

LEWIS D. WRIGHT

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WORK EXPERIENCE

CREST, Loughborough University

Research Associate

October 2019 - Present

- Funded by a Loughborough enterprise grant the project *An infra-red reflecting coating for solar module cover glass: development of a demonstrator* was to further develop a coating which is simultaneously anti-reflective to visible light (improves efficiency through increased incident light) and reflective to infrared light (prevents efficiency loss from excessive heating). **For my involvement I was named as a co-inventor on the patent**, submitted December 2019.

My role was to investigate the effect of composition on the optical properties of the coating. This was partially carried out by a student for his final year project, who I supervised. To produce his samples I taught him the combinatorial process I had developed in my PhD, supported him while collecting his range of characterisation data, and was his primary contact for questions about the project. I also worked with a PhD student whose research was the deposition of anti-reflective coatings. I worked with him sharing characterisation, and also as a first contact for practical questions in the lab or when reviewing results. This work was heavily disrupted by COVID-19.

CREST, Loughborough University

Postgraduate Researcher

October 2015 - Present

- Funded by the EPSRC CDT-PV my thesis titled *Earth Abundant Materials for Photovoltaic Applications* looked to increase the efficiency of disruptive material systems. In my first project I built an ultrasonic spraying rig and programmed it in LabView to automate deposition. I developed a brand new solvent system, eventually produced an in-house record material efficiency. This project gave me a strong foundation in depositing thin films and characterising optoelectronic properties.

My second project was significantly different, as I aimed to synthesise a brand new inorganic semiconductor compound. This materials discovery was executed with combinatorial sputtering, a high-throughput technique for maximising the number of samples while minimising the equipment time and material usage. While searching for the intended material a second simpler material was found, which became my third project. This second material was unpublished, strongly photoactive, and had a bandgap in the ideal range for photovoltaics. Both materials are still under investigation.

My broad experimental skill-set is complimented by a strong self-taught proficiency in object-orientated Python, which streamlined my experimental work by automating data processing and visualisation. Automated data handling is a prerequisite for combinatorial studies which are multivariate experiments with a large information density per sample. **This programming ability made me a kingmaker in producing a paper which was published in Nature Energy.**

I have attended and/or presented at a number of conferences, including: IoP Thin Films and Surfaces; PVSAT; EMRS; annual CDT showcases; internal group presentations. I take pride in the presentation of my work and enjoy explaining new ideas to people. I am regularly involved in training new starters or undergraduate project students, and help where I can with general maintenance around the department. I initiated, chair, and minute a weekly equipment meeting for our group. This organises the time allocation for the following week, and also helps keep on top of regular machine maintenance. I also spearheaded a push to declutter and reorganise the wet-chemistry lab shared by the group.

Department of Physics, Loughborough University

Research Intern

June - Sept 2014

Funded by a School of Science bursary I worked with Dr Kelly Morrison while she calibrated her equipment for researching the 'spin Seebeck effect'. I gained a working knowledge of ultra-high vacuum systems for thin film preparation, cryostat operation, thermoelectrics, and the programming language LabView which I used to write a simple analysis program. This project was the point at which I decided to enter research full time.

PUBLICATIONS

Understanding the role of selenium in defect passivation for highly efficient selenium-alloyed cadmium telluride solar cells

Fiducia *et al.*, Nature Energy 2019. DOI: 10.1038/s41560

Water based spray pyrolysis of metal-oxide solutions for $\text{Cu}_2\text{ZnSn}(\text{S,Se})_4$ solar cells using low toxicity amine/thiol complexants

Wright *et al.*, Thin Solid Films 2019. DOI: 10.1016/j.tsf.2018.11.040

How do you solve a problem like the V_{oc} -deficit in kesterites?

Wright *et al.*, (in progress).

A brand new Earth-abundant photoabsorber with ideal bandgap

Wright *et al.*, (in progress).

POSITIONS OF RESPONSIBILITY

Loughborough University

Hall Chair, Hazlerigg-Rutland Hall, 2013-14

E&E Vice Chair, LSU Exec Committee, 2012-13

FREEC Chair, Hall Students Federation, 2012-13

FREEC Vice Chair, FREEC Committee, 2012

FREEC Rep Hazlerigg-Rutland Hall, 2011-12

Beauchamps High School

Head Boy (teacher elected)

Senior Prefect (peer elected)

INTERESTS

I enjoy graphic design and have produced a number of pieces such as t-shirts, posters, schematics, courseworks, etc, with vector graphics. A selection of pieces are viewable on my personal website, which I designed and host on a Raspberry Pi from home. I am a regular gym-goer with a keen interest in house/electronic dance music. I have also recently started playing games in Virtual Reality, and am so taken with the new technology I aim to start writing VR apps.

ACHIEVEMENTS

Outreach

Winner, *I'm A Scientist, Get Me Out Of Here!*

Committee member

Hall of the Year 2012-13

Committee of the Year 2011-12

Loughborough Students Union

Over £4000 raised for Hall Rag

Over 60 hours volunteered for Action