Amy J. V. Riches

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QUALIFICATIONS AND TRAINING

From - To	Qualification	Awarding Body
2024-now	MOOCs undertaken for continuing professional development e.g: • Career Management • Leading Diverse Teams • Managing & Dealing with Difficult People (Behavioural Intelligence) • Making Blended Education Work • How to Create an Online Course • Research Data Management and Sharing	University provisions, UK
2024-now	Three × MOOCs concerning Leadership Development.	LEAD2 co-funded by the European Commission, UK.
2016	Two-part course: Supervising (Science) Ph.D Students	Durham University, UK.
2004-2009	Ph.D (Isotope and Elemental Geochemistry / Petrology)	The Open University, UK.
2006-2007	Level 1 and 2 Basketball Coach Certification, equiv. SCQF L5 & 6	Basketball England, UK. (Hobby)
2005	Certificate, Project Management (with R&D Management Centre)	Cranfield University, UK.
2000-2004	MSci (Hons), *first class.* Geological Sciences	Durham University, UK.

Plus, I've benefited from further professional development courses such as for student education, lab. / field safety, Equality and Diversity, unconscious bias training, hiring committee protocols, and applicant training with employers and funders.

EMPLOYMENT

†From - To	Job Title / Affiliation	Employer
2019-now	Senior Consultant / Professor → *E.g., with SETI Institute, UK Space Agency, Scot/UK/int'l sci. diplomacy, Chaired International Conference, EuroPlanet Team, and other contracts.*	Various contracts, UK. [No lab access, not strictly research active.]
2022	Consulting Professor (NERC-funded E-DIAL project) → *Studying the people of science and their career experiences.*	Open University, UK. [EDI-directed work.]
2018	Planetary and Earth Scientist, technical support.	University of Glasgow, UK. [Support. Not personal research.]
2015-2017	Planetary Scientist → *Won personal Marie Sklodowska-Curie Individual Fellowship*	Arthur Holmes Laboratories Durham University, UK.
2014-2015	Project Manager (construction)	Eco-improving Homes, Canada.
2014	Lecturer	University of Alberta, Canada.
2011-2013	Scientific Research Fellow, mainly Earth Science → *E.g. Helped realise largest laboratories of their kind in the world (flagship, over $22M) alongside new rocky research collections.* → *With Canada Excellence in Research Chair, Professor D. Graham Pearson FRS, FRSC*	Arctic Resources Geochem. Lab. & Canadian Centre for Isotopic Microanalysis, U of Alberta, Canada.
2009-2011	Planetary Scientist → *With University Distinguished Professor Lawrence A. Taylor*	Planetary Geosciences Institute, University of Tennessee, USA.
1994-2004	Supervisor trusted with charge of the whole site at weekends. Shop Supervisor (overseeing other staff), and paper rounds Childminder. Three part-time jobs that were held simultaneously.	Foundry Nurseries/Plant Centre, Norfolk. Alldays Convenience Store, Norfolk, UK. With various families, Norfolk.

Experienced vision-setting leader, manager, educator, and scientific researcher. Plus, I hold a clean UK driving license.

† Under many international employment laws I have a disability, and am entitled to protections. Such as under the 2010 UK Equality Act and Equality Duty of relevant public bodies ± Disability Confident commitments. Counselling has greatly helped.

Career breaks were: 2017-2019, roughly 22 months total impacted by illness + to focus on treatment, immediately followed by about 4 months for jury duty service during 2019 where zero other work was allowed; 2023, 9 months medical leave for treatment of a medical reoccurrence now recovered from.

CHOSEN MARKS OF ESTEEM

From – To	
To date	Over 55 invited talks, including Keynote, delivered in a wide range of international forums.
2020-now	Affiliate Scientist, SETI (Search for Extraterrestrial Intelligence) Institute, Carl Sagan Center, USA.
To date	In eligible academic roles, over £1M of competitive funding on the global stage and other monies raised from prestigious schemes; marking the international competitiveness of my work and ideas.
2023	Invited Participant, President's Special Reception of the European Association of Geochemistry.
2022	Royal Society Pairing Scheme. Top 10% of cross-discipline applicants. Week of Westminster training. ► Just half of the successful 60 attendees are paired. I secured pairing, an extended and intensive one-on-one discussion with a Senior Politician.
2020	Profiled as a National Geographic Society Explorer. https://tinyurl.com/5bbpkt47
2019	Invited career profile. American Astronomical Society's Committee on the Status of Women in Astronomy. https://tinyurl.com/4fhbkszk Demonstrating the cross-discipline appeal of my research.
04/2016	Elected, Europe's Marie Sklodowska-Curie Fellow of the week, recognising the import of my contributions.
2015-2017	Awarded prestigious personal Marie Sklodowska-Curie Fellowship, European Commission. ► Top 15% of all international applicants. *"Awarded to the best, most promising individual [experienced] researchers from anywhere in the world."*
2013-2015	Award of prestigious National Geographic Society Waitt Grant as PI ► *"Award of venture capital, supporting exceptional projects...at the cutting edge of technology and exploratory research...with the potential for new breakthroughs."*
1999	Invited Participant, Sutton Trust Summer School, Univ. of Cambridge as a prospective first generation HEI student.

TEACHING AND LEARNING

From – To		Note
To date	Undergraduate Courses: • Introduction to Geological Field Work, Durham Univ., UK • Global [Climate] Change, Univ. of Alberta, UK • Field School – Geology of Northern England, Open Univ., UK • Field School – Mountain Building in Scotland, Open Univ., UK Postgraduate Courses:, • Advanced Igneous Petrology and Geochemistry, U of TN, USA Overall: • Over 10 successful Ph.D students trained, mentored, & supervised. Including winners of international medals, academic & other great posts. • 13 successful masters & undergraduate researchers trained. • Many hundreds of hours of preparation, structured teaching & learning, marking & assessment provided for undergraduates & postgrads.	• Undergraduate & postgraduate student scores & comments have provided positive feedback on my contributions to learning. • Student remarks have highlighted enjoyment, the relevance of subject matter, & interesting assignments to their career prospects/jobs gained. • Class sizes and field school cohort groups have numbered 12 to 120. • Additional time given to student supervision & mentoring. • Further, I have long – informally – trained & mentored early-career postdoc. colleagues to support their development

HIGHLIGHTS AMONG CONFERENCE / SYMPOSIA ORGANISATION

Year	Event	Role
2024	7 day International Symposium on Planets and Exoplanets hosted by Indian Planetary Science Association at India's PRL. *Roughly 250 in-person delegates (1/3 women) from 12 countries.* • Headline Event, India's Dept. of Space and adjacent Ministries. • Special Public Presentation: Prof. Michel Mayor, Nobel Laureate.	Scientific Organising Committee Link
2022	Inaugural Forming and Exploring Habitable Worlds Meeting, Edinburgh, UK. *Over 150 delegates (~45 % women + non-binary) from 96 institutions of 26 countries.* Hybrid event. Two themes: • Origins of habitable bodies in and beyond our Solar System • Space exploration & its governance: priorities, visions, concerns & ambitions	Chair. *Exceeded expectations, twice anticipated size.* Marked as an outstanding contribution by host institution.
2016	4th International Workshop on Highly Siderophile Element Geochemistry, Durham, UK. *Over 75 international delegates (~40 % women + non-binary) from 43 institutions across 11 countries.*	Chair. *Twice the size of the previous meeting in this series.*
2013	76th Annual Meeting of the Meteoritical Society, Edmonton, Canada. *Over 325 international delegates.*	Local Organising Committee Member (1 of 4).

EXAMPLE LEADERSHIP AND CITIZENSHIP

International / Domestic Societies, Funders, and Community

From - To

2025 Expert review pool, for call 2 of UK Space Agency's National Space Innovation Programme

2024,2025 Expert reviewer, Geol. Soc. Fermor Seed Corn Fund (× 3 2024 scheme opening; 2025 × 2 or panel expected)

2024 Invited, Geological Society, London, Policy Expertise Pool.

2024 Selected, expert pool for UK Space Agency's ongoing Space Programme Review Panels

2022-now Selected, Pool for 2023 STFC Ernest Rutherford Fellowships Panel.
Pool for 2023 STFC Education, Training and Careers Committee.

2023 Panel Member, UK Space Agency, Space Program [Mission] Review (SPRP) - Bilateral Exploration (lunar)

2023 *Well ranked:* Member, NASA Extraterrestrial Materials Analysis Group (ExMAG)

2022 Liaison with Geol. Soc. London's Policy / DEI Team & Royal Astronomical Society's Policy Group.

2022 Member, Earth & Space Sciences in Global [+ Domestic] Policies with American Geophysical Union.

2022 Member, Global Inclusion & Representation Task Team coordinated by American Geophysical Union.

2021 Invited to pool for UK Space Agency Program Management Boards / Space Projects Review Panel.

2021 Goldschmidt Mentor. Supported/provided introductions for three Ph.D students from Japan & USA.

2020-2022 Founding Member (1 of 14) & invited Co-Chair, European Association of Geochemistry's energetic Diversity, Equity, & Inclusion Committee. www.eag.eu.com/about/dei/ & EAG's DEI blog.

- Team leads several grassroots initiatives and Town Halls.
- Phased reform, international Geochemistry Awards (AR led 2021 writing of revisions).
- Successfully requested new e.g. nomination committee.
- Advised revisions, Journal Management / COPE criteria.
- Team drove Global Geochemistry Community Survey (AR initiated & led writing with team input) over 1,500 responses received. First resultant output arising from funded analysis shared here.
- Recommendations, Goldschmidt Conference.

Editorships

2016-2017 Guest Managing Editor, Special Issue of Geochimica et Cosmochimica Acta (GCA).
"Highly Siderophile Element Constraints on Earth and Planetary Processes" Volume 216.

Peer Review and Other

2010-ongoing Solicited reviewer: Geochimica et Cosmochimica Acta, Meteoritics & Planetary Science, Earth & Planetary Science Letters, Journal of Petrology, Lithos, Special Vol. of the 10th International Kimberlite Conf. among others.

Grant proposals: UKSA, NASA (Emerging Worlds, SS Workings), NSF (Marine Geology & Geophysics), European Research Council applications.

Other: Reviews in Mineralogy and Geochemistry (Vol. 81; Highly Siderophile & Strongly Chalcophile Elements in High-Temp. Geo- & Cosmochem.), and Oxford Univ. Press (book proposals).

2014 Expedition Leader / National Geographic Explorer, Southern Alps, New Zealand.

2011-2013 Construction of major new scientific infrastructure, U of Alberta, Canada. project valued at over CA$22M; the largest facility of its kind involving installation of six new state of the art mass spectrometers, two laser sampling units, over 2,200 sq. ft metal-free clean lab. suite, and
over 1,300 sq. ft of dedicated instrument room.

2009 Member, international Consortium: newly identified Martian Ultramafic Shergottite, Yamato 984028.

EXAMPLE ENGAGEMENT, OUTREACH, KNOWLEDGE TRANSFER, ADVISORY

Public / Schools / Other

From - To

2025	Feature Presenter. Soapbox Science, Scotland. Large public engagement event platforming the contributions of women and non-binary scientists.
2024	Invited. Featured guest for Space Month, Edinburgh Royal Hospital for Children and Young People.
2020-2023	Driving collaborations: Planetary materials collections to broaden access with e.g. chosen Scotland museums.
2022	Organised and hosted Public Event of the Nov. 2022 meeting; generated three free talks (recorded).
2022	Schools' Virtual Outreach. STFC-funded Helium Zone, I'm a Scientist Get Me Out of Here!
2021	School Outreach: Skype a Scientist Q & A, John Bramston Primary School, Ilford, Essex.
2021	Geoscience for the Future. Featured as firstgen at uni, relatable to some among nextgen cohorts.
2021	Invited to National Geographic Society's Explorers Meetup, COP26 UN Climate Change Conference.
2021	Invited to a range of NatGeo. Society's networking and virtual events for Scottish / global Explorers.

Parliamentary – I adhere to the Nolan Principles

2022-now	Liaise, build networks, and advocate to effect global and domestic policy/culture change with European Commission, other funders, learned societies, in-house at Uni and via parliamentarians, government committees, and civil servants at Westminster (UK) and Holyrood (Scottish Parliament).
2024	Science in Parliament (Holyrood) - Participant. Future of STEM theme.
2023	Science in Parliament (Holyrood) - Participant. STEM Education theme.
2022	Science in Parliament (Holyrood) – Participant. STEM Innovation.
2022	My Science Inquiry contribution(s) with Royal Astro. Soc. for UK Science and Technology Committee.
2022	Evidence Week. Participant, Holyrood.
2022	Week in Westminster, Royal Society Pairing Scheme. Paired with Ian Murray MP and team.
2022	Talking to Policy Makers. Participant. University Training, Knowledge Exchange and Impact Team.
2021	First Look: Science and Parliament Virtual, convened by the Royal Society of Chemistry (Scotland).
2021	Engaged Chi Onwurah MP, Shadow Minister for Science, Research and Innovation. Press release & phys.org.

Media

2025	Steered a constructive feature with Nature.
2023	Expert opinion sought for UK national news & CNN (USA) re. findings for Earth's core. *Redirected.*
2022	Live expert opinion requested by LBC's drive time broadcast re. a lunar base by 2030. *Deferred.*
2021	Interviewed by N. Forrester. 'Reconsidering the role of alcohol in the scientific workplace' in Nature.
2021	Wrote EuroPlanet press releases for a meteorite-dropping fireball and Chang'e-5 lunar sample return mission. World news -> Spanish, Ukrainian, Indian, Italian, & Brazilian press, phys.org (2), space.com, Mirror, Financial Express, universetoday, livesci, room, FloridaNT, bollyinside, scitechdaily, bigthink insidehook, & more
2021	Chemistry World, Royal Society of Chemistry: Solicited work concerning space and planetary science.
2020	Interviewed by Rebecca Boyle for two Scientific American magazine articles. Chang'e 4's recent observations and future human presence on and near the Moon. Plus, concepts related to exomoons.
2019	Feature in the Research Highlights of Nature. Also, January 15th 2019 edition, Geochem. Soc. News.
2017	Highlight of the GCA Special Issue that I led by the Geochemical Society in the Geochem. News (03/10/2017) that all global society members receive, and again in this forum on 07/11/2017.
2016	I guided a ScienceNews article authored by Alexandra Witze exploring emerging themes in planet scale studies of iron loving elements. Arose from the 4th HSE Workshop that I Chaired. *Alexandra won the 2016 AGU David Perlman award for excellence in science journalism.*

At earlier dates, I delivered a range of successful public activities and outreach.

OTHER HIGHLIGHTS

- Positive can do attitude and solutions-focused approach born of 15 years post-PhD and consultative leadership experience in the public body sector, higher education and research, along with their strategies, assessment, and deadline-driven operation.

Proven in project delivery, working to tight deadlines, and advancing inclusive research excellence:

- Thrive with responsibility and high degree of autonomy in dynamic fast-paced settings; calm under pressure, grasp the big picture, exceptional organisation, mark teamwork, and am beneficial to connectivity within/beyond my home organisation.
- Demonstrated mastery steering complex construction projects, and I deliver unique know-how realising flagship capital projects.
- Proven in establishing, motivating, managing / assigning tasks, providing feedback, and supporting personnel to achieve their best and work toward shared goals across employers' UK and international teams numbering from ~5 to over 125.
- Extensive experience of cross-functional collegial collaboration, shaping positive work environments, pre-empting challenges, tactfully resolve real or perceived conflicts/problems, and served with internal committees and recruitment teams.
- Adept in consultative approaches and as a purposeful proactive champion of collective achievements. E.g. providing uplifting roles of prominence and responsibility to others - particularly those of lesser privilege ± underrepresented identities.
- Used my intellectual capacity and versatility, broad-based skills, know-how, cultural sensitivity and emotional intelligence in successfully teaching and training students and others, developing and delivering courses, scoping and designing new degrees.
- Established leader bringing hundreds to thousands of people together from over 25 countries in successive time-sensitive, complex, ± parallel, internationally-prominent and visionary headline initiatives that:
    - Disseminated important findings and supported development of high proportions in their early careers.
    - Advanced areas of intellectual authority, and nurtured partnerships of long-term strategic import.
    - Attracted trailblazing and international medal winning scholars and Nobel Laureate for Public showcases.
    - Engaged a range of stakeholders, and also public figures such as pertinent celebrities and Senior Politicians for ceremonial aspects.
    - Garnered media attention reaching millions, and had wider beneficial impacts of lasting benefit and legacy.

  The programmes and events I've led have been marked outstanding by my hosts.
- I am relied on for my attention to detail, analyses, clear summaries, and actionable plans to address complex visions or issues via effective prioritised resources, which together meaningfully delivering against institutional goals and strategic priorities.
- Established portfolio of friendly accessible contributions, technical work, and expert advisory briefs shaping scientific debate, cross-discipline domestic and international research agendas, community position and culture. Including my conception and leadership of an influential thematic volume in Earth and Planetary processes. See list.
- Prowess in high-quality grant applications. In academic roles, my advanced knowledge, prized analytical skills, and the international competitiveness of my ideas is proven via my winning over £1M successful PI'd and joint funding applications including e.g. Individual Marie Sklodowska-Curie Fellowship and other prestigious merit-based awards, inclusive of multi-institution team project funds. My successes have attracted press coverage highlighting key accomplishments among wider audiences. Community endeavours to which I contribute and advocate for are pursuing well over £140M in coordinated, uplifting, transformative investment of long-term benefit.

Strong research system knowledge and effective with a wide range of internal and external stakeholders:

- Experienced in the protocols and standards across a range of panels / committees and other expert peer-review. Including unconscious bias training and conduct of objective ± blinded reviews for applications to medium-sized and major grant funding proposals relevant to Scottish and partner research communities, and learned society service. E.g.:
    - UKRI – including the Science and Technologies Facilities Council, Natural Environmental Research Council etc
    - European Commission
    - Geological Society, London
    - Scottish Alliance for Geosci., Environment, and Society
    - The European Association of Geochemistry
    - UK Space Agency
    - Royal Astronomical Society, American Geophys. Union
    - The Meteoritical Society (global)
    - The Geochemical Society (international)
- Proven in active contributions, tactful positive influence, and trusted integrity in potentially sensitive and competitive settings whilst respectfully digesting, debating, handling and navigating the range of demands that arise across all levels of seniority.

Combined, my contributions and achievements enhance critical capacity to address learning and skills needs, and steer- or respond to emerging areas of sustained commitment among funder, philanthropy, or governments' policies or position.

ANALYTICAL EXPERTISE TO DATE

Earth and Planetary Scientist: I am the only woman in the world developing and training others in original high-spatial resolution study approaches integrating my specialist combination of cutting-edge, quantitative and qualitative, Earth-based empirical rocky study tools. These original approaches - also foundational to collaborations in advanced thermodynamic modelling providing realistic physical descriptions of complex natural processes - are required to break otherwise persisting barriers to scientific knowledge concerning the origins and evolution of habitable Earth and neighbouring rocky bodies such as asteroids, the Moon, and Mars.

Sample Acquisition, Preparation, and Laboratory Techniques

- **Optical Microscopy**
  Experienced in optical microscope techniques under transmitted, cross-polarised, and reflected light and production of detailed sample descriptions / classifications, and collection of corresponding image records.
- **Clean laboratory wet chemistry protocols**
  Including mixed-acid bench top / hot plate digestions and processing, in some cases followed by column chemistry to preconcentrate elements prior to high-precision isotope ratio measurements.
- **Digestions at high temperature and high pressure**
  Performed in high purity quartz-lined and/or borosilicate carius tubes (OpenU, UofMaryland) and – a method to achieve ultra-low-blanks – via a high pressure chamber with high purity quartz reaction vessels (Anton Paar products: UofAlberta, Durham University).
- **Spearheading of meteorite selection and acquisitions for planetary studies**
  Sample description and imaging, polarising and reflected light microscopy. Planning, risk assessment, and leadership of field work for geological studies. OpenU, UofTN, UofAlberta, Durham, collab. guidance given at UofGlasgow; I am currently leading ongoing planning.
- Operation of a range of rock saws, hand-held precision cutting tools, steel jaw crushers, agate and alumina ball mills, alumina and agate mortar and pestles, micro-milling/drilling, mineral picking and grain mount prep.; OpenU, UofTN, UofAlberta, Durham.
- Preparation of pressed powder pellets and fused glass disks. Separately, fused glass beads from small amounts of powdered material created to determine the "bulk" compositions of meteorites via EMPA; OpenU, UofTN, UofAlberta.

Focused Beam, Scanning Analysis, and Other Data Collection etc

- **Laser ablation and solution ICP-MS**
  Extensive suites of trace and highly siderophile element data obtained for a range minerals and silicate rock types using both gas-source and solid state lasers (142, + 193 excimer) coupled to the ICP-MS instruments of each facility; OpenU, Notre Dame, UofMaryland, UofAlberta, Durham University, and Geological Survey of Canada / Natural Resources Canada in Ottawa.

  Supported establishment, routine problem solving, and management of then new LA-ICP-MS facility in UoGlasgow's GES. Housing an Agilent 7900 ICP-MS and 193 excimer RESOlution laser ablation system -> New matrix matched standards were sourced as needed, users trained and overseen in the acquisition of trace element abundance data across a range of geological materials, and e.g. zircon + apatite dating constraints. Also rationalised several widely used facility spaces to improve those working environments, ease flow and efficiencies. And provided oversight to ensure safe and smooth use of the optical microscopy facilities, as well as for circular-air-scrubbed wet-chemistry laboratories used by cosmogenic isotope specialists.
- **Scanning Electron Microscopy**
  Various models of SEMs used for analysis of extraterrestrial dust / grain morphologies and specific compositional mapping and point spectra purposes etc - UofTN, UofAlberta, UofGlasgow.
- **Electron microprobe**
  Range of phases characterised via EMP instruments that include Cameca SX-100 and JEOL JXA-8900R; OpenU, UofTN, UofAlberta, UofEdinburgh. Output data subsequently processed offline for stoichiometry / site / charge balancing and other data treatments / calculations via my own spreadsheets.
- **Thermal ionisation mass spectrometry (TIMS)**
  Thermo's Triton and TritonPlus models wielded in positive and negative modes to obtain high-precision radiogenic Sr and Os isotope ratio data, including at low sample loads / ultra-low blanks and small beam sizes; OpenU, UofMaryland, UofAlberta, Durham.
- **Ion microprobe (secondary ion mass spectrometry, SIMS)**
  Light stable isotopes data collected at high spatial resolution etc; UofAlberta, Cameca IMS 1280 and collab. for a research student project with CRPG-Nancy's ion microprobe team (large geometry SIMS).
- **Multi-collector inductively coupled mass spectrometry** (MC-ICP-MS, and included in 'PIMMS' due to the plasma ionisation process). Thermo's Neptune operated to collect high-precision radiogenic Sm-Nd, Lu-Hf, Rb-Sr isotope data; Durham.
- **XRF** analysis to determine major and some minor element concentrations in bulk materials; OpenU, UofAlberta.
- For the above, I have extensively used relevant software packages (e.g Iolite, previously Glitter) and other calculation approaches for offline data processing, and have trained a range of students, postdocs, and other colleagues in these techniques. In addition, my own early training involved offline processing of initial small data batches by manual calculation so as to deepen understanding of what the sometimes 'black box like' data handling software packages do; where feasible I favour this approach for trainees' robust skills building.
- Plus, I'm experienced with high-specification metal-free clean laboratory development and instrument installation.
- Adept at problem solving and routine maintenance in applying the above techniques, supervising / introducing others to those methods, and proven in broad field work leadership / skills.
- Experienced in scrutiny and interpretation of integrated rock - mineral textures. Encompassing modelling styles of (igneous) magma genesis and crystallisation ("petrogenesis"), and robust treatment of high-precision isotopic systematics for Earth & Planetary melts / residues.
- My previously published work has also used X-ray computed tomography (≥1.5 µm voxel size) so as to utilise phase distributions in hand-specimens (± diamonds) to inform petrological interpretations.
- Additionally, other justifiable forms of petrologic and geochemical tools are utilised as called for by the research questions that are subject to investigation.

University-based referees:

- Professor of Ocean Biogochemistry (E-DIAL project lead), Pallavi Anand, The Open University, UK.
- Professor of Planetary Science, Martin R. Lee, University of Glasgow, UK.
- Professor and Director of Geochemistry, Kevin W. Burton, Durham University, UK.
- University Distinguished Professor, Richard J. Walker, University of Maryland, USA.
- Professor and Curator of the University Meteorite Collection, Principal Director, Institute for Space Science Exploration and Technology, Chris D. K. Herd, University of Alberta, Canada.