

Pawsey Supercomputing Centre Projects

INTRODUCTION

This document contains links to some of the many Projects undertaken between 2014 and 2016 at the Pawsey Supercomputing Centre located in Perth, Western Australia. The Centre was named after the Australian radio astronomer Joseph Pawsey who was a Fellow of the Royal Society of London. The Pawsey Supercomputing Centre is an unincorporated joint venture between CSIRO, Curtin University, Edith Cowan University, Murdoch University and The University of Western Australia. Funding comes from the joint venture partners, the Western Australian Government and the Australian Government.

PROJECT PARTNERS

Project Partners referred to in this document and links to their projects are as follows:-

- **COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION (CSIRO)**
<https://www.pawsey.org.au/institution/csiro/>
- **AUSTRALIAN NATIONAL UNIVERSITY, ACT (ANU)**
<https://www.pawsey.org.au/institution/australian-national-university/>
- **SWINBURNE UNIVERSITY OF TECHNOLOGY, VIC (SUT)**
<https://www.pawsey.org.au/institution/swinburne-university-of-technology/>
- **CURTIN UNIVERSITY, WA (CU)**
<https://www.pawsey.org.au/institution/curtin-university/>
- **EDITH COWAN UNIVERSITY, WA (ECU)**
<https://www.pawsey.org.au/institution/edith-cowan-university/>
- **MURDOCH UNIVERSITY, WA (MU)**
<https://www.pawsey.org.au/institution/murdoch-university/>
- **UNIVERSITY OF WESTERN AUSTRALIA, WA (UWA)**
<https://www.pawsey.org.au/institution/the-university-of-western-australia/>
- **THE INTERNATIONAL CENTRE FOR RADIO ASTRONOMY RESEARCH, WA (ICRAR)**
<http://www.icrar.org/about/>

There are many Projects not included herein, which involve institutions including University of Adelaide, University of Melbourne, Royal Melbourne Institute of Technology, University of Sydney, University of New South Wales, University of Technology in Sydney, University of Wollongong, and University of Queensland.

AREAS OF SCIENCE

Projects in the following pages are in these areas:-

- | | |
|-------------------------|-----------------------------|
| ▶ Archaeology | ▶ Genetic Epidemiology |
| ▶ Astronomy | ▶ Health Science / Medicine |
| ▶ Bacteriology | ▶ Marine Science |
| ▶ Chemistry | ▶ Materials Science |
| ▶ Climate Science | ▶ Nanoscale Science |
| ▶ Computational Science | ▶ Plant Biology |
| ▶ Geoscience | ▶ Renewable Energy |

MORE ABOUT PAWSEY

- <https://www.pawsey.org.au/>
- <https://www.pawsey.org.au/project/>
- <http://www.pawsey.org.au/wp-content/uploads/2015/01/pawseybookletweb.pdf>
- https://en.wikipedia.org/wiki/Pawsey_Supercomputing_Centre
- https://en.wikipedia.org/wiki/Joseph_Lade_Pawsey

Pawsey Supercomputing Centre Projects

► Archaeology



3D Reconstruction of HMAS Sydney and German raider HSK Kormoran - CU

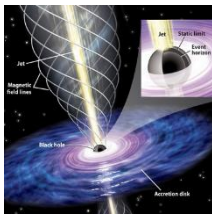
<https://www.pawsey.org.au/case-study/the-sydney-kormoran-project/>

► Astronomy



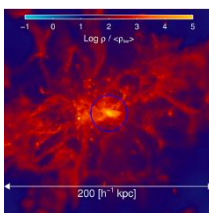
Cosmic Web Simulation including Dark Matter - CSIRO

<https://www.pawsey.org.au/case-study/cosmic-web-simulation/>



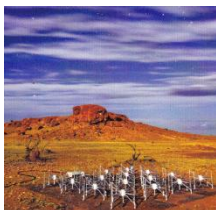
Astrophysical Accretion Disks, Jets and Winds and Interactions - ANU

<https://www.pawsey.org.au/projects/astrophysical-accretion-disks-jets-and-winds-and-interactions-with-the-surrounding-medium/>



Simulating The Epoch of Reionisation (SMAUG) - SUT

<https://www.pawsey.org.au/case-study/simulating-the-epoch-of-reionisation/>



Let There Be Light Epoch of Reionisation - Murchison Widefield Array – CU/UWA/ICRAR

<https://www.pawsey.org.au/case-study/let-there-be-light/>

<https://www.pawsey.org.au/case-study/murchison-widefield-array/>

Pawsey Supercomputing Centre Projects

► Bacteriology

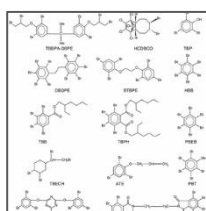


Revealing the Hidden Bacterial World in Ticks - MU

<https://www.pawsey.org.au/case-study/revealing-the-hidden-bacterial-world-in-ticks/>

<http://www.abc.net.au/catalyst/stories/4494187.htm>

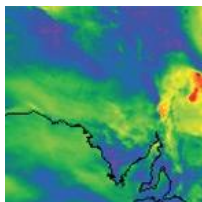
► Chemistry



Investigation into Combustion Chemistry of Novel Brominated Flame Retardants - MU

<https://www.pawsey.org.au/projects/a-first-principle-investigation-into-combustion-chemistry-of-novel-brominated-flame-retardants-2/>

► Climate Science



Exploring New Techniques for Simulating the Global Climate - CSIRO

<https://www.pawsey.org.au/case-study/exploring-new-techniques-for-simulating-the-global-climate/>

<https://www.pawsey.org.au/science-area/climate-science/>

► Computational Science



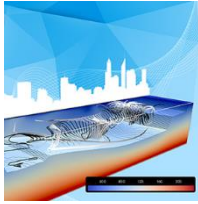
Render Farm enabling Game Design and Animation - ECU

<https://www.pawsey.org.au/projects/ecu-render-farm-2015/>

https://en.wikipedia.org/wiki/Render_farm

Pawsey Supercomputing Centre Projects

► Geoscience



Hydrothermal Modelling in the Perth Basin - CSIRO

<https://www.pawsey.org.au/case-study/hydrothermal-modelling-in-the-perth-basin/>



Modelling Microbially Enhanced Oil Recovery - CSIRO

<https://www.pawsey.org.au/case-study/modelling-microbially-enhanced-oil-recovery/>



3D Seismic Imaging of South East Asia - Earthquake and Tsunami Source Estimation - ANU

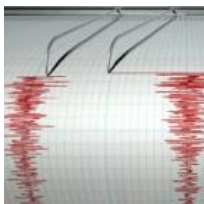
<https://www.pawsey.org.au/case-study/3d-seismic-imaging-of-south-east-asia/>

<https://www.pawsey.org.au/projects/bayesian-approaches-to-earthquake-and-tsunami-source-estimation/>



Seismic Imaging and Modelling of Resources - CU

<https://www.pawsey.org.au/case-study/seismic-imaging-and-modelling-of-resources/>



Large-scale Computational Modelling of 3D Passive Elastic Seismic Wavefields - UWA

<https://www.pawsey.org.au/case-study/large-scale-computational-modelling-of-3d-passive-elastic-seismic-wavefields/>

Pawsey Supercomputing Centre Projects

► Genetic Epidemiology



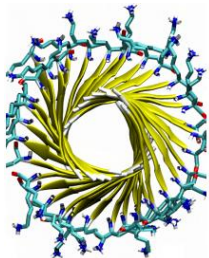
Unlocking The Genetic Code to Understand the Onset of Complex Diseases - UWA

<https://www.pawsey.org.au/case-study/unlocking-the-gene-code/>

<https://www.pawsey.org.au/projects/genetic-signatures-in-complex-human-diseases/>

<https://www.pawsey.org.au/projects/enabling-personalized-medicine-by-predicting-genetic-signatures-of-disease/>

► Health Science / Medicine



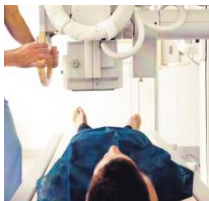
Combating Alzheimer's and Dementia - Modelling the Tau Protein - CU

<https://www.pawsey.org.au/case-study/modelling-the-tau-protein/>



Canonical Simulation of Respiratory Airflow to Improve Medication Delivery - CU

<https://www.pawsey.org.au/case-study/clinical-simulation-of-respiratory-airflow/>



Developing the Next Generation of Cancer Radiation Therapy - UWA

<https://www.pawsey.org.au/case-study/development-and-modelling-of-advanced-radiation-guided-technologies-in-medical-physics/>

<https://www.pawsey.org.au/projects/development-and-characterisation-of-online-detector-for-advanced-radiotherapy-treatment-verification/>

Pawsey Supercomputing Centre Projects

► Marine Science

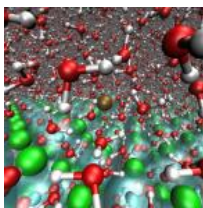


CATAMI - Collaborative and Automated Tools for Analysis of Marine Imagery

<http://catami.org/>

<https://www.pawsey.org.au/our-services/data/project-catami/>

<https://www.pawsey.org.au/case-study/catami/>



Molecular Modelling of the Adsorption of Magnesium on Calcium Carbonate - CU

<https://www.pawsey.org.au/case-study/molecular-modelling-of-the-adsorption-of-magnesium/>

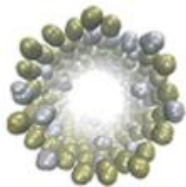
► Materials Science



Design and Analysis Methods for Blast Resistant Window Structures - CU/UWA

<https://www.pawsey.org.au/case-study/development-of-design-and-analysis-methods-for-blast-resistant-window-structures/>

► Nanoscale Science



Quantum-mediated Freezing and Melting of Hydrogen Isotopes in Nanopores - MU

<https://www.pawsey.org.au/projects/quantum-mediated-freezing-and-melting-of-hydrogen-isotopes-in-nanopores/>

http://158.75.16.31/web_page/pdf/2015_11.pdf

Pawsey Supercomputing Centre Projects

► Plant Biology

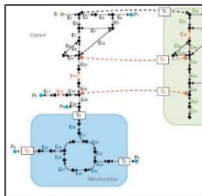


Knowing the Enemy - Eradicating Whitefly from Eastern Africa - UWA

<http://www.cray.com/sites/default/files/CS-Cray-Pawsey-XC40-Whitefly.pdf>

<https://www.pawsey.org.au/case-study/mrbayes-and-beast-analyses-of-agriculturally-important-organisms/>

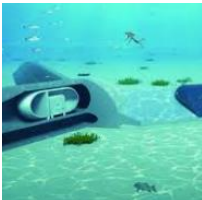
<http://www.abc.net.au/news/2015-10-13/perth-supercomputer-used-in-fight-against-global-hunger/6848538>



Constraint Based Approach for Simulating Plant Heterosis using Genome Scale Models - UWA

<https://www.pawsey.org.au/projects/constraint-based-approach-for-simulating-plant-heterosis/>

► Renewable Energy



Bombora Wave Power System – Flexible Membrane Performance Modelling - CU

<https://www.pawsey.org.au/case-study/bombora-wave-power-system-flexible-membrane-performance-modelling/>

<https://www.pawsey.org.au/2015/09/bombora-installs-wave-power-prototype/>