James David Pickering

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Experienced researcher at the interface of physics and chemistry, with a track record of delivering high-quality results in complex scientific projects. Significant expertise in spectroscopy, laser physics, optical and electronic design, scientific computation, and science communication. Academic looking to transition into an industrial career.

Experience

Lecturer in Physical Chemistry — **Leicester, UK**
School of Chemistry, University of Leicester — *Dec 2021 - Present*

- Programme lead for chemistry undergraduate degree programmes. Delivered teaching in physical chemistry, mathematics, and computer programming to students in Leicester, and partner institution in Dalian, China (over 1000 students in total). Developed multiple new lecture courses and laboratory practicals in these areas.
- Supervised multiple research students at master's and PhD level on projects relating to spectroscopy, scientific computation, and scientific instrument design. Successfully applied for funding and experimental time for a wide range of projects at external facilities, including the Diamond Light Source and SACLA Free Electron Laser.
- Managed multiple university-wide projects, especially around equity, diversity, and inclusivity initiatives. Highlights include a university-wide event for International Women's Day, and leading a team that successfully applied for a £60k grant for a multi-year project to tackle the awarding gap in the physical sciences.

Postdoctoral Researcher — **Aarhus, DK**
Department of Chemistry, Aarhus University — *Oct 2020 - Oct 2021*

- Led multiple research projects based around nonlinear spectroscopy of molecules at interfaces. Designed and built multiple instruments and beamlines for spectroscopy experiments.
- Wrote a comprehensive software package for analysis of SFG spectroscopy data, and several smaller pieces of software for laser beam profiling, spectral simulation, and control of height displacement sensors.
- Edited a collection of tutorial articles based on vibrational sum-frequency generation spectroscopy in the journal *Biointerphases*, and wrote three core articles for this collection (two of which have attracted >20 citations in under a year since publication, one selected for the AIP "Scilight" Award).

Postdoctoral Researcher — **Oxford, UK**
Department of Chemistry, University of Oxford — *Oct 2019 - Oct 2020*

- Designed and built an instrument for femtosecond laser-induced Coulomb explosion imaging mass spectrometry. Undertook all aspects of the process from initial CAD design work to final assembly.
- Designed and built the first multi-user femtosecond laser beamline in the Oxford chemistry department, currently in use by three research groups.
- Effectively managed a laboratory space shared by three groups during the COVID-19 pandemic, where access was severely restricted.

Stipendiary Lecturer — **Oxford, UK**
Department of Chemistry, University of Oxford — *Oct 2019 - Oct 2020*

- Taught all aspects of the physical chemistry, theoretical chemistry, and mathematics for chemistry courses to 50 undergraduate students across multiple colleges within the university.
- Developed a graduate-level course on experimental use of ultrafast lasers and optics, which was subsequently commissioned and published as a book through the Institute of Physics.
- This work was done concurrently with postdoctoral work outlined above.

Education

Aarhus University — **Aarhus, DK**
PhD Chemical Physics, Supervisor: Prof. Henrik Stapelfeldt. — *2015 - 2018*

Jesus College, University of Oxford — **Oxford, UK**
MChem Chemistry (Hons), First Class — *2011 - 2015*

Selected Awards and Qualifications

University of Leicester
Citizens Award (x2) — *2023*

University of Leicester, Chemistry Society
Best Lecturer Award (x2) — *2022, 2023*

Higher Education Academy
Associate Fellowship. *2019 - Present*

Jesus College, University of Oxford
College Prize for Performance in University Examinations *2015*
Ferdinand Prize for Meritorious Work in Chemistry *2015*

Selected Conference Activity & Invited Talks

ACS Spring Meeting **Virtual**
Talk entitled "Fatty acids at seawater surfaces". Session presider. *Apr 2021*

Leicester University Invited Seminar **Leicester, UK**
Seminar entitled "Alignment and Imaging of Molecular Complexes inside Helium Droplets" *Feb 2018*

Spectroscopy and Dynamics Group Meeting **Durham, UK**
Talk entitled 'Coulomb Explosion Imaging of Molecular Dimers inside Helium Droplets'. *Jan 2018*

Selected Secondments & External Experiments

Have been PI and co-I on multiple projects at external laboratories including:
- Ultrafast dynamics of thioketone dissociation (SACLA, Japan, 2023 - PI).
- Ultrafast dynamics of iodomethane explosion (SACLA, Japan, 2019 - co-I).
- X-ray absorption spectroscopy of hydrogenases under electrochemical control (Diamond Light Source, 2022 - assisting).
- Transient absorption spectroscopy of heme enzyme analogues (Surflab Facility, Denmark, 2023 - PI).

Computer Skills

Programming Languages: Python, Fortran, Lua (advanced), Rust, MATLAB, LabVIEW, C++ (competent).

Software Packages: Autodesk Inventor, Solidworks, SIMION, ChemDraw, LaTeX, MS Office

Languages

English: Fluent (Native Language)

Danish: Highly Proficient (B2)

Selected Publications

Books and Book Chapters

Ultrafast Lasers and Optics for Experimentalists **May 2021**
J. D. Pickering. IOP Publishing.

Molecules in Superfluid Helium Nanodroplets: Spectroscopy, Structure, and Dynamics **May 2022**
Book chapter in the above. J. H. Nielsen et al, including J. D. Pickering. Springer.

Journal Papers - *h*-index: 10

14 articles (8 first author), >250 citations.
See Google Scholar (link) for full details. Selected works include:
- **Guest editor:** *Biointerphases* special issue on tutorials in sum-frequency generation spectroscopy.
- **AIP Scilight and featured article:** Tutorials in vibrational sum frequency generation spectroscopy. I. The foundations (J. D. Pickering *et al*, Biointerphases 17, 2022).
- **Editors Pick:** Femtosecond laser induced Coulomb explosion imaging of aligned OCS oligomers inside helium nanodroplets (J. D. Pickering *et al*, J Chem Phys 149, 2018).