



## Position Description

<b>College/Division:</b>	ANU College of Science
<b>Faculty/School/Centre:</b>	Research School of Astronomy and Astrophysics
<b>Department/Unit:</b>	Advanced Instrumentation and Technology Centre
<b>Position Title:</b>	Adaptive Optics R&D Software Engineer
<b>Classification:</b>	ANU Officer Grade 8 (Information Technology)
<b>Position No:</b>	TBA
<b>Responsible to:</b>	Adaptive Optics Group Lead
<b>Number of positions that report to this role:</b>	0
<b>Delegation(s) Assigned:</b>	NA

### PURPOSE STATEMENT:

The Advanced Instrumentation and Technology Centre (AITC) at the Research School of Astronomy and Astrophysics (RSAA) has high-level engineering and scientific teams that develop innovative state-of-the-art instrumentation for astronomy, space applications, laser communications and advanced materials. The Adaptive Optics (AO) R&D Software Engineer plays a major role in the development of the real-time computing hub at the AITC. Together with the Instrument Scientist and other software engineers, the AO R&D Software Engineer supports the production of AO real-time computers (RTC) for major observatories and R&D programs among AITC priority research areas in real-time computing for AO. The AO R&D Software Engineer brings critical knowledge on real-time systems design using innovative processors and hardware accelerators at the AITC and supports the AO group for the development of a comprehensive software stack for AO RTC. This work is done in the context of a worldwide collaboration including major observatories and industrial and academic partners, and in particular, in the context of MAVIS, an instrument for the ESO Very Telescope, for which a conceptual design will be carried out in 2019/2020.

### Position Dimension & Relationships:

The Adaptive Optics R&D Software Engineer will be responsible for developing a scalable real time computer architecture for future large AO systems on 8-10-meter-class telescopes and extremely large telescopes, as part of the R&D team, responsive to the Instrumentation Scientist. This will include, developing a new modular software stack to control adaptive optics systems and supervise their operations, including fast and low latency components based on emerging solution in High Performance Computing. The position will participate in R&D programs around this computing platform and will provide support to scientists at various levels (PhD, postdoc, researcher) on software design and implementation.

### Role Statement:

Under the broad direction of the Adaptive Optics Group Lead, the R&D Software Engineer will:

1. Perform software engineering work requiring individual judgment and initiative in the application of best-practice software engineering techniques and methods, including but not limited to developing software engineering solutions for the adaptive optics real-time pipeline including computing kernels, data interfaces, user interfaces and process sequencing, management and monitoring.
2. Maintain an awareness of, and capability, in their field of engineering expertise applying best-practice techniques and methods in the context of prototype and one-off constructions, and an awareness of relevant state-of-the-art technologies that might be applied to astronomical or space research.
3. Participate in engineering studies and the evaluation of systems, designs and novel concepts, delivering within financial and project planning estimates.
4. Participate in the manufacture and integration of (elements of) instruments and systems.
5. Provide specialist technical advice to a variety of stakeholders as appropriate.
6. Provide coding and performance tuning of critical software blocks in the AO pipeline.
7. Maintain the School's existing production software used for supporting the School's research program.

8. Comply with all ANU policies and procedures and in particular those relating to work health and safety and equal opportunity.
9. Perform other duties as requested, consistent with the classification of the position and in line with the principle of multi skilling.

### SELECTION CRITERIA:

1. Degree or post-graduate qualifications and extensive relevant experience or an equivalent combination of experience and education/training.
2. Extensive knowledge of, and experience with, the design, production and testing of software systems in a scientific/technical environment.
3. Extensive experience with object oriented software development methodologies with language experience including C/C++ development, Python 2 & 3, CUDA runtime, driver APIs and in developing software for Adaptive Optics systems on large astronomical telescopes, with real-time data acquisition systems, including custom FPGA based interfaces.
4. Experience developing software systems in a multi-threaded heterogeneous distributed environment and in GPU computing including algorithm mapping on the hardware features.
5. Demonstrated ability to solve problems and follow technical and project management protocols. Experience developing software for real-time systems.
6. Demonstrated capacity to work effectively as a team member of a multi-disciplinary team using best practice engineering protocols. Well-developed interpersonal and liaison skills.
7. Demonstrated ability to document work, present his/her work orally and prepare project review documents and presentations. Demonstrated ability to set priorities, meet deadlines and quickly adapt to new environments.
8. A demonstrated understanding of equal opportunity principles and policies and a commitment to there application in a university context

<b>Supervisor Signature:</b>		<b>Date:</b>	
Printed Name:		<b>Uni ID:</b>	