Position Title:	**Software Engineer (CAASTRO-3D Data Intensive Astronomy)**
Position Classification:	Level 8
Position Number:	316177
Faculty/Office:	Faculty of Engineering and Mathematical Sciences
School/Division:	Physics
Centre/Section:	ICRAR (International Centre for Radio Astronomy Research)
Supervisor Title:	Professor
Supervisor Position Number:	306979

Your work area

The Australian Research Council (ARC) Centre of Excellence for All Sky Astrophysics in 3-Dimensions (CAASTRO-3D), headed by Professor Lisa Kewley, spans six Australian universities, three national infrastructure facilities, and seven international partner institutions and conducts world-leading observational and theoretical research focused on the main Centre scientific programs:

1. The Epoch of Reionization : This program will use the Murchison Wide-field Array in Western Australian to detect the sources at the epoch of reionization using rest-frame 21cm emission and to compare with the predictions of detailed theoretical simulations.
2. First Stars: This program aims to discover the oldest and most metal-poor stars in and around the Milky Way using ANU's SkyMapper telescope and determining their chemical compositions by means of high-resolution spectroscopy with telescopes like Keck and Magellan to shed light on their formation, evolution and nucleosynthesis.
3. First Galaxies: This program aims to discover the first galaxies in the universe with JWST and to reveal their chemical and star formation properties.
4. Galaxy Formation and Evolution: This research program, suitable for both theorists and observers, combines rest-frame UV, optical, and infrared Keck spectroscopy with large-scale numerical simulations to understand chemical evolution, mass build-up, and the accumulation of angular momentum in galaxies across cosmic time, gas transport through galaxies and in galactic outflows, and how chemical elements are incorporated into stars.
5. ASKAP Surveys: The Australian Square Kilometre Array Pathfinder is conducting three large surveys (FLASH, WALLABY, and DINGO) to measure the mass and angular momentum through neutral hydrogen gas of hundreds of thousand galaxies over the past 6 billion years.
6. SAMI: the SAMI survey is providing data on the kinematics, morphology and stellar populations of more than 3000 galaxies. This project will use this data to explore the role of angular momentum in determining the morphologies and star formation histories of galaxies. It will compare observations to simulations of galaxy formation to test models of angular momentum evolution during galaxy assembly.
7. GALAH: The GALactic Archaeology with HERMES (GALAH) survey is an ambitious spectroscopic survey on the Anglo-Australian Telescope with the ultimate goal of determining the detailed chemical composition of a million stars in the Milky Way to unravel the full assembly, dynamical, chemical, star formation and merger history of the Galaxy.
8. Data Intensive Science: the Centre is reliant on the efficient collection, processing, storage and curation of vast amounts of data from the Centre's scientific programs, requiring novel techniques and advanced algorithms to accomplish.

The focus of this software engineering position is on large-scale global data management, data processing, enabling in-site visualisation and data product dissemination. The development will be driven by science requirements of the various science projects carried out within CAASTRO-3D (see the list above). Due to the amount of data collected by current and future facilities and experiments, the handling and processing of the data requires large, heterogeneous computing facilities and capabilities.

This includes HPC centres, in-house clusters as well as private and public clouds. The software needs to be able to make use and manage such a diverse landscape. Science projects are highly experimental and agile in nature and thus the software, as well as the persons behind the software need to be able to work in such an environment.

CAASTRO-3D host institutions are: the Australian National University, the University of Sydney, the University of Melbourne, Swinburne University of Technology, University of Western Australia, and Curtin University.

CAASTRO-3D partner institutions are: CSIRO, the Anglo-Australian Observatory, the National Computational Infrastructure, Caltech, the University of Washington (Seattle), the University of Toronto, Oxford University, the Heidelberg Institute for Theoretical Studies, the Netherlands Institute for Radio Astronomy (ASTRON), and the Chinese Academy of Sciences.

Reporting Structure

Reports to:Andreas Wicenec (ICRAR/UWA)

Direct Reports:
Andreas Wicenec

Teams:
Data Intensive Astronomy Program.

Your role

The appointee will work together with the Data Intensive Astronomy (DIA) team and the CAASTRO-3D science teams on the implementation of optimised software to advance the ability of the science teams to analyse and combine the significant data streams coming from the various facilities. The science teams can be seen as the customers, while the DIA team will provide expertise and dedicated software development resources where required. The appointee will be expected to actively engage with the science teams in order to discuss and detail requirements and identify potential solutions and improvements. The required software development will be carried out within the DIA team, in an agile manner using existing software development methodologies and tools.

Key responsibilities

In their role in the International Centre for Radio Astronomy Research, the appointee will be expected to:

- Engage with the science teams to develop requirements for software and tools, both on a high and detailed level.
- Actively collaborate with researchers and other software developers within ICRAR/UWA, CSIRO and other CAASTRO-3D nodes and partner institutes.
- Participate and in some cases lead the development of the various science data reduction pipelines and workflows and identify synergies and commonalities.
- Participate in the further development of data lifecycle management systems operated on a global scale.
- Produce and maintain proper software documentation, both technical and user level.
- Develop and provide training for the users of newly developed software packages.
- Comply with, maintain an awareness of and help promote all UWA policies and procedures and in particular those relating to work health and safety and equal opportunity.
- Perform other duties as requested

Your specific work capabilities (selection criteria)

- Degree in software engineering or computer science, or a proven record of participating in large-scale, distributed software development projects in leading roles.
- Demonstrated ability to architect, design and develop high quality software in multiple languages, including C/C++, Python, Java and/or others.
- Substantial experience in data intensive software applications, both in data management and data processing in High Performance Computing and/or Cloud computing environments.
- Highly developed verbal and written communication skills
- Substantial record of participation in complex software projects.
- Experience with astronomical or other scientific data reduction packages would be an asset.
- An understanding of equal opportunity principles and policies and a commitment to their application in a university context.

Special Requirements

Undertake Interstate Travel

Compliance

Workplace Health and Safety
All supervising staff are required to undertake effective measures to ensure compliance with the Occupational Safety and Health Act 1984 and related University requirements (including Safety, Health and Wellbeing Objectives and Targets).
All staff must comply with requirements of the Occupational Safety and Health Act and all reasonable directives given in relation to health and safety at work, to ensure compliance with University and Legislative health and safety requirements.
Details of the safety obligations can be accessed at http://www.safety.uwa.edu.au

Equity and Diversity
All staff members are required to comply with the University's Code of Ethics and Code of Conduct and Equity and Diversity principles. Details of the University policies on these can be accessed at http://www.hr.uwa.edu.au/publications/code_of_ethics, http://www.equity.uwa.edu.au