# 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 Mathematics for Geosciences |
| Job Reference | 93675 |
| Tenure | Specified Term of 3 years |
| Salary Range | AU$92,624 to AU$101,459 pa (pro-rata for part-time)  plus up to 15.4% superannuation |
| Location(s) | Kensington, WA |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | All Candidates |
| Position reports to the | Geoscience Analytics Team Leader, Discovery Program |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Fang Huang via email on [F.Huang@csiro.au](mailto:F.Huang@csiro.au) and June Hill via email June.Hill@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. |

**Acknowledgement of Country**

CSIRO acknowledges the Traditional Owners of the land, sea and waters, of the areas that we live and work on across Australia. We acknowledge their continuing connection to their culture and pay our respects to their Elders past and present. View our [vision towards reconciliation](https://www.csiro.au/en/about/Indigenous-engagement/Reconciliation-Action-Plan).

**Child Safety**

CSIRO is committed to the safety and wellbeing of all children and young people involved in our activities and programs. View our [Child Safe Policy](https://www.csiro.au/en/about/policies/child-safe-policy).

### Role Overview

**CSIRO Early Research Career (CERC) Fellowships** provide opportunities to scientists and engineers who have completed their doctorate and have less than three years relevant research 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; and
* Opportunities to develop skills and experience in collaborative research teams to effectively work within national and global multi/transdisciplinary and multi-stakeholder environments.

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

The Discovery Program in CSIRO Mineral Resources understands that the development of mathematical techniques for geoscience applications is essential to enable effective mineral exploration and maximise success in mineral discovery. To this end, our team are aiming to develop innovative methods for quantifying the textural description of rocks. Our team consists of enthusiastic geologists and mathematicians working closely together to solve difficult geological problems.  
  
Mineral exploration relies on rock samples collected via drillholes that are sparsely distributed due the high cost of drilling campaigns. It is crucial to capture as much physicochemical information as possible from these valuable samples to enable geologists to develop 3D geological models. Although recent advances in collecting high-resolution physical, chemical and mineralogical data, the automated quantification of the texture of rocks remains a challenge. Rock texture is the result of complex physical and chemical processes and is essential for understanding how rocks formed and how they were subsequently altered. Rock textures can be used as indicators of conditions favourable for ore mineral deposit formation. Description of rock texture is currently a manual process, and the inconsistent data are difficult to translate into numerical models for understanding mineral deposits.   
  
As the CERC Fellow, you will develop an automated framework to measure different textures from diamond drill core photos using non-linear and complex system methods. The framework will be used to develop a software platform, which will allow geologists to distinguish different types and scales of textures, and to correlate regions with similar texture in different drill holes. The platform will also allow the geologist to integrate textural data with other geological data, such as geochemistry, mineralogy or geophysics. The integration of different data sets is essential to improve discovery rates of new resources of critical minerals and to help source suitable rock reservoirs for permanent carbon locking. These impacts will support a renewable-energy, low-carbon future for Australia.

### Duties and Key Result Areas

Under the direction of senior research scientists and engineers, this CERC Fellow will:

* + Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + Review literature to identify existing texture quantification algorithms that can be implemented in code and tested and improved. As well as developing novel algorithms for practical application of texture quantification.
  + Collect and evaluate the suitability of drill core images produced from CSIRO’s drill core research laboratory.
  + Produce high quality scientific papers suitable for publication in quality journals, for client reports, conference presentations, and granting of patents.
  + Work collaboratively with colleagues within your team, the business unit and across CSIRO.
  + Communicate effectively and respectfully with all staff, clients and suppliers in the interests of good business practice, collaboration and enhancement of CSIRO’s reputation.
  + Record, manage, and analyse data/information using relevant domain data science techniques.
  + Undertake training and development as required and that aligns with career goals.
  + Adhere to the spirit and practice of CSIRO’s Values, Code of Conduct, Health, Safety and Environment procedures and policy and diversity initiatives.
* Other duties as directed.

The CERC Fellow learning, development and training programis developed between the CERC 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

## **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). The doctorate must be in a relevant discipline area, such as Mathematics, Statistics, Physical Sciences/Engineering, Data Science, or Computer Science/ Engineering.

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

1. Demonstrated expertise in statistical learning, data science, or machine learning.
2. Demonstrated coding skills (e.g. python, R, Matlab, or Julia) used to implement theoretical algorithms as functioning scripts.
3. Experience in analysing datasets in applied science.
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. **The ability to work effectively as part of a multi-disciplinary, potentially regionally dispersed research team, plus the motivation and discipline to carry out autonomous research.**
6. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.

## **Desirable**

1. Software engineering skills for turning research code into applications for end users.
2. Expertise image processing and pattern recognition application in geology or other physical science fields.
3. A desire to understand the place of critical minerals or mineral carbonation in exploration and mining.
4. Remain productive, positive and resilient in complex and dynamic environments.

## **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.

To be appointed to this CERC Fellowship role within CSIRO, candidates will be expected to commence employment by 31 January 2024. Candidates are also required to have **submitted** their doctoral thesis 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 ($89,680). 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 is subject to provision of a pre-employment background check and may be subject to other security/medical/character clearance requirements.

* The successful candidate will undertake a pre-employment background check. Please note that individuals 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 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.

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

## **About CSIRO**

We solve the greatest challenges through innovative science and technology. Visit [CSIRO Online](http://www.csiro.au/) and [CSIRO Mineral Resources](https://www.csiro.au/en/about/people/business-units/Mineral-Resources) for more information.

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

* People First
* Further Together
* Making it Real
* Trusted