# Position Details

## CSIRO Early Research Career (CERC) Postdoctoral Fellowship– CSOF4

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| The following information is for applicants | |
| Advertised Job Title | CSIRO Postdoctoral Fellowship in Volatiles in Magmatic Ore Deposits |
| Job Reference | 71344 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$86,434 to AU$94,679 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Kensington, Perth, Australia |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | * Australian/New Zealand Citizens and Australian Permanent Residents * Australian temporary residents currently residing in Australia (visa sponsorship may be provided to eligible candidates) |
| Position reports to the | Ore Deposit Petrology Team Leader |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Dr. Siyu Hu via email at [siyu.hu@csiro.au](mailto:siyu.hu@csiro.au) |
| How to apply | Apply online at <https://jobs.csiro.au/>  Internal applicants please apply via **Jobs Central**  If you experience difficulties when applying, please email [careers.online@csiro.au](mailto:careers.online@csiro.au) or call 1300 984 220. |

### Role Overview

**CSIRO Early Research Career (CERC) Postdoctoral Fellowships** provide opportunities to scientists and engineers who have completed their doctorate and have less than three years of relevant postdoctoral work experience. These fellowships aim to develop the next generation of future leaders of the innovation system through:

* A differentiated career development program to deliver capability excellence and breadth across all facets of the national innovation system.
* Research training via strategic research and development projects with a clear focus that will deliver real impact through science and engineering excellence.
* An innovative culture supporting the development and demonstration of original thinking and expertise leading to peer-recognition.
* Opportunities to develop skills and experience in collaborative research teams to effectively work within national and global multi/transdisciplinary and multi-stakeholder environments.

CERC Postdoctoral Fellows **are appointed for three years or part time equivalent.**

**Project Overview:**

Much of the world’s supply of battery metals and platinum group elements (PGE) comes from sulfide ore bodies formed in the magmatic plumbing systems of ancient volcanoes. We need to discover a major new ‘high quality’ deposit of these metals every year to keep up with the growth in demand from the emerging EV battery industry.

Recent research on magmatic sulfide ore genesis is finding increasing evidence of the role of volatiles in transport and concentration of chalcophile metals. Findings from the proposed project will help bridge the gap between magmatic and hydrothermal ore forming processes, thus impacting exploration strategies. They will also impact our understanding of metal emissions from volcanoes, with important environmental consequences.

This project will focus on addressing the following fundamental questions:

* Is the assimilation of volatile-rich wall rocks by the magma one of the necessary steps to form a giant Ni-Cu-Co-PGE ore body?
* What is the role of volatiles in the transport, coalescence and deposition of metal rich-sulfide blebs within the magma? Does the presence of volatiles impact the physical concentration of the sulfides? Is this a necessary step?
* What is the role of volatiles in the metal enrichment of the sulfide melt? What conditions (composition, pressure, temperature, redox) concentrate metals into the fluid phase?
* What imprint do these processes leave on the host rocks away from the deposits themselves, and can this imprint be used to expand the detectable footprint?

The project will be conducted in close collaboration with CSIRO Data 61 and the CNRS-ISTO experimental petrology lab in Orleans, France.

The fellow will have the opportunity and freedom to lead this highly inter-disciplinary approach and have ownership of results that will provide striking insights into critical metal ore formation and volcanic metal emissions, with direct applications for exploration models.

### Duties and Key Result Areas

The role of the appointed post-doctoral fellow will be adapted to the Covid19 situation and the fellow’s interests and strengths. They will have the freedom to decide how to divide time and resources between project components:

* + Carry out experimental work (if travel is permitted) on magma-fluid reaction experiments using specialised high-pressure vessels in the ISTO lab (Orleans, France, supervised by Dr. Iacono-Marziano).
  + Conduct detailed 2D/3D characterisation of experimental products and natural specimens.
  + Evaluate time-scales and length-scales of physicochemical processes at play: review literature, apply theoretical, fundamental physics and fluid dynamics to understanding transport mechanisms, surface tension effects, diffusion and heat transfer; and generate working hypotheses for further experimental testing.
  + Modify and apply computational fluid dynamic (CFD) particle codes to understanding behaviour of droplets and bubbles in magma-crystal mixtures, building on recent publications, further generation of working hypotheses to test with experiments.
  + Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + Recognise and exploit opportunities for innovation and the generation of new theoretical perspectives, and progress opportunities for the further development or creation of new lines of research
  + Utilise design thinking methodology to plan and prepare research proposals, and apply non-academic impact methodology to research projects
  + Carry out research investigations requiring originality, creativity and innovation
  + Record, manage, and analyse data/information using relevant domain data science techniques.
  + Proactively undertake development to grow effective researcher capabilities to support career goals.
  + Adhere to the spirit and practice of CSIRO’s Values, Code of Conduct, Health, Safety and Environment procedures and policy, Diversity initiatives and Making Safety Personal goals.
* Other duties as directed.

[**The CERC Postdoctoral Fellow learning and development program**](http://www.csiro.au/en/Careers/Student-and-graduate-programs/Postdoctoral-fellowships)is developed between the CERC Postdoctoral Fellow and their CSIRO supervisor. The program will focus on enhancing the Fellow’s capabilities to the level expected of an independent researcher and will include on-the-job and course-based development encompassing:

* Discipline-specific techniques and protocols
* Professional growth
* Project management
* Communication and influencing skills
* Working and collaborating with others

## **Required Competencies**

* **Teamwork and Collaboration:** Cooperates with others to achieve organisational objectives and may share team resources in order to do this. Collaborates with other teams as well as industry colleagues.
* **Influence and Communication:** Uses knowledge of other party's priorities and adapts presentations or discussions to appeal to the interests and level of the audience. Anticipates and prepares for others reactions.
* **Resource Management/Leadership:** Allocates activities, directs tasks and manages resources to meet objectives. Provides coaching and on the job training, recognises and supports staff achievements and fosters open communication in the team.
* **Judgement and Problem Solving:** Investigates underlying issues of complex and ill-defined problems and develops appropriate response by adapting/creating and testing alternative solutions.
* **Independence:** Recognise and makes immediate changes to improve performance (faster, better, lower cost, more efficiently, better quality, improved client satisfaction).
* **Adaptability:**Copes with ambiguity or situations that lack clarity. Adapts readily to changing circumstances and new responsibilities (which may include activities outside own preferences) in the interests of achieving team objectives. Recognises the need for and undertakes personal development as a result of changes.

## **Selection Criteria**

#### Essential

*Under CSIRO policy only those who meet all essential criteria can be appointed.*

1. A doctorate (or will shortly satisfy the requirements of a PhD) in a relevant discipline area, such as Experimental Petrology, Exploration Geology, Numerical modelling of geological processes.

Please note: To be eligible for this role you must have **no more than 3 years** (or part time equivalent) of relevant postdoctoral research experience.

1. Demonstrated experience in igneous petrology and geochemistry.
2. Familiarity with at least three of the following techniques: SEM, TEM, XRF mapping, computed micro-tomography, Laser ablation ICP-MS, electron microprobe and ion probe technologies; computational fluid dynamic modelling.
3. The ability to work effectively as part of a multi-disciplinary, regionally dispersed research team, plus the motivation and discipline to carry out autonomous research.
4. High level written and oral communication skills with the ability to represent the research team effectively internally and externally, including the presentation of research outcomes at national and international conferences.
5. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
6. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable**

1. Experience in experimental petrology.
2. Experience in computational fluid dynamic modelling.
3. Knowledge of magmatic nickel sulfide ore-forming processes.
4. Demonstrated willingness to develop applied solutions relevant to mineral exploration based on fundamental scientific research.
5. Demonstrated ability to remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.

To be appointed as a CERC Postdoctoral Fellow within CSIRO, candidates are required to have **submitted** their PhD at the time of commencement, as a minimum requirement, if PhD conferment has not been obtained. If a candidate has submitted, but their PhD has not yet been formally attained, the starting salary will be CSOF4-1 ($83,687). Upon CSIRO receiving written confirmation that the PhD has been awarded (within a six month period from commencement date), the salary will be increased to the negotiated level and the difference will be back-paid to the Officer’s start date.

Special Requirements

Appointment to this role may be subject to conditions including provision of a national police check as well as other security/medical/character clearance requirements.

* The successful candidate will be asked to obtain and provide evidence of a National Police Check or equivalent. Please note that people with criminal records are not automatically deemed ineligible. Each application will be considered on its merits.
* If the successful candidate is not an Australian Citizen or Permanent Resident, they may be required to undergo additional security clearances, which may include medical examinations and an international standardised test of English language proficiency (i.e. IELTS test).- https://ielts.com.au/

**Our Value Proposition**

We want CERC Postdoc Fellows to join our world class science, engineering and digital teams to solve big, complex problems that make a real difference to the future of Australia and the world.

You'll get to work with some of the most talented minds in their fields, not just in Australia, but in the world. At CSIRO, we spark off each other, learn from each other, trust each other and collaborate closely to achieve more than we could individually.

CSIRO Early Research Career Postdoctoral Fellow Experience Employee Value Proposition. Find out more [here](https://www.csiro.au/en/careers/postdoctoral-fellowships)!

## **About CSIRO**

We solve the greatest challenges through innovative science and technology. To find out more visit us [online](http://www.csiro.au/)!

CSIRO is a values-based organisation.  In your application and at interview you will need to demonstrate behaviours aligned to our values of:

* 1. People First
  2. Further Together
  3. Making it Real
  4. Trusted

Find out more about CSIRO [Mineral Resources](https://www.csiro.au/en/Research/MRF)

Find out more about CSIRO [Data61](https://data61.csiro.au/)