Mirabel Brow

MSci Chemistry Graduate

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Summary

Recent Chemistry graduate keen to pursue a career in research. My research interests focus on sustainable solutions, analytical chemistry, and nano-engineered materials, particularly electronic and photonic materials. Although I am confident working independently, I am most fulfilled when working within an interdisciplinary team. By taking on many roles alongside my degree studies, such as Art Society President, I have developed a strong work ethic and ability to adapt my time management under pressure. I enjoy learning new things and solving problems. My experiences span academic research, teaching, and science outreach, reflecting a commitment to both advancing scientific knowledge and engaging diverse audiences. I aspire to lead innovative research with a focus on sustainability and ethical innovation in chemical sciences.

Education

MSci Chemistry - University College London (UCL) 2017 – 2023

- Advanced Chemical Research Project: *Evaluating the validity of using caffeine as an indicator of wastewater contamination in surface waters.*
- Chemical Literature Project: *Could conductive MOFs be the key to viable Zn-air batteries?*
- Optional modules: Tech Journalism, Materials Chemistry, Scientific Programming.
- Year 4 Topics in Modern Chemistry 'mini' modules: 'Surface science', 'Atmospheric chemistry', 'Advanced solid-state chemistry', 'Green chemistry, renewable energy landscape and nano', 'Colloids and microplastics in the environment', 'CO_2 capture, sequestration and utilisation', 'Scientific computing and data analysis', 'Preparation and characterisation of heterogeneous catalysts', and 'Chemical crystallography'.

Wimbledon High School 2010 - 2017

A Levels: Chemistry (A), Physics (A), Mathematics (A), Latin (A)
GCSEs: 10 A*s, 1 A; including Mathematics (A*), English (A), (FSMQ) Additional Mathematics (PASS)

Research experience

Research Intern *(Institute for Materials Discovery, UCL)* 07/2023 – 09/2023

- Shadowed a PhD student to learn about their research into perovskite caesium lead halide quantum dots.
- Reviewed current literature to learn about strengths, weaknesses, and applications.
- Devise my own research investigation looking at ligand exchange to tune band gap.
- Synthesised samples with varying ratios of halide composition and collected data on UV-Vis, photoluminescence, and X-ray Photoelectron Spectroscopy (XPS).
- To collect XPS data, contacted HarwellXPS to arrange a site visit and novel data collection for both my own samples and for the PhD student.
- Balanced research time with laboratory maintenance demands; kept chemical inventory records, coordinated waste management, and aided the move of equipment to new premises at UCL East.
- Created instructional content on lab etiquette and safety for researchers.

Advanced Chemical Research Project *(Supervisor: Dr Hilborne, UCL)* 01/2023 – 09/2023

- Investigated caffeine as an indicator for wastewater contamination in surface waters.
- Conducted literature review on water quality evaluation, indicators of waste, and environmental policy.
- Developed a method for solid phase extraction based on reported methods in literature but simplified to reflect the equipment available to me. Compared two different solid phase extraction tubes for analysis.
- Worked with Dr Karu to develop a LCMS protocol which suited my target analyte.
- Refined methodology to minimise lab contamination of environmental samples, e.g. moving from burettes to dispense samples to sterile plastic syringes.
- Examined environmental samples via LCMS and MSMS to confirm analyte identity.
- Designed a Python-based program to automate the contaminant identification process, enabling efficient and reproducible data analysis.
- Authored a 35-page dissertation, a two-page research highlight in the style of a communications paper, gave a 15-minute presentation summarising my project and was examined via 30-minute viva.

Tech Journalism Module *(Module Leader: Dr Bains, UCL)* 01/2021 – 06/2021

- Wrote a technical analysis on future battery technologies and scientific articles on perovskite inspired materials, MOFs for water harvesting and basic cosmetic chemistry.
- Background research included reviewing literature, interviewing academics and conference attendance.

Chemical Literature Project *(Module Leader: Dr Potts, UCL)* 09/2020 – 03/2021

- Produced a 3000-word literature review titled 'Could conductive MOFs be the key to viable Zn-air batteries?' which scored 81%. This examined bifunctional catalysts for oxygen evolution and reduction.
- Gave a 5-minute presentation summarising the area and paper findings, for which I achieved 86%.

UCL Air Poll Project, Chemical Skills Module *(Module Leader: Dr Potts, UCL)* 09/2017 – 12/2017

- Taught children at Gillespie Primary school about air pollution for an outreach program managed by UCL.
- Developed hypothesis with children to target local sites suspected to have poor air quality.
- Analysed NO_2 levels accumulated over 30 days with diffusion tubes to research local air pollution.
- Dissolved NO_2 from tubes and determined concentration via spectrophotometer.
- Presented results and methodology to the children in a second visit.

Educational Research and Teaching experience

Private Tutor *(Self-employed, London)* 09/2013 – 01/2023

- Taught beginners Latin, GCSE Science and A-Level Chemistry, Maths and Physics; using both multi-sensory and distance learning techniques, students improved by an average of 2 GCSE grades.

Teaching Assistant *(Chemistry Department, UCL)* 06/2021 – 10/2021

- Interviewed students and collated feedback to develop a new module for postgraduate taught students.
- Created teaching resources, including digital lessons on scientific writing and laboratory skill refreshers.

Connected Learning Intern *(Anthropology Department, UCL)* 11/2020 – 02/2021

- Re-hired beyond my initial contract dates to continue assisting the transition to online teaching.

Connected Learning Intern *(Anthropology Department, UCL)* 06/2020 – 10/2020

- Assisted staff transitioning to online teaching, delivered training on video editing, recording and online meeting scheduling. Updated online library reading lists and requests for e-books.
- Ensured that all online teaching resources were clear and met accessibility requirements.

Summer Intern *(Chemistry Department, UCL)* 06/2018 – 08/2018

- Researched student retention and any common pitfalls of adapting to first year university teaching.
- Conducted a literature review and drafted research questions with my supervisor.
- Created an introductory Moodle page aiming to bridge the gap between secondary and tertiary education; created revision videos and quizzes, a department virtual tour and provided lab safety informational videos.

Other experience

Medical Paralegal *(Self-employed, London)* 12/2023 - Present

- Researching literature to support medicolegal reports, reorganising medical evidence bundles and summarising medical history timelines.

President of UCL Art Society *(Students' Union, UCL)* 07/2020 – 06/2022

- Coordinated a team of 18 students to deliver between 2 and 7 events per week during term time.
- Responsible for wellbeing of both committee members and society members. Received safeguarding training and risk assessed all activities.
- Managed detailed attendance records, budgets, and collating of feedback.
- Represented UCL Art Society, speaking publicly, introducing presenters, and coordinating with contractors.

Science Outreach Digital Producer *(Bloomsbury Festival, London)* 08/2020 – 10/2020

- Produced a digital outreach programme, which included advising on content and format, ensuring material was delivered on time and that the material was accessible to the target audience.
- Liaised between a variety of people to deliver diverse content to a wide audience. Involved collaborating with academics, students, producers, non-profit organisations, medics, and industry professionals.

Publications

Self-published articles

'Next Generation Batteries for High Energy Density Power Storage in EV (Electric Vehicle) and Grid Stabilisation Applications' (https://reflect.ucl.ac.uk/mirabelbrow/2021/08/16/technical-analysis/)

'Understanding intervalence charge transfer for better solar cell materials' (https://reflect.ucl.ac.uk/mirabelbrow/2021/08/16/understanding-intervalence-charge-transfer-for-better-solar-cell-materials/)

'Omar Yaghi Wins 2020 Sustainable Water Prize from Royal Society of Chemistry' (https://reflect.ucl.ac.uk/mirabelbrow/2021/08/16/waterprize/)

'Discovering Cosmetic Science' (https://reflect.ucl.ac.uk/mirabelbrow/2021/08/16/discoveringcosmeticscience/)

'Could conductive MOFs be the key to viable Zn-air batteries?', (https://www.linkedin.com/in/mirabel-brow/overlay/education/498803780/multiple-media-viewer/?)

'The Redemption of Vanity', (https://reflect.ucl.ac.uk/mirabelbrow/2023/03/09/the-redemption-of-vanity/)

Conference presentations crediting my contribution

Potts, SE; Brow, MA, "Welcoming New Undergraduates to UCL Chemistry: A Moodle-Based Welcome Page", COP – Widening Participation Lunch & Learn Meeting, 20/05/2020, https://discovery.ucl.ac.uk/id/eprint/10114880/

Potts, SE; Brow, MA, "How can we Ease the Transition from Further to Higher Education?", New Collaborative Initiatives in Education Research in the Physical Sciences, 20/09/2019, https://discovery.ucl.ac.uk/id/eprint/10114881/

Potts, SE; Brow, MA, "Welcome! Using Moodle to Ease New Chemistry Students' Transition to Higher Education", Variety in Chemistry Education / Physics Higher Education Conference (VICEPHEC) 2019, 22/08/2019 – 23/08/2019, https://discovery.ucl.ac.uk/id/eprint/10114884/

Potts, SE; Brow, MA, "Easing the Transition from Further to Higher Education: Use of Moodle to Welcome New Chemistry Students", UCL Education Conference 2019, 01/04/2019, https://discovery.ucl.ac.uk/id/eprint/10114882/

Further training

Python for Data Science 07/2021
Sololearn Certificate #: CT-ZLN0QFNH
Photonic Devices (Advanced) CPD Training at EEE Department, UCL 01/2025 - 03/2025
40 hours teaching over 10 weeks with an exam, result TBC. Worth 15 credits at FHEQ level 7.

Professional affiliations

Institute of Physics (Member) 2024 – Present

Institute of Materials, Minerals and Mining (Student Member) 2024 – Present

International Federation of Societies of Cosmetic Chemists (Student Member) 2021 - Present

Society of Cosmetic Scientists (Student Member) 2021 - Present

Society of Dyers and Colourists (Member) 2021 - Present

Society of Chemical Industry (Student Member) 2021 - Present

Royal Society of Chemistry (Associate member) 2020 - Present

Conference Attendance

RSC Chemical Nanoscience and Nanotechnology (CNN) Interest Group Annual Symposium by RSC	01/2025
International Solar Fuels Conference by RSC	07/2021
15th International conference on materials chemistry (MC15) by RSC	07/2021
Global Challenges in Inorganic Chemistry by OxICFM CDT	06/2021
MOFs for energy and environmental applications Faraday Discussion by RSC	06/2021
Plastics, From Cradle to Grave – and Resurrection II by SCI	06/2021
RSC Materials Chemistry Division poster symposium by RSC	01/2021
Global Chemicals Management Towards 2030 and Beyond by Chemical Watch	01/2021

Honours and Awards

Anisha Dixit Prize for Physics 2017
"Awarded for excellence in Physics and in problem-solving in particular, to a student continuing their studies post A-level."

Corpus Christi Cambridge STEM Summer School Place 2016
Awarded a place on the weeklong summer school for aspiring women in STEM by answering all 20 of the Isaac Physics challenge questions correctly.

Gold Level 3 Industrial Cadet 2016
Awarded for my work in my EES (Engineering Education Scheme) project by EDT.

Gold Crest Award 2016
Awarded for my work in my EES (Engineering Education Scheme) project by the British Science Association.

Dora Richardson Science Scholarship 2016
Worth 10% of school fees at Wimbledon High School for year 12 and 13. Awarded to students who demonstrate both passion and excellent ability in the sciences.

Academic Achievement Award 2016
Awarded to students who achieved 10 or more A*s at GCSE.

Skills

Scientific computing	Software including Jupyter, PyMol, Crystal Maker, Origin, Data Warrior, WebMO, Agilent MassHunter Workstation, Agilent MassHunter Quantitative Analysis.
Programming	Proficient in Python and have some experience with Arduino C++.
Editing Software	Software including Adobe Premiere Rush, Audacity, Adobe Photoshop, Adobe Illustrator.
Events	Confident publishing, hosting, and public speaking. Can also edit HTML and CSS for websites.
Languages	A-Level Latin, GCSE Ancient Greek, and basic French.