





Luke Benjamin Ellis MChem


Multidisciplinary Scientist and Programmer: Bridging the Gap Between Chemistry, Environmental Science, and Digital Innovation


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Summary

As an innovative professional with a solid foundation in science, chemistry, and programming, I've refined my expertise in analytical techniques, environmental analysis, quality assurance, R&D and software development, striving for excellence in all projects. My career in science is driven by a commitment to public health and safety, highlighted by my significant role in water quality assurance and broad experience in environmental services. Additionally, my enthusiasm for technology and programming has cultivated a unique skill set that merges traditional scientific methods with digital advancements. This combination not only boosts my analytical skills but also empowers me to embrace innovative solutions for complex challenges. Embracing continuous learning and interdisciplinary growth, I'm deeply committed to advancing my professional skills across multiple fields. For an in-depth view of my diverse expertise and contributions to science and technology, visit [lukeellis.me](#).

Experience

South West Water Analytical Chemist https://www.southwestwater.co.uk/ <ul style="list-style-type: none">Played a crucial role during the COVID-19 pandemic, maintaining public health and safety through rigorous water quality assurance, highlighting the essential nature of our work in delivering safe drinking water.Conducted comprehensive analysis of the metal content in the water supply using an Agilent ICP-MS, which involved precise operation, maintenance, and meticulous sample preparation to accurately reflect true metal concentrations.Contributed to efforts to adapt workflow and implement innovative solutions to maintain uninterrupted analysis amidst evolving health guidelines, demonstrating a commitment to continuous learning and adaptation.Conducted training programmes to enhance the technical skills of the department's personnel, improving efficiency and helping to foster a culture of excellence and shared commitment to our mission.Managed the capture of analytical results into our Laboratory Information Management System (LIMS), ensuring data integrity and accessibility for review and reporting, which was pivotal in running proficiency schemes and affirming our laboratory's commitment to excellence and reliability in public service.	October 2020 - September 2021 Exeter, UK
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Environment Agency - NLS Assistant Scientist https://nationallaboratoryservices.com/ <ul style="list-style-type: none">Contributed to enhancing analytical expertise in environmental analysis, contributing significantly to the delivery of high-quality environmental services through a dynamic role involving rotation across all departments.Supported the comprehensive analysis of samples, ensuring adherence to the Environment Agency's stringent requirements and diverse client needs, focused on efficiency and UKAS accredited standards.Played a key role in quality control and the analysis of formal samples for legal prosecutions, reinforcing the agency's commitment to enforcing environmental laws and maintaining high Health & Safety standards.Gained specialised experience in the Organic Chemistry department, analysing volatile organic compounds using headspace GC-MS, and collaborated on an educational video project on 'Asbestos Identification by Polarised Light Microscopy' for NLS conferences.Developed vital communication and problem-solving skills through interdisciplinary collaboration, significantly enhancing professional capabilities and contributing to the agency's mission.	2015- 2018 Leeds, UK
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GSL Media LTD Senior PHP Developer https://www.gslmedia.co.uk/	August 2023- March 2024 Plymouth UK
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Nexus Agencies Ltd Full Stack Developer https://pearlgallery.co.uk	2018- 2023 Remote
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Education University of Bradford Masters in Chemistry	September 2014 - 2015 MChem
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For my masters year, I specialised in a research project in Supramolecular Chemistry on Co-crystals, in addition to undertaking modules in Advanced Organic Chemistry, Biological Organic Chemistry, Physical Chemistry, Nano-Chemistry and Complex Chemistry.

University of Bradford Chemistry	2010-2013 BSc (Hons)
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In my BSc Chemistry studies, I explored a vast array of chemical disciplines, forming a robust foundation for advanced specialisation. My journey covered Organic Chemistry, with an emphasis on synthesis and mechanisms; Inorganic Chemistry, studying compound properties and reactions; Physical Chemistry, understanding chemical process principles; and Analytical Chemistry, focusing on substance identification and quantification. Electives in Environmental and Medicinal Chemistry expanded my perspective on chemistry's application in ecological and health contexts.

Projects ICPMS-DiluteCalc	2024
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ICPMS-DiluteCalc is a web app i created using Vue.js, for calculating dilutions for ICP-MS analysis. It simplifies sample preparation with user-friendly inputs for concentration and volume, supporting various units. Ideal for chemists and lab technicians seeking precision.

<https://github.com/lukebellis/ICPMS-DiluteCalc>

Features

- Dilution Factor Calculation:** Automatically calculates the dilution factor needed to bring a sample's concentration within the detection limit of the ICP-MS instrument.
- Volume Calculation:** Determines the exact volumes of sample and solvent required to achieve the desired dilution, optimising accuracy and efficiency in sample preparation.
- Unit Conversion:** Supports various concentration units (µg/L, mg/L, ng/L), allowing for flexible input according to user preference.

QuantumVue QuantumVue is a web application that transforms the way we visualise and comprehend atomic orbitals within quantum mechanics. Built on Vue.js, it offers an engaging, user-friendly platform for exploring the intricate shapes and orientations of atomic orbitals across diverse energy levels, making complex quantum concepts accessible and interactive https://github.com/lukebellis/quantumvue Embracing the latest in web technology, QuantumVue stands out as an innovative solution for demystifying the complexities of quantum mechanics through visualisation. By leveraging Vue.js, it provides an intuitive and interactive experience, enabling users to easily explore and understand the fundamental aspects of atomic orbitals. QuantumVue serves as a valuable educational tool, bridging the gap between abstract quantum theories and visual comprehension. Vue.js, Quantum Mechanics, Web Application, Atomic Orbitals, Visualisation, Educational Tool, Complex Concepts, Intuitive Experience	2023
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Asbestos Identification by Polarised Light Microscopy Environment Agency https://vimeo.com/229981785 In this informative video, I delved into the intricate process of 'Asbestos Identification using Polarised Light Microscopy', a critical methodology in the field of environmental science. Collaborating closely with the head of the asbestos department, I captured the nuanced steps of their identification process through detailed photography and documentation. My involvement spanned the production, editing, and voicing of the video, ensuring a clear and comprehensive guide that remains a valued resource at NLS conferences today. This video not only educates on the precise technique of asbestos identification but also highlights the importance of meticulous scientific analysis in safeguarding public health. Asbestos Identification, Polarised Light Microscopy, Environmental Science, Collaboration, Photography, Documentation, Video Production, Video Editing, Public Health, Scientific Analysis	March 2018
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MolVR - Royal Society of Chemistry Research Grant The MolVR project, backed by the Royal Society of Chemistry during my placement year, significantly enhanced my Python skills and familiarity with PyOpenGL and RDKit. This initiative revolutionised molecular visualisation via virtual reality, allowing for immersive interactions with 3D molecular structures, thereby making scientific concepts more accessible. It not only expanded my technical expertise but also affirmed my commitment to blending technology with science to improve educational resources, emphasising innovation and self-reliance. https://github.com/lukebellis/Molvr Features: <ul style="list-style-type: none">3D Visualisation: Render molecular structures in 3D from '.mol' files.VR Support: Experience molecular models in virtual reality for an immersive learning and research tool.Cross-Platform: Built with Python, making it relatively easy to run on various operating systems.Extensible: Open source and designed for easy extension and customisation. 3D Visualisation, VR Support, Molecular Structures, Virtual Reality, Cross-Platform Compatibility, Python Programming, Open Source, Immersive Learning, Research Tool, Extensibility	2015
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Co-Crystals and 18-Crown-6 Masters Research Project Introduction to the Project My engagement in research and development prominently featured an ambitious project on Co-Crystals and 18-Crown-6 during my postgraduate studies. Venturing into the domain of Supramolecular Chemistry , the project aimed at unraveling and manipulating the intermolecular forces that drive the formation and define the properties of co-crystals. The investigation into 18-crown-6, celebrated for its ion-complexing efficacy, illuminated the facets of host-guest chemistry, revealing its potential in molecular recognition and sensor technology development. Methodologies and Techniques Navigating the complexities of supramolecular structures required a diverse array of analytical and synthetic methods to disclose the structural subtleties and interaction dynamics between co-crystals and 18-crown-6. X-ray Crystallography provided insights into molecular geometry, NMR Spectroscopy offered detailed perspectives on chemical environments and atomic-level interactions, and Mass Spectrometry aided in identifying molecular fragments and verifying molecular compositions. This multifaceted approach enabled a thorough investigation into the composition and structure of co-crystals. Engineering Co-Crystals for Advanced Applications This project delved deeply into the science of co-crystal engineering, exploring avenues for tailoring these structures for superior performance across various applications, including drug delivery systems and materials science innovations. It underscored the synergy between theoretical principles and hands-on experimentation, emphasizing chemistry's pivotal role in the advent of new materials and technologies.	September 2014- July 2015
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The Multidisciplinary Approach The research highlighted the necessity of a multidisciplinary strategy, integrating knowledge from Physical Chemistry for thermodynamics, Organic Chemistry for synthesis, and Analytical Chemistry for in-depth characterisation. This comprehensive approach not only honed my analytical skills but also cultivated my capacity for creative problem-solving and complex scientific inquiry.	
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Conclusion and Impact The conclusion of this research project has reinforced my ability to conduct exhaustive scientific investigations, from hypothesis generation to experimental execution and analysis. The outcomes signify the potential of supramolecular chemistry to foster novel solutions in pharmaceuticals, materials engineering, and beyond, signifying the essential role of advanced research in propelling scientific and technological progress. Through this project, my dedication to employing chemistry for societal benefit has been further affirmed, driven by an unwavering zeal for discovery and knowledge advancement.	
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Certifications DipHex Chemical Safety DipHex https://www.diphex.com/ Completed the "DipHex Chemical Safety" course, a comprehensive training program focused on chemical decontamination and emergency first aid. This course equipped me with essential skills and knowledge in handling hazardous materials safely, responding effectively to chemical spills, and executing decontamination procedures. It also provided in-depth training in emergency first aid, preparing me to offer immediate assistance in case of chemical-related injuries. This experience has not only heightened my awareness of chemical safety protocols but also enhanced my capability to maintain a secure working environment in my scientific endeavors.	2017	ISO-17025 Awareness Training United Kingdom Accreditation Service https://www.ukas.com/training-and-advisory/training/courses/iso-iec-17025-awareness/ I completed the "ISO-17025 Awareness Training" course offered by UKAS, which deepened my understanding of the international standard for the competence of testing and calibration laboratories. This training equipped me with the knowledge to implement and maintain quality management systems, ensuring the reliability and accuracy of laboratory results. It emphasised the importance of continual improvement, technical competence, and a systematic approach to laboratory processes. This course has significantly contributed to my ability to uphold and enhance the quality of scientific research, aligning my work with global standards for excellence in laboratory practices.	2016
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Skills Analytical Techniques Having extensive training and experience in analytical chemistry, I excel in a wide array of techniques, including ICP-MS, Headspace GC-MS, ICP-OES, Mass Spectrometry, IR Spectroscopy, NMR Spectroscopy, Gas Chromatography, High-Performance Liquid Chromatography, Electrophoresis, UV-Visible Spectrophotometry, X-ray Crystallography, and Thermal Analysis. This diverse expertise, nurtured through both academic rigor and practical application, allows me to address intricate analytical challenges, ensuring scientific advancements and adherence to safety standards in various sectors. ● ● ● ● ● analytical chemistry, ICP-MS, Headspace GC-MS, ICP-OES, sample preparation, mass spectrometry, infrared spectroscopy, NMR spectroscopy, chromatographic techniques, gas chromatography, high-performance liquid chromatography, electrophoresis, UV-visible spectrophotometry, X-ray crystallography, thermal analysis, differential scanning calorimetry, thermogravimetric analysis, materials characterisation, health and safety standards, pharmaceuticals, materials science, environmental studies, theoretical knowledge, practical expertise, continuous learning, innovation.	Research and Development My postgraduate R&D project on co-crystals and 18-crown-6 sharpened my skills in advanced analytical techniques like X-ray crystallography, NMR spectroscopy, and mass spectrometry, essential for material characterization and co-crystal engineering. This experience enhanced my interdisciplinary approach, blending physical, organic, and analytical chemistry to navigate supramolecular chemistry's complexities. It honed my problem-solving and innovative thinking, preparing me for challenges in pharmaceutical and materials science research. This project was a pivotal step in my development, reinforcing my proficiency in research and dedication to scientific innovation. ● ● ● ● ● Co-crystals, 18-crown-6, Supramolecular Chemistry, Host-Guest Chemistry, Molecular Recognition, Analytical Techniques, Synthetic Chemistry, X-ray Crystallography, NMR Spectroscopy, Mass Spectrometry, Material Development, Cross-Disciplinary Research
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Laboratory Practices My expertise encompasses a broad understanding of critical elements such as laboratory safety, strict protocol adherence, and stringent quality control measures. I am deeply committed to ensuring a safe working environment by rigorously adhering to Good Laboratory Practice (GLP) standards, which serve as the cornerstone of my professional conduct. My meticulous approach to reagent preparation and handling is testament to my dedication to precision and reliability, aiming to eliminate any variables that could compromise the integrity of experimental results. This foundational skill set is vital in maintaining the highest standards of accuracy and reliability across all experimental outcomes, essentially serving as the backbone of scientific research integrity. Through consistent application of these practices, I contribute to fostering an environment where quality assurance is not just a regulatory requirement but a fundamental principle that guides every step of the experimental process. My dedication to upholding these standards ensures that every research endeavour I undertake or oversee is built on a solid foundation of trustworthiness and excellence, reinforcing the overarching goal of advancing scientific knowledge through reliable, reproducible research. ● ● ● ● ● Laboratory Safety, Good Laboratory Practice (GLP), Reagent Preparation, Quality Control, Protocol Adherence, Experimental Accuracy, Scientific Research Standards, Safe Working Environment	Specialisation in Metals Analysis of Drinking Water My journey into the specialised field of metals analysis in potable water commenced during my tenure at the Environment Agency, where I first encountered the intricate techniques of Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) in my role as an Assistant Scientist. It was here that the foundational stones of my expertise were laid, offering me a comprehensive introduction to the pivotal methods used in tracing and analysing metal contaminants. My skills were significantly developed and expanded upon at South West Water, where my focus shifted primarily to the analysis of drinking water, diverging from the broader environmental scope that encompassed soils and sediments. Within this new setting, my role necessitated the meticulous application of ICP-MS techniques for the precise detection and quantification of metals in drinking water; a task critical to ensuring the water's compliance with rigorous health and safety standards. This complex work was not just about maintaining regulatory standards but was central to guaranteeing the safety and quality of potable water for communities, highlighting the vital role of accurate scientific analysis in addressing and surmounting environmental health challenges. At South West Water, my responsibilities also extended to developing and refining methodologies that could enhance the sensitivity and accuracy of metal detection in drinking water, thereby improving the reliability of our analytical results. The analysis required not only a deep technical understanding of the instruments and techniques involved but also a creative approach to problem-solving. Through this work, I contributed to setting new benchmarks in water quality analysis, reaffirming my commitment to leveraging scientific innovation to safeguard public health and the environment. My journey in this specialised field underscores a steadfast dedication to applying rigorous scientific methodologies to address some of the most pressing environmental health challenges of our time. ● ● ● ● ● metals analysis, drinking water, ICP-MS, ICP-OES, potable water quality, health standards, water safety, environmental health, scientific methodology, South West Water, Environment Agency, public health.
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LIMS Expertise Throughout my career, I have gained a lot of experience in utilising Laboratory Information Management Systems (LIMS) to significantly enhance laboratory operations. My proficiency in LIMS extends to optimizing data documentation, enabling comprehensive analytical reviews, and ensuring precise reporting. This skill set has been instrumental in boosting laboratory efficiency, reducing the potential for human error, and facilitating seamless communication between different research and analytical teams. By implementing LIMS, I have been able to streamline workflows, automate routine tasks, and manage vast datasets with ease, thus improving overall lab productivity. My approach to LIMS not only encompasses its application in day-to-day laboratory functions but also involves customising and upgrading systems to meet the specific needs of various projects, ensuring that data integrity and accessibility are maintained at the highest standards. ● ● ● ● ● LIMS, data documentation, data analysis, reporting, laboratory efficiency, analytical review, precise reporting, workflow streamlining, automation, data management, system customisation, project-specific needs, technology in science, research support, decision-making.	Environmental Conservation and Advocacy My engagement in Environmental Conservation and Advocacy showcases a dedication to preserving our planet and advocating for sustainable practices. My involvement ranges from conducting research on the environmental impact of pesticides, notably through a publication on the critical role of bees in global pollination and the threats posed by neonicotinoid pesticides, to actively participating in conservation initiatives, such as volunteering with "Friends of the Arboretum." These efforts contribute to safeguarding biodiversity, advocating for essential policy changes, and supporting a science-led approach to environmental protection. My work aims to support farmers, protect wildlife, and reverse the decline of essential pollinators like bees. By highlighting these issues in my writing and through direct action, I strive to inspire meaningful change and promote a more sustainable, eco-conscious future. ● ● ● ● ● Pesticide Impact Research, Environmental Conservation, Sustainability Advocacy, Biodiversity Protection, Policy Advocacy, Sustainable Practices, Wildlife Protection, Pollinator Health, Community Engagement, Science-Led Environmental Protection
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Instrument Maintenance & Troubleshooting Proficient in maintaining and troubleshooting advanced analytical instruments, particularly Agilent 7000 series ICP-MS, ensuring operational reliability. ● ● ● ● ● instrument maintenance, troubleshooting, Agilent 7000 series, operational reliability	Science Communication and Public Engagement Served as a STEM Ambassador, engaging schools and the public in science education through workshops, demonstrations, and interactive events. ● ● ● ● ● STEM Ambassador, Science Education, School Engagement, Public Outreach, Workshops, Demonstrations, Interactive Events
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Theoretical Knowledge ● ● ● ● ● Quantum Mechanics, Molecular Modeling, Reaction Simulations, Physical Chemistry, Supramolecular Chemistry, Organic Chemistry, Inorganic Chemistry, Biochemistry, Nuclear Chemistry	Grant Writing Success Successfully navigated the grant application process, securing funding from prestigious bodies like the Royal Society of Chemistry for pivotal projects ● ● ● ● ●
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Volunteering Friends of the Arboretum Volunteer https://www.newtonwonder.net/friends-of-the-arboretum.html My volunteer work with "Friends of the Arboretum" reflects my commitment to community engagement and environmental conservation. I devoted my time and effort to preserving our local wildlife sanctuary, the Arboretum, a treasured green space nestled within the grounds of a 17th-century estate and manor house gifted to our community over 150 years ago. This experience was not just about maintaining a sanctuary for plants and animals; it was a collective effort to uphold a legacy, ensuring this natural haven continues to thrive for future generations. Working alongside fellow community members to protect and cherish the Arboretum was immensely rewarding, offering a profound sense of connection to both our local heritage and the environment.	September 2021- Present Newton St Cyres, Exeter, UK
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STEMNET Ambassador https://www.stem.org.uk/stem-ambassadors As a STEM Ambassador with STEMNET, I actively participated in engaging schools and the public in STEM education and careers. Through various activities, workshops, and events, I played a vital role in inspiring the next generation of scientists, technologists, engineers, and mathematicians, demonstrating the exciting possibilities within these fields.	August 2014 to September 2015 Bradford, UK
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Bradford Science Festival Volunteer https://www.scienceandmediamuseum.org.uk/whats-on/bradford-science-festival During the Bradford Science Festivals, I volunteered to support the School of Life Sciences at the University. My responsibilities included assisting with logistical arrangements and managing the Chemistry department's spectroscopy demonstration. This role allowed me to contribute directly to promoting science to the public, highlighting the fascinating world of scientific discovery.	October 2013 to December 2014 Bradford, UK
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Interests Scientific Analysis Chemistry Education Open Source Technology	Environmental Conservation Science Communication Cross-Platform Development	Analytical Techniques STEM Outreach Motorcycles	Public Health Programming Travelling	Chemical Synthesis Web Development
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Awards Local Recognition Award Chris Mann, Particle Size Team Leader <i>"Luke is really growing in his role and showing us skills that are at a premium and an enthusiasm that should see him have a great future with us. Last week he met with our Executive Director Toby Willison and spent around 15 minutes showing him some of the tests that we do. Toby was very impressed with Luke, which left me feeling very proud to have him as part of our team."</i>	June 2017
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Publications The Critical Role of Bees in Global Crop Pollination and the Threat of Neonicotinoid Pesticides Linkedin https://www.linkedin.com/pulse/neonicotinoids-bees-luke-benjamin-ellis/ In this publication, I explore the vital role of bees in pollinating a significant portion of the world's crops and the existential threat posed by neonicotinoid pesticides, particularly imidacloprid. Drawing on various studies, I detail how these pesticides impair bees' cognitive functions and contribute to their decline. The paper advocates for the extension and permanence of the neonicotinoid ban in Europe, supported by a personal advocacy case study involving communication with MP Rachel Reeves. This work emphasises the need for a science-led approach to pesticide use, the exploration of safe alternatives, and the collective responsibility to protect bee populations for environmental sustainability and food security.	April 2018
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Programming Languages HTML ● ● ● ● ● Node.js ● ● ● ● ●	Javascript ● ● ● ● ● Nuxt.js ● ● ● ● ●	Tailwind CSS ● ● ● ● ● PHP ● ● ● ● ●	Python ● ● ● ● ●	React.js ● ● ● ● ●
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