data analytics due to the COVID-19 pandemic, and the transferable skillset that science gives you.	ABC Radio National
2020	<b>NYSF Guest Panelist</b>	Shared my personal journey in science outreach, and presented on how to give effective presentations.	National Youth Science Forum
2019-2017	<b>ScopeTV Guest Scientist</b>	Helped script, narrate and appear in ScopeTV educational astronomy episodes.	ScopeTV, Channel 10
2019	<b>Science Says! Scientific Panelist</b>	Panel scientist for Science Says, a comedy science show for Brisbane's World Science Festival.	World Science Festival

2019	<b>Probably Science Podcast Guest Scientist</b> Guest scientist for Probably Science, joining the previous guests of Neil deGrasse Tyson, Sean Carroll and more.	Probably Science Live Podcast and Comedy Show
2019	<b>2SER Radio Scientific Correspondent</b> Monthly scientific and astronomy updates.	Radio, 2SER
2019-2018	<b>Podcast Host</b> Hosted and presented on a podcast about various space related concepts.	Commuting the Cosmos
2018	<b>Curious Kids Writer</b> Consulted and authored articles for The Conversation's Curious Kids program.	The Conversation
2018	<b>BrisScience Presenter</b> Invited to talk at the monthly BrisScience event on the dark side of the universe.	BrisScience & UQ
2018	<b>Australian Survivor Invited Contestant, Academic Champion</b> Cast as the academic champion for the 'Champions v. Contenders' season of Australian Survivor.	Endemol Shine
2018-2017	<b>School Guest Presenter</b> Talks to primary and secondary students on astronomy, science, STEM and career pathways.	Clayfield College, Gumdale State School
2019-2017	<b>Science Communicator</b> Gave public talks to a general audience about various topics in astronomy.	Pint of Science, Physics in the Pub
2017	<b>Invited Presenter</b> Invited presenter at a progressional development program for physics PhD, honours and undergraduate students.	Research Education and Development Retreat
2017	<b>Workshop Organiser, Host and Presenter</b> Created and presented a code workshop focusing on open-source science run across Australia.	CAASTRO Code Workshop
2017	<b>Battle of the Brains Panel Scientist</b> Invited participant in a games panel discussion for physicists during National Science Week.	National Science Week
2017	<b>World Science Festival Tour Guide</b> Scientific tour guide for the Large Hadron Collider exhibit during the World Science Festival.	Queensland Museum & UQ
2017	<b>FameLab Australia Scientist</b> State finalist FameLab scientist. Public communication through radio interview and stage presentation.	British Council
2016	<b>Guest Scientist, An Evening with Dr Lisa Randall</b> Gave the opening speech for the Brisbane event, talking about the exciting future of astronomy.	ThinkInc
2016	<b>UQ Science Demo Troupe Member</b> Joined the UQ Science Demo troupe to create resources for the group and participate in UQ demonstrations.	University of Queensland
2016	<b>Uluru Astronomer in Residence</b> Accompanied Sky Tours to answer scientific questions from the public and gave public lectures on popular astronomy topics.	CAASTRO

## Teaching

2020	<b>Data Manipulation in Python</b>	SuperDataScience
2019	<b>Python for Statistical Analysis</b>	SuperDataScience
2019	<b>Frontiers of Astrophysics Guest Lecturer</b>	University of Queensland
2018	<b>Introduction to Astrophysics Guest Lecturer</b>	University of Queensland
2018	<b>Cosmology Tutor and Guest Lecturer</b>	University of Queensland
2018	<b>Supervisor - Capstone Project</b>	University of Queensland
2017	<b>Computational Physics Tutor</b>	University of Queensland
2017	<b>Computational Physics Content Creator</b>	University of Queensland
2017	<b>Supervisor - Summer Project</b>	University of Queensland
2015	<b>5-Minute Physics Content Creator</b>	University of Queensland

## Presentations

June 2020	<b>Data Science Pipelines</b>	DataScienceGo Virtual Conference
May 2020	<b>Getting Started with Pippin</b>	Duke University
Jan 2020	<b>Supernova Cosmology updates from the Dark Energy Survey</b>	AAS
Oct 2019	<b>Pippin: A pipeline for SN Ia cosmology</b>	SCAM
Jul 2019	<b>Barry - A BAO model fitting framework</b>	Python in Astronomy
Mar 2019	<b>The path towards Photometric Supernova Cosmology with DES</b>	Cosmology on Safari
Feb 2019	<b>Hitting the Limits of Supernova cosmology</b>	ANITA
Nov 2017	<b>Coding Practises for the Busy Astronomer</b>	CAASTRO
Jun 2017	<b>Hierachical Bayesian Models for Supernova Cosmology</b>	Lawrence Berkeley National Lab
Dec 2016	<b>Introduction to git and code management</b>	University of Cambridge
Dec 2016	<b>Hierachical Bayesian Models for Supernova Cosmology</b>	University of Southampton
Dec 2016	<b>Hierachical Bayesian Models for Supernova Cosmology</b>	University of Portsmouth
Nov 2016	<b>Sound waves in Space: Wigglez and the BAO</b>	Swinburne University of Technology
Aug 2016	<b>Publishing Packages in Python</b>	University of Queensland
Aug 2016	<b>ChainConsumer: Plots and LaTeX from MCMC chains</b>	CAASTRO
May 2016	<b>Hieracrhical Bayesian Models for Supernova Cosmology</b>	Stanford University
Feb 2016	<b>Detecting Globular Clusters in Maffei 1</b>	Gemini Institute
Nov 2015	<b>Marz - Redshifting software inside your browser</b>	OzDES Workshop

## Publications

### Core Author

BARRY and the BAO model comparison

**Hinton, Samuel R.**, Cullan Howlett, and Tamara M. Davis MNRAS 493.3 (Apr. 2020) pp. 4078–4093

Pippin: A pipeline for supernova cosmology

**Hinton, Samuel** and Dillon Brout Journal of Open Source Software 5.47 (2020) p. 2122. *The Open Journal*

Can redshift errors bias measurements of the Hubble Constant?

Davis, Tamara M. et al. MNRAS (Sept. 2019) p. 2279

Steve: A Hierarchical Bayesian Model for Supernova Cosmology

**Hinton, S. R.** et al. The Astrophysical Journal 876.1 (Apr. 2019) p. 15. *American Astronomical Society*

Measuring the 2D baryon acoustic oscillation signal of galaxies in WiggleZ: cosmological constraints

**Hinton, S. R.** et al. MNRAS 464 (Feb. 2017) pp. 4807–4822

ChainConsumer

**Hinton, S. R.** JOSS 1.4 (Aug. 2016). *The Open Journal*

Marz: Manual and automatic redshifting software

**Hinton, S.R.** et al. Astronomy and Computing 15 (2016) pp. 61–71

### Science Contributions

OzDES multi-object fibre spectroscopy for the Dark Energy Survey: Results and second data release

Lidman, C. et al. MNRAS (May 2020)

First cosmology results using type Ia supernovae from the Dark Energy Survey: the effect of host galaxy properties on supernova luminosity

Smith, M. et al. MNRAS 494.3 (Apr. 2020) pp. 4426–4447

First Cosmology Results using Type Ia Supernovae from the Dark Energy Survey: Constraints on Cosmological Parameters

Abbott, T. M. C. et al. ApJ 872.2, L30 (Feb. 2019) p. L30

First Cosmology Results Using SNe Ia from the Dark Energy Survey: Analysis, Systematic Uncertainties, and Validation

- Brout, D. et al. *ApJ* 874.2, 150 (Apr. 2019) p. 150
- First Cosmology Results Using Type Ia Supernovae from the Dark Energy Survey: Photometric Pipeline and Light-curve Data Release  
Brout, D. et al. *ApJ* 874.1, 106 (Mar. 2019) p. 106
- First cosmology results using Type Ia supernova from the Dark Energy Survey: simulations to correct supernova distance biases  
Kessler, R. et al. *MNRAS* 485.1 (May 2019) pp. 1171–1187
- First cosmology results using Type Ia supernovae from the dark energy survey: effects of chromatic corrections to supernova photometry on measurements of cosmological parameters  
Lasker, J. et al. *MNRAS* 485.4 (June 2019) pp. 5329–5344
- First cosmological results using Type Ia supernovae from the Dark Energy Survey: measurement of the Hubble constant  
Macaulay, E. et al. *MNRAS* 486.2 (June 2019) pp. 2184–2196
- OzDES multifibre spectroscopy for the Dark Energy Survey: 3-yr results and first data release  
Childress, M. J. et al. *Monthly Notices of the Royal Astronomical Society* 472 (Nov. 2017) pp. 273–288
- OzDES multifibre spectroscopy for the Dark Energy Survey: first-year operation and results  
Yuan, F. et al. *Monthly Notices of the Royal Astronomical Society* 452 (Sept. 2015) pp. 3047–3063

## Infrastructure / Data Contributions

- Studying Type II supernovae as cosmological standard candles using the Dark Energy Survey  
de Jaeger, T. et al. *MNRAS* (May 2020)
- DES16C3cje: A low-luminosity, long-lived supernova  
Gutiérrez, C. P. et al. *MNRAS* (May 2020)
- The mystery of photometric twins DES17X1boj and DES16E2bjy  
Pursiainen, M. et al. *MNRAS* 494.4 (Apr. 2020) pp. 5576–5589
- Supernova Host Galaxies in the Dark Energy Survey: I. Deep Coadds, Photometry, and Stellar Masses  
Wiseman, P. et al. *MNRAS* (May 2020)
- Quasar Accretion Disk Sizes from Continuum Reverberation Mapping in the DES Standard-star Fields  
Yu, Zhefu et al. *ApJS* 246.1, 16 (Jan. 2020) p. 16
- A joint SZ-Xray-optical analysis of the dynamical state of 288 massive galaxy clusters  
Zenteno, A. et al. *MNRAS* (May 2020)
- Cosmological Constraints from Multiple Probes in the Dark Energy Survey  
Abbott, T. M. C. et al. *Phys. Rev. Lett.* 122 (17 May 2019) p. 171301. *American Physical Society*
- C IV black hole mass measurements with the Australian Dark Energy Survey (OzDES)  
Hoormann, J. K. et al. *MNRAS* 487.3 (Aug. 2019) pp. 3650–3663
- Dark Energy Survey year 1 results: Cosmological constraints from galaxy clustering and weak lensing  
Abbott, T. M. C. et al. *Phys. Rev. D* 98 (4 Aug. 2018) p. 043526. *American Physical Society*
- The Dark Energy Survey: Data Release 1  
Abbott, T. M. C. et al. *ApJS* 239, 18 (Dec. 2018) p. 18
- The WiggleZ Dark Energy Survey: final data release and the metallicity of UV-luminous galaxies  
Drinkwater, M. J. et al. *Monthly Notices of the Royal Astronomical Society* 474 (Mar. 2018) pp. 4151–4168
- Dark Energy Survey year 1 results: Galaxy clustering for combined probes  
Elvin-Poole, J. et al. *Phys. Rev. D* 98 (4 Aug. 2018) p. 042006. *American Physical Society*
- Dark Energy Survey Year 1 Results: Cross-Correlation Redshifts - Methods and Systematics Characterization  
Gatti, M. et al. *Monthly Notices of the Royal Astronomical Society* (Feb. 2018)
- DES science portal: Computing photometric redshifts

- Gschwend, J. et al. *Astronomy and Computing* 25 (Oct. 2018) pp. 58–80
- Dark Energy Survey Year 1 Results: redshift distributions of the weak-lensing source galaxies  
Hoyle, B et al. *Monthly Notices of the Royal Astronomical Society* 478.1 (2018) pp. 592–610
- Quasar Accretion Disk Sizes from Continuum Reverberation Mapping from the Dark Energy Survey  
Mudd, D. et al. *ApJ* 862, 123 (Aug. 2018) p. 123
- Rapidly evolving transients in the Dark Energy Survey  
Pursiainen, M et al. *Monthly Notices of the Royal Astronomical Society* 481.1 (2018) pp. 894–917
- The Taipan Galaxy Survey: Scientific Goals and Observing Strategy  
da Cunha, E. et al. *PASA* 34, e047 (Oct. 2017) e047
- Discovery of a  $z = 0.65$  post-starburst BAL quasar in the DES supernova fields  
Mudd, D. et al. *Monthly Notices of the Royal Astronomical Society* 468 (July 2017) pp. 3682–3688
- A Study of Quasar Selection in the Supernova Fields of the Dark Energy Survey  
Tie, S. S. et al. *AJ* 153, 107 (Mar. 2017) p. 107
- The 2-degree Field Lensing Survey: design and clustering measurements  
Blake, C. et al. *Monthly Notices of the Royal Astronomical Society* 462 (Nov. 2016) pp. 4240–4265

## In Journal Review

- STRIDES: Spectroscopic and photometric characterization of the environment and effects of mass along the line of sight to the gravitational lenses DES J0408-5354 and WGD 2038-4008  
Buckley-Geer, E. J. et al. *arXiv e-prints* (Mar. 2020)
- Increasing the census of L and T dwarfs in wide binary and multiple systems using Dark Energy Survey DR1 and Gaia DR2 data  
dal Ponte, M. et al. *arXiv e-prints* (Jan. 2020)
- Validation of Selection Function, Sample Contamination and Mass Calibration in Galaxy Cluster Samples  
Grandis, S. et al. *arXiv e-prints* (Feb. 2020)
- Dark Energy Survey Identification of A Low-Mass Active Galactic Nucleus at Redshift 0.823 from Optical Variability  
Guo, Hengxiao et al. *arXiv e-prints* (Mar. 2020)
- Chemical Analysis of the Ultra-Faint Dwarf Galaxy Grus II. Signature of high-mass stellar nucleosynthesis  
Hansen, T. T. et al. *arXiv e-prints* (May 2020)
- The impact of spectroscopic incompleteness in direct calibration of redshift distributions for weak lensing surveys  
Hartley, W. G. et al. *arXiv e-prints* (Mar. 2020)
- First Hubble diagram and cosmological constraints using superluminous supernova  
Inserra, C. et al. *arXiv e-prints* (Apr. 2020)
- Constraints on the Physical Properties of S190814bv through Simulations based on DECam Follow-up Observations by the Dark Energy Survey  
Morgan, R. et al. *arXiv e-prints* (June 2020)
- Is diffuse intracluster light a good tracer of the galaxy cluster matter distribution?  
Sampaio-Santos, H. et al. *arXiv e-prints* (May 2020)
- Supernova Siblings: Assessing the Consistency of Properties of Type Ia Supernovae that Share the Same Parent Galaxies  
Scolnic, D. et al. *arXiv e-prints* (Feb. 2020)
- The Host Galaxies of Rapidly Evolving Transients in the Dark Energy Survey  
Wiseman, P. et al. *arXiv e-prints* (May 2020)
- Milky Way Satellite Census – II. Galaxy-Halo Connection Constraints Including the Impact of the Large Magellanic Cloud  
Nadler, E. O. et al. *arXiv e-prints* (Dec. 2019)

First Cosmology Results Using Type Ia Supernovae From the Dark Energy Survey: Survey Overview and Supernova Spectroscopy  
D'Andrea, C. B. et al. arXiv e-prints (Nov. 2018)

Quasar Accretion Disk Sizes from Continuum Reverberation Mapping in the DES Standard Star Fields  
Yu, Z. et al. arXiv e-prints (Nov. 2018)