# Position Details

## Research Projects- CSOF4

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| The following information is for applicants |
| Advertised Job Title | Coastal wave-flow model developer |
| Job Reference | 74728 |
| Tenure | Specified Term of 24 months Full-time  |
| Salary Range | AU$85,361\_ to AU$96,573 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Hobart, Melbourne, Perth, Canberra (Hobart or Melbourne preferred) |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | Australian/New Zealand Citizens, Australian Permanent Residents, and candidates already in Australia or New Zealand holding a visa with rights to work in Australia |
| Position reports to the | Research Team Leader - Sea-level Waves and Coastal Extremes (SLWCE) Team, CSIRO Climate Science Centre |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | Vanessa.Hernaman@csiro.au, Ron.Hoeke@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 or call 1300 984 220. |

### Role Overview

Research Projects staff in CSIRO collaborates in scientific and technological activities with other research staff usually by assisting with detailed planning, undertaking or assisting with experimental, observational or technology development work, and in carrying out the more practical aspects of the work.

The role requires an experienced wave modeler who understands the physics and numerics of wave models such as SWAN or Wave Watch III (WW3), and has highly-advanced model development and scientific programming skills. The role will work closely with coastal ocean model developers to enhance, optimise and consolidate a third-generation spectral wave model within CSIRO Ocean and Atmosphere’s Environmental Modelling Suite (EMS, <https://research.csiro.au/cem/software/ems/>). Specifically, the position will work towards capitalizing on the two-way wave and circulation coupling within the EMS hydrodynamic core (COMPAS, <https://research.csiro.au/cem/software/ems/hydro/unstructured-compas/>) to improve wave-circulation and boundary layer processes. COMPAS operates on an unstructured mesh, and while two-way wave coupling has been accomplished (e.g. enhanced bottom drag, vertical mixing, Stokes drift and Coriolis and radiation stress gradient/wave force), it would benefit from further development, potentially using spectral wave quantities rather than peak or mean aggregates, and selection of default turbulent process schemes. This may include working with other researchers to perform verification and sensitivity testing at various study sites. This will likely also be associated with fundamental research into coastal/nearshore oceanographic processes at Australian/Indo-Pacific study sites.

### Duties and Key Result Areas:

* Use expertise in SWAN, WW3 or similar wave model to work with EMS/COMPAS developers to improve simulated wave-current-water level processes, as well as associated near-bed boundary layer processes at wave phase-averaged timescales;
* Work with EMS/COMPAS model developers to implement the wave model configuration and coupling scheme into EMS/COMPAS, including direct contributions to the EMS code base and associated documentation;
* Work with colleagues to create and follow model verification workflows for various study sites and conditions, and incorporate required improvement and modifications for further testing;
* Contribute to the interpretation and communication of results, including presentations, written reports and peer-reviewed publications for clients and the scientific and/or technology community;
* Participate in project planning and accept responsibility for the scheduling and completion of major parts of the project;
* Provide training and instruction to colleagues on activities pertaining to the immediate work area and responsibilities, as required;
* Communicate openly, effectively and respectfully with all staff, clients and suppliers in the interests of good business practice, collaboration and enhancement of CSIRO’s reputation;
* Work collaboratively as part of a multi-disciplinary, regionally dispersed research team, and business units to carry out tasks in support of CSIRO’s scientific objectives;
* Adhere to the spirit and practice of CSIRO’s Code of Conduct, Health, Safety and Environment procedures and policy, Diversity initiatives and Making Safety Personal goals; and
* Other duties as directed.

## **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. Relevant Masters or PhD Degree in science, preferably with major subjects in mathematics, physics or engineering sciences, or equivalent experience.
2. Demonstrated knowledge of source terms and numerical solutions to the (spectral) wave action balance equation and its application to common wave models (e.g. SWAN and/or WW3).
3. Demonstrated proficiency in programming computational fluid dynamic routines in C/C++ and/or FORTRAN.
4. Working knowledge of version control systems, e.g. Git/Mercurial.

## **Desirable:**

1. Experience with existing wave-flow coupled coastal models (such as Delft3D, SCHISM, ADCIRC, Telemac) and/or with phase-resolved wave models (such as Swash, XBeach-NH).
2. Experience with generating unstructured mesh computational grids for coastal models (or other fluid dynamics applications).
3. Experience with model coupling packages, e.g. OASIS.
4. Working knowledge and demonstrated skills in Linux/Unix-based shell scripting and/or Python, as well as experience with HPC systems and/or administering and configuring of Linux servers and virtual machines.
5. Knowledge of multidimensional file structures such as netCDF, its associated tools and handling of large scientific data sets.
6. Familiarity with GIS software libraries and databases (e.g. GDAL/OGR, Google Earth API, OSM) and/or web-based tools and data visualisation.
7. Strong interest in oceanography, meteorology, climate and/or other aspects of the earth sciences. Experience with earth science observations (both in-situ and satellite) and/or numerical model output would be an advantage.
8. Evidence of written and verbal communication skills including the ability to communicate effectively with colleagues and clients using a variety of communication methods (e.g., brochures, reports, papers, training courses).

Special Requirements

The successful candidate will be required to obtain and National Police Check.

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