

Alasdair Keith

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Personal Statement

I have recently completed my PhD in Biophysical Chemistry from the University of Cambridge. I have worked as a Chemistry intern in both the USA and Germany, with both positions requiring technical proficiency and independent thought. My main interest is in the structural analysis of proteins from biological (esp. pathogenic bacterial and virological) species. I have advanced experience in conventional laboratory-based methods as well as in computational modeling.

EDUCATION

2017-2021, Jesus College, University of Cambridge

PhD Biophysical Chemistry

- *Thesis: Anaerobic, NADH-Dependent Haem Breakdown in a Family of Haemoproteins.*
- This thesis consisted of an investigation into a novel heme breakdown reaction catalyzed by homologues contained in a range pathogenic bacteria, including those responsible for the Bubonic Plague and Dysentery.
- Involved experimental, computational and bioinformatic components.
- Experimental: DNA manipulation, protein expression and purification, and biophysical analysis.
- Computational: Used Wales group code interfaced to AMBER package to model protein-ligand behavior. Wrote my own algorithms to expand functionality.
- Bioinformatics: Supervised a Masters student who used standard databases and techniques such as Uniprot and the Protein Data Bank to place certain proteins within their phylogenetic contexts.
- Two papers currently in preparation, in which I will be first author.
- Side-project on simulation of glucagon-like peptides. Paper currently in preparation, in which I will be joint-first author.
- First year project was on coarse-grained virus capsid (HK97) self-assembly and maturation.

2012-2017, Heriot-Watt University

MChem Chemistry with Nanotechnology

- Modules in Organic, Inorganic, Physical and Materials Chemistry, Physics, Nanoscience and Applied Mathematics.
- Masters project was a DFT-driven computational investigation entitled, *Modelling of Hydrogen Release from Irradiated Ammonia Borane (NH_3BH_3)*. These are a potential hydrogen-based alternative fuel source.
- Awarded the Lord Thomson of Monifieth Scholarship, giving me funding for the first four years of my studies (only one is awarded by Heriot-Watt each year).
- Awarded an Access Bursary for my final year of study at Heriot-Watt.

- Awarded the *University Prize for Outstanding Merit for Chemistry* (x4). These were received for attaining the highest percentage marks in Chemistry in my cohort. I received this in all four of my exam-based years at Heriot-Watt.
- Awarded the *Watt Club Medal* for achieving the highest-graded degree in the Chemistry department upon graduation.

2006-2012, Elgin Academy

- Three Advanced Higher A grades in Chemistry, English and Physics.
- Six Higher A grades in Biology, Chemistry, English, Mathematics, Modern Studies and Physics.
- Nine Standard Grade examination 1 grades.
- Received attainment awards for the best grades of my year for two years running, in both Chemistry and English.

WORK EXPERIENCE

June 2016-August 2016, University of Rochester, NY, USA.

International Summer Research Fellow

- One of five students from across the globe (and the only one from Europe) to be granted an international summer research fellowship position.
- Synthesized functionalized lead sulfide (PbS) quantum dots to complement patterned plasmonic waveguides.
- Practical work was largely synthetic, but I also became acquainted with various optical techniques.

June 2015-September 2015, Max-Planck-Institut für Polymerforschung/ Max Planck Institute for Polymer Research (MPIP), Mainz, Germany

DAAD RISE Intern

- One of 300 students (out of over 2000 applicants) to be granted funding for a Research Internship.
- Worked in the *Physical Chemistry of Polymers* division at the MPIP.
- Research was on the Structural Control of Polymer/Inorganic Hybrid Nanomaterials.
- Became acquainted with sonication, centrifugation, dialysis, SEM, TEM and TG techniques.
- Results published in *RSC Advances* [DOI: 10.1039/C6RA08896A].

July 2012-2016 (Seasonal), ASDA Elgin

Home-shopping Service Crew

- Ensured perishable products were correctly stored and prepared for delivery.
- To meet time constraints, logistical coordination and quick-thinking were required.

Sept. 2011-Sept. 2012, STV Group Plc

Sept. 2010-Sept. 2012, highandleague.net

Journalist

- Wrote match-day reports to tight deadlines.
- Conducted post-match interviews with managers and selected players. Spontaneity and tact were often required, especially when emotions were running high.

INTERESTS

I especially enjoy writing. I have a keen interest in politics and current affairs. I was an office-holder in a student political group, and contributed to various student newspapers whilst a graduate student. I enjoy sport, and used to play football for my school team. I also enjoy playing badminton and am a black belt in Taekwon-do.

OTHER INFORMATION

I would say I am organized, but also creative. I feel this is reflected in the two novels that I wrote as a teenager, of which one is published on Amazon Kindle and as a paperback, <https://www.amazon.co.uk/Man-Who-Fooled-Scotland/dp/1500522368>

Driving License

I have a full category B driving license.

Publications

Schoth, A.; Keith, A.D.; Landfester, K.; Muñoz-Espí, R., *Silanization as a versatile functionalization method for the synthesis of polymer/magnetite hybrid nanoparticles with controlled structure*, **RSC Advances**, 2016, **6**, 53903-53911

Keith, A.D.; Sawyer, E.B.; Choy, D.C.Y.; Cole, J.L.; Xie, Y.; Biggs, G.S.; Klein, O.J.; Brear, P.D.; Wales, D.J.; Barker, P.D., *Novel Anaerobic NADH-Dependent Haem Breakdown Discovered in a Family of Haemoproteins* [In Preparation]

Keith, A.D.; Sawyer, E.B.; Choy, D.C.Y.; Cole, J.L.; Xie, Y.; Biggs, G.S.; Klein, O.J.; Brear, P.D.; Shang, C.; Wales, D.J.; Barker, P.D., *Effect of Selected Mutations on the Novel Anaerobic Haem Breakdown Capabilities of the Yersinia enterocolitica Haemoprotein, HemS* [In Preparation]

Brichtová, E.; Keith, A.D.; Röder, K., *Relative Stabilities of Glucagon-Like Peptide-I Monomers Under a Selection of pH Conditions* [In Preparation]
[Brichtová and Keith co-first authors.]

REFERENCES

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