



## Francois Flocard

### Principal Engineer

Francois has over 15 years of applied experience working on a range of consulting engineering projects in coastal engineering and the marine renewable energy sector. Francois has managed projects in the fields of coastal hazards, coastal structures, climate change adaptation, physical and numerical modelling, and coastal monitoring. Francois is also an expert in the field of marine renewables; having managed the installation of a 250 kW pilot device in Victoria and led several

large studies related to wave dynamics and wave energy conversion. Francois brings to WRL the combined attributes of a practical engineering background and academic analysis to resolve complex coastal and hydraulic problems.

Francois is one of Australia's foremost experts in the application of physical models for analysis of coastal and marine structures, having modelled over 30 coastal and offshore structure projects in the past 10 years, and published many papers on coastal structure physical modelling methods and case studies. Francois's expertise is in the application of both 2D and 3D physical models for assessing rock and precast concrete armoured structures as well as the measurement of wave loading on rigid marine structures such as platforms, jetties and wharves.

Francois regularly undertakes desktop and numerical modelling investigations for coastal process, hazards and inundation studies. He has completed desktop based coastal process studies ranging from assessment of small property developments, through to regional coastal climate change vulnerability assessments. Francois's work extends from Tasmania in the south to Darwin in the north, and includes several projects in the Australasia region.

Francois is an active member of the marine renewable energy and coastal engineering communities, regularly publishing work in technical conferences and journals. He is a member of PIANC and was also a committee member of the Australian Wave Energy Atlas project in 2015 and 2016. He is an Australian Standard committee member for EL-066 "Marine energy – Wave, tidal and other water currents converters".

### Qualifications

BSc (Mechanical Engineering), Ecole Nationale des Arts et Metiers, France  
MEngSc (Hydraulics), Ecole Nationale des Arts et Metiers, France  
PhD (Civil Engineering), University of Sydney

### Professional history

2017-Current: Principal Engineer, UNSW WRL  
2015-2017: Senior Engineer, BPS Pty Ltd  
2011-2015: Senior Project Engineer, UNSW WRL  
2008-2011: Mechanical Engineer, BPS Pty Ltd  
2005-2007: Project Engineer, Beicip Franlab, Paris  
2004-2005: Reservoir Engineer, Total, Cameroon

### Expertise

- Wave energy conversion
- Physical model design, construction and testing
- Renewable energy resource assessment
- Numerical wave modelling
- Coastal processes and hazards
- Wave loading analysis
- Geo-spatial data analysis and planning
- Field investigations and data collection

### Summary of relevant experience

#### Coastal Processes and Numerical Modelling Studies

2008-2010: Wave-structure hydrodynamic modelling  
2012: Seawall Assessment and Adaptation strategies  
2012: Generic coastal setbacks for Australia  
2013: National Framework for Management of Coastal Erosion  
2012: Batemans Bay, NSW, coastal inundation study  
2012: Port Fairy, VIC, coastal hazard assessment  
2014: Coastal Adaptation for extreme events, Cook Islands

2015: Sediment transport assessment in Port Philip Bay  
2015: Automated wave forecasting system for Western Victoria  
2018: Rock revetment design, Hobart, TAS  
2018: Coastal hazards adaptation for Okines Beach, TAS  
2019: Muri Lagoon coastal hazards, Cook Islands  
2019: Kangaroo Island hazard lines  
2020: Byron Bay geo-bag revetment design, QLD  
2020: Australia-wide wave buoy climatology assessment

2020: Lake Illawarra foreshore protection  
2021: Newport SLSC overtopping protection, NSW  
2021: Scour protection for offshore renewable project, TAS  
2022: Clarence City Council Coast Hazards Adaptation, TAS

#### **Coastal and Offshore Physical Modelling Studies**

2011: Browse LNG terminal port and facilities, WA  
2012: Geotextile revetment stability testing  
2012: Rarotonga, Cook Islands  
2013: Craigie Beach, seawall climate change adaptation, VIC  
2013: Toogoom rock wall, QLD  
2013: Royal Yacht Club of Victoria Marina, VIC  
2014: Clump Point breakwater mobile bed 3D mode, QLD  
2014: Coffs Harbour Northern Breakwater Upgrade, NSW  
2015: Large scale modelling of sandy beaches under SLR  
2015: Tiwi Islands, floating pontoons, NT  
2017: Clump Point breakwater, QLD  
2018: Auckland America's Cup Upgrades, NZ  
2019: Port of Napier revetment, NZ  
2019: Ohau Point coastal protection, NZ  
2019: Port of Townsville reclamation, QLD  
2019: Concrete mattress stability testing  
2020: Opotiki training walls, NZ  
2021: Wellington coastal protections, NZ  
2021: Mandorah Breakwater, NT  
2022: Salt Ponds bund walls, WA  
2022: Ebeye, Republic of Marshall Islands

#### **Wave Loading Analysis**

2010: Wave loading on WEC foundation  
2013: Wave loading assessment for private coastal property  
2014: Subsea cable routing across reef, VIC  
2015: Offshore saltwater intake system, QLD  
2018: Wastewater treatment pipeline routing, Cook Islands

2021: Newport SLSC coastal protection, NSW

#### **Field Investigations and Data Collection**

2003: Guyana, environmental impact  
2004: Cameroon, geotechnical seismic survey  
2007: Iran, gas and oil wells pressure tests  
2010: Port Fairy, VIC, wave data  
2011: Sydney desalination plant compliance  
2012: Brooklyn and Dangar Island outfall study  
2012: Sydney, NSW, heat exchanger testing  
2015: Port Fairy, VIC, wave and current data  
2015: Portsea, VIC, sediment transport study

#### **Water and Energy Studies**

2004: Rio del Rey, Cameroon, oil gas reservoir modelling  
2005: Sirri, Iran, oil field simulation  
2007: GTFT, Algeria, gas field simulation  
2017: Hydrological impact of longwall mine in NSW  
2018: Audit of NSW Open cut coal mines final voids and impact on water resources  
2020: Expert review of coal mine water impact

#### **Marine Renewable Energy**

2002: Development of an experimental OWC turbine  
2007-2010: PhD (ocean wave energy conversion by pitching cylinders)  
2008-2011: Development of a wave energy converter pilot device  
2012: Port Fairy, VIC, wave power resource analysis  
2014: Marine spatial planning for Wave Energy Projects in Western Victoria  
2015-2016: BioWAVE 250 kW pilot deployment & commissioning  
2017: Assessment of coastal protection benefits from marine renewable project  
2020: Flume testing of floating wave energy prototype  
2021: Design of scour protection for wave energy device  
2021: Design of scour protection for deployed wave energy device