Jason Webster

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Personal

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Languages

English: Mother tongue
Afrikaans: Basic Knowledge

Work Experience

Jan 2019 - Present

Junior Data Scientist at Explore-AI
Teaching and Consulting
Course facilitator for 100 data science students in Johannesburg. Designed and implemented curriculum for online courses. Supervised 4 teams of interns positioned at and consulting with a multitude of different companies. Organized a monthly meetup event (see Leadership). Currently launching a research division within the company.

Jun - Jul 2016

Research Collaborator at University of Oregon
Reference: Dr. Ben McMorran | mcmorran@uoregon.edu
Developed new methods of generating electron vortex beams, and was trained to operate a transmission electron microscope. Helped form new collaborations between my research group and that of Ben McMorran's.

Dec 2015 – Jan 2016

Intern at the National Institute for Theoretical Physics (NITheP)
Reference: Prof. Michael Kastner | kastner@sun.ac.za
Studied a long-range highly constrained spin model that has shown equivalence to certain Bose-Einstein condensates. Learned to tackle extremely technical and challenging theoretical problems, and learned a great deal of quantum mechanics and statistical physics in the process.

Jul 2012 – Dec 2014

Intern at the Council for Scientific and Industrial Research (CSIR)
Reference: Dr. Hermann Uys | hermann@sun.ac.za
Interned throughout various summer and winter vacations. Was tasked with a number of projects, including: building a large-scale ion trap for use in public demonstrations, simulating the motion of trapped ions, and investigating rotational broadening effects on molecular spectra.

Education

Dec 2018 Master of Science in Physics, **Stellenbosch University**
With distinction, Summa cum laude
Thesis: "Towards Atomic Physics Using Spatially Structured Light"
Advisor: Dr. Hermann Uys

Mar 2016 BSc Honours in Physics, **University of the Witwatersrand**
With distinction, Summa cum laude
Thesis: "Electron Vortex Beams and Non-Radiating Accelerating Electrons"
Advisor: Prof. Andrew Forbes
Average: 91.1% | Gpa 3.92/4 | Academic Record

Mar 2015 BSc in Physics and Applied Mathematics, **University of the Witwatersrand**
With distinction, Summa cum laude
Average: 85.0% | Gpa 3.84/4 | Academic Record

Dec 2012 Highschool Certificate, **Curro Bankenveld**

Awards

2018 S2A3 Medal, **Stellenbosch University**
Awarded to the top MSc graduate in the natural sciences at Stellenbosch University.

2016 Chancellor's Medal, **University of the Witwatersrand**
Awarded to the top overall graduating student across all fields of study at the university. Presented by Adam Habib, then Vice Chancellor of Wits.

2016 Samuel Goodman Memorial Medal, **University of the Witwatersrand**
Awarded to the most distinguished Honours graduate across the Faculty of Science.

2016 Jan Loubser Medal, **University of the Witwatersrand**
Awarded to the most distinguished Honours graduate across the Faculty of Science.

2016 Element Six Diamond Research Lab and DST/NRF Centre of Excellence in Strong Materials Medal, **University of the Witwatersrand**
Awarded for outstanding performance in the Honours year of study in Physics.

2015 William Cullen Medal, **University of the Witwatersrand**
Awarded to the most distinguished Bachelor of Science graduand in the Faculty of Science.

2015 Element Six Diamond Research Lab and DST/NRF Centre of Excellence in Strong Materials Medal, **University of the Witwatersrand**
Awarded for outstanding performance in Physics III.

Publications

Apr 2019 Coiling free electron matter waves
J Pierce, **J Webster**, H Larocque, E Karimi, B McMorran, A Forbes, *New Journal of Physics 21 (4), 043018*
Demonstrated the construction of a novel class of angularly accelerating electron beams. Provided the means to construct the beam, while my collaborators performed the experiment. Contributed to the theoretical analysis of the electromagnetic field during the electron's propagation. This paper was based on work from my Honours thesis.

Jun 2018 Subexponentially Growing Hilbert Spaces and Nonconcentrating Distributions in a Constrained Spin Model

J Webster, M Kastner, *Journal of Statistical Physics 171.3 (2018): 449-461*

Studied a highly constrained long-range spin model for use in a specially prepared Bose-Einstein condensate experiment. Resulted from the work done during my internship at NITheP.

Jan 2017 Radially dependant angular acceleration of twisted light

J Webster, C Rosales-Guzmán, A Forbes, *Optics letters 42.4 (2017): 675-678*

Developed a new technique of controlling the angular acceleration of laser light by using the Guoy phase in Laguerre-Gauss beams. This paper was featured as one of the top downloads on OSA's website during February 2017.

Conferences

Sep 2017 International Conference on Optical Angular Momentum
Anacapri, Italy
Poster: "Angularly Accelerating Electron Waves"

Jul 2017 SAIP 62nd Annual Conference
Stellenbosch, South Africa
Presentation: "Nano-fabricated Si3N4 holograms for probing matter with structured waves." | Awarded best Honours presentation in the Material Sciences Division.
Presentation: "Non-radiating accelerating electrons?"

Leadership

2019 - present Explore-AI Meetup Organizer
Started, organized, and maintained a meetup group for the public. Organized speakers for the event. More details can be found at https://www.meetup.com/Explore-AI-JHB-Meetup-Group/

2018 Chris Engelbrecht Summer School Organisational Committee
Served as head of accommodation management. Ensured that a local python package repository was accessible to the attendees. Assisted in the set up of the venue.

2017 Stellenbosch OSA Student Chapter Committee
Head of media in the student chapter organisational committee. Was placed in charge of designing posters/flyers for events. Designed a website for the committee.

Committees and Societies

2017 Maties Underwater Club
Member of the Stellenbosch University scuba diving club.

2015 - 2016 Wits Astronomy Club
Member of the Wits University Astronomy Club. I've always had a passion for astronomy, and had briefly considered becoming an Astrophysicist at one stage in my life.

2016 - 2018 OSA Student Chapter Member
Maintained participation in outreach activities to local schools.

2014 - present International Golden Key Society
Invited due to the academic success in my 1st year of undergraduate studies.

Skills

Software	Experienced: Python, Matlab, Mathematica, Keras, Tensorflow, PyTorch Familiar: C, C++, Java, ActionScript, Delphi, PyQt
Research	Optics, Electron Microscopy, Statistical Mechanics, Wave Propagation and Dynamics
Technical	Laser Design and Construction, Laser Operation

Certificates

Apr 2018	NMISA Basic Laser Safety Course
May 2017	Writing for Peer Review

Personal Achievements

2018 **Modelled a self-driving car using deep learning**
Built a self-driving car using a deep learning model, trained on recorded footage of myself playing "Burnout: Ultimate Paradise". Learned about convolutional neural networks, GPU memory management, and working in a simulated environment. An article on this project can be found at offerzen.com/blog/how-to-develop-a-self-driving-car-in-under-a-week.

2016 **Graduated from Wits University as one of the top performing students across all fields of study**
Received the highest academic honour, the Chancellor's medal, for my academic performance at Wits.

2015 **Became a "professional" game developer**
I developed a small web-based game using the ActionScript programming language, and received a pay cheque of $25 in advertising revenue from the website that hosted it.

Interests and Hobbies

Technology, Programming, Deep Learning, Machine Learning, Computer Vision, Reinforcement Learning
Physics, Optics, Quantum Mechanics, Quantum Field Theory, Astronomy
Art, Game Design, Digital Painting, 3D Rendering and Animation

Academic Record

BSc Honours in Physics

University of the Witwatersrand

Course	Credits	Mark	US Code
Quantum Mechanics	13	100	A
Statistical Physics	13	72	B+
Nuclear Physics	13	75	A
Electrodynamics	13	99	A
Solid State Physics	13	91	A
General Relativity	13	96	A
Introduction to Quantum Field Theory	13	96	A
Research Project	30	95	A
		Ave	91.1
		Gpa	3.92

Undergraduate BSc Physics and Applied Mathematics

University of the Witwatersrand

Course	Credits	Mark	US Code
Computational and Applied Mathematics I	36	77	A
Computer Science I	36	94	A
Algebra I	15	72	B+
Calculus I	21	85	A
Physics I (Major)	36	87	A
Computational and Applied Mathematics II	48	93	A
Basic Analysis II	16	71	B+
Differential Equations II	8	77	A
Multivariable Calculus II	24	56	C
Advanced Analysis II	8	92	A
Group Theory II	8	85	A
Linear Algebra II	8	83	A
Physics IIA (Major)	24	78	A
Physics IIB (Major)	24	86	A
Computational and Applied Mathematics III	48	93	A
Quantum Mechanics III	11	96	A
Quantum Mechanics and its Applications	11	100	A
Statistical Physics III	11	90	A
Waves and Modern Optics	11	90	A
Advanced Experimental Physics and Project	28	86	A
		Ave	85.0
		Gpa	3.84