# Postdoctoral Fellowship – CSOF4

Role summary for potential applicants

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| Advertised Job Title**:** | Postdoctoral Fellowship – Development of Scientific Software for the Quantification and Visualisation of Uncertainty in complex Agricultural Systems |
| Reference Number**:** | 29501 |
| Classification**:** | CSOF4 |
| Salary Range: | AU $78K to AU $88K plus up to 15.4% superannuation |
| Location**:** | Canberra, ACT |
| Tenure: | Specified Term of 3 years |
| Relocation assistance**:** | Will be provided to the successful candidate if required. |
| Applications are open to: | Australian Citizens Only  Australian Citizens and Permanent Residents Only   * All Candidates |
| Functional Area**:** | Research Scientist / Engineer - Postdoc |
| % Client Focus - Internal: | 80% |
| % Client Focus - External: | 20% |
| Reports to the: | Project Leader |
| Number of Direct Reports: | 0 |

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| **Role Overview:** |
| Postdoctoral Fellowshipsat CSIRO provide opportunities to scientists and engineers, who have completed their doctorate and have less than three years relevant postdoctoral work experience. These fellowships will help launch their careers, provide experience that will enhance their career prospects, and facilitate the recruitment and development of potential leaders for CSIRO.  Postdoctoral Fellows are appointed for up to three years and will work closely with a leading Research Scientist or Engineer in their respective field. They carry out innovative, impactful research of strategic importance to CSIRO with the possibility of novel and important scientific outcomes. They present the findings in appropriate publications and at conferences.  Future Science Platforms (FSPs) are a major new CSIRO initiative. FSPs are multi-year investments in frontier science that will reinvent and create new industries for Australia. [Digiscape](http://my.csiro.au/Business-Units/Future-Science-Platforms/Digiscape-FSP.aspx) is the FSP that is creating next-generation decision tools to transform the agriculture and land management sector. To achieve this aim, Digiscape will bring to bear cutting edge climate science; new sources of locally and remotely sensed data; informatics for agro-ecosystems; rigorous analysis of uncertainties; and innovation in both the ICT and social dimensions of systems integration. The successful candidate for this position will therefore join a cohort of early-career researchers and engineers who will combine their individual disciplinary contributions into mission-focussed R&D.  As part of Digiscape, you will be integral in the development of an “uncertainty toolbox” for quantifying, visualising and communicating uncertainty for improved decision making in complex agricultural systems. The development of the “Digiscape Uncertainty Toolbox” is driven by the need to better quantify predictions and forecasts of agricultural systems in space and time given a range of very large and complex datasets (remote sensing, sensor network data, farm production data, meteorological data) and under a range of modelling paradigms (e.g. deterministic/stochastic, multivariate/univariate). As the toolbox will house an overarching set of methodologies for the Digiscape FSP, your role is therefore fundamental to the platform and the agricultural models and applications that sit within it. The Postdoctoral Fellow will be responsible for development of theory and algorithms that are computationally efficient and fast to cope with large volumes of information and slow model runs and will most likely make use of CSIRO’s high performance computing infrastructure. The Postdoctoral Fellow will also be integral in the software development of this tool to ensure it will be of the highest quality and meets stringent quality assurance benchmarks necessary for commercial use.  The Postdoctoral Fellow will work in collaboration with two statisticians and a software engineer to develop the components of the toolbox. The innovations behind the toolbox will require new computational advancements, new statistical/machine learning methodologies and new visualisations and graphics that can quantify uncertainty in the predictions and forecasts, provide an accessible communication device and give credibility to the agriculture models being developed. As the toolbox is motivated by the agricultural applications residing in the Digiscape FSP, the Postdoctoral Fellow will also gain experience interacting closely with other CSIRO researchers with different backgrounds and expertise.  The ideal candidate will possess exceptional computational skills, have experience developing algorithms that are computationally efficient, be highly proficient in one or more scientific programming languages such as R, Python, Java, C/C++ or equivalent and possess some analytics capability. Experience in machine learning, statistics, datamining, Bayesian methods, Markov Chain Monte Carlo and related algorithms would be an advantage. |

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| **Duties and Key Result Areas:** |
| * Under the direction of senior research scientists, carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes. * Work with CSIRO scientists within the project team and across the Digiscape FSP to develop relevant software components for the uncertainty toolbox. This will involve:   + Development of fast and efficient algorithms for statistical/machine learning/data mining approaches that can work on high performance computers so that methods can work with large volumes of data and computationally demanding scientific models.   + Create static and dynamic visualisations of scientific data, model output and uncertainties quantified from the models.   + Assist in the development of front end Graphic User Interfaces (GUIs) to the uncertainty toolbox to facilitate ease of use of the software by end users. * Undertake regular reviews of relevant literature and patents. * Produce high quality scientific and/or engineering papers suitable for publication in quality journals, for client reports and granting of patents. * Prepare appropriate conference papers and present those at conferences as agreed with your supervisor. * Contribute to the development of innovative concepts and ideas for further research. * Make a contribution to the effective functioning of the research team and help deliver CSIRO’s organisational objectives and plans. * 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. * Adhere to the spirit and practice of CSIRO’s Values, Health, Safety and Environment plans and policies, Diversity initiatives and Zero Harm goals. * Undertake an appropriate training and development program developed by CSIRO. * Other duties as directed.   ***CSIRO’s postdoctoral training program***is developed between the Postdoctoral Fellow and a CSIRO scientist. The program will focus on enhancing the Fellows’ 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   <http://www.csiro.au/en/Careers/Student-and-graduate-programs/Postdoctoral-fellowships> |

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| **Selection Criteria:** |
| *Under CSIRO policy only those who meet all essential criteria can be appointed*  ***Pre-Requisites:***   1. **Education/Qualifications:** A doctorate (or will shortly satisfy the requirements of a PhD) in a relevant discipline area, such asComputer Science, Statistics/Mathematics or Machine Learning with a computing major*.*   ***Please note:*** *To be eligible for this role you must have* ***no more than 3 years*** *of relevant postdoctoral experience.*   1. **Communication: Excellent written and oral communication skills with the ability to represent the research team effectively internally and externally, including at national and international conferences.** 2. **Publications: A record of publications in quality, peer reviewed journals.** 3. **Behaviours:** A history of professional and respectful behaviours and attitudes in a collaborative environment.   ***Essential Criteria:***   1. **A strong background in the development of statistical, machine learning and/or datamining theory and algorithms for solving important large and complex problems.** 2. **Demonstrated conceptual and practical knowledge and skills operating with large datasets, particularly focussed on developing fast and efficient algorithms that can potentially be parallelised on high performance computing environments and served on the web using at least one of the following: Java, Python, C/C++ or R.** 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. **A record of science innovation and creativity, plus the ability and willingness to incorporate novel ideas and approaches into scientific investigations.**   **Desirable Criteria:**   1. **Some background in software development and quality assurance techniques.** 2. **Knowledge of Agricultural systems, processes and the types of data that support them.**   **CSIRO is a values based organisation. You will need to demonstrate behaviours aligned to our values of:**   * Integrity of Excellent Science * Trust & Respect * Creative Spirit * Delivering on Commitments * Health, Safety & Sustainability   To be appointed as a 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 *$78,479.* 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.  ***Other special requirements:***  *Appointment to this role may be subject to conditions including security/medical/character clearance requirements. Applicants who are not Australian Citizens or Permanent Residents may be required to undergo additional security clearance processes; which may include medical examinations and an international standardised test of English language proficiency (i.e. IELTS test).-* [*http://www.ielts.org/default.aspx*](http://www.ielts.org/default.aspx) |

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| **Other Information:** |
| **How to Apply**  Please apply for this position online at [www.csiro.au/careers](http://www.csiro.au/careers). You may be asked to provide additional information (online) relevant to the selection criteria. If so, then responding will enhance your application so please take the time to provide relevant succinct answers. Applicants who do not provide the information when requested may not be considered.  If you experience difficulties applying online call 1300 984 220 and someone will be able to assist you. Outside business hours please email: [careers.online@csiro.au](mailto:careers.online@csiro.au).  **Referees**: If you do not already have the names and contact details of two previous supervisors or academic/ professional referees included in your resume/CV please add these before uploading your CV.  **Contact:** If after reading the selection documentation you require further information please contact:  Dr Petra Kuhnertvia email: Petra.Kuhnert@data61.csiro.au or phone: +61 2 6216 7075  Please do not email your application directly to Dr Kuhnert. Applications received via this method will not be considered.  **About CSIRO**  At CSIRO, we do the extraordinary every day. We innovate for tomorrow and help improve today – for our customers, all Australians and the world.  Our innovations contribute billions of dollars to the Australian economy every year. As the largest patent holder in the nation, our vast wealth of intellectual property has led to more than 150 spin-off companies.  With more than 5,000 experts and a burning desire to get things done, we are Australia’s catalyst for innovation.  CSIRO. We imagine. We collaborate. We innovate.  Find out more! [www.csiro.au](http://www.csiro.au).  **About DATA61:** In today’s data-focused world, there’s no doubt that numbers count.  [Data61](http://www.data61.csiro.au/) are the largest data innovation group in Australia, a connector that brings together technology innovators, businesses and universities to transform Australian industry and to help solve our greatest challenges. A CSIRO business, we are creating our data-driven future.  Find out more! <http://www.data61.csiro.au/> |