



POSITION DESCRIPTION – Academic Staff

Position Title: Research Fellow Level: B

Faculty/Division: AIIM / ARC Research Hub for Australian Steel Innovation
School/Unit: Electron Microscopy Centre

Primary purpose of the position:

The Research Fellow will be primarily undertaking applied, industry-focused research, working closely with Chief Investigators and researchers from UOW, Deakin University, Australian National University and Monash University, including Associate Investigators from BlueScope, and will be supported through additional mentoring, training, and personal development.

Reporting to the Chief Investigator and Senior Research Fellow, the incumbent will be supporting research activities outlined in Themes 1, 2, and 3 and described in Project Agreement B3.1 of the Steel Research Hub.

The Research Fellow is responsible for characterising the corrosion products forming on test panels after known and ostensibly similar outdoor and laboratory-based accelerated exposure cycles, to confirm corrosion mechanisms and kinetics. This information will be applied to alter key accelerated corrosion parameters to better correlate laboratory-based accelerated exposure cycles with their real-world outdoor counterparts. This position will be responsible for devising an accelerated exposure protocol that better simulates outdoor exposure cycles, thereby enabling more accurate accelerated mechanism-based product assessment decisions.

The incumbent will be working within a large scale multi-disciplinary research entity, and will be a member of the Steel Research Hub's Program 3, Advanced Corrosion Performance and Manufacturing Efficiency (Project B3.1).

The appointee will be affiliated with the Australian Institute of Innovative Materials (AIIM) located at Innovation Campus.

Position environment:

The ARC Research Hub for Australian Steel Innovation (Steel Research Hub, SRH) is a 5 year, \$28M research program designed to support the transition of Australia's steel manufacturing industry to a more sustainable, competitive, and resilient position based on the creation of new, higher value-added products and more advanced manufacturing processes. Led by the University of Wollongong (UOW), the Steel Research Hub brings together 9 Universities and 10 industry partners to deliver innovative research designed to enable a necessary technological shift in the steel supply chain. UOW is globally ranked among the top 1% of universities in the world focused on research excellence and impact.

AIIM is UOW's core research-intensive unit with over 70 specialised laboratories/suites spread across three flagship institutes, including the Electron Microscopy Centre (EMC). AIIM combines the very best of fundamental and applied science and has a demonstrated record of commercial translation to benefit our global communities' needs and aspirations. The EMC is UOW's premier electron microscopy facility. The EMC currently supports the imaging and characterisation needs of more than 200 researchers and higher degree research (HDR) students from AIIM as well as the faculties of Engineering and Information Science (EIS) and School of Medicine and Health (SMAH), external universities and commercial clients.

Major accountabilities/responsibilities:

Responsibilities		Outcome	Percentage of Time
1.	Identify the composition and morphology of corrosion products forming on bare alloy and organic coated (pre-painted) steel products after being subjected to known and ostensibly similar outdoor and laboratory-based accelerated exposure cycles.	<ul style="list-style-type: none"> • A catalogue of corrosion products each of which are correlated with their corrosion mechanisms and kinetics forming on bare alloy and organic coated (pre-painted) steel products. 	Up to 25%
2.	Correlate specific exposure conditions and history with identified corrosion products on pre-painted panels.	<ul style="list-style-type: none"> • Identification of macro corrosivity trends that correlate environmental data (e.g. ambient temperature, rainfall intensity and frequency, ambient humidity, salt deposition quantity and rate, sun and UV exposure) with the formation of corrosion products on outdoor pre-painted panels. 	Up to 25%
3.	Improve the realism and relevance of laboratory-based accelerated exposure cycles.	<ul style="list-style-type: none"> • To accurately replicate key outdoor exposure parameters (e.g. time of wetness, humidity, temperature, and drying cycles) in accelerated exposure tests. • To successfully reproduce outdoor corrosion products in laboratory-based accelerated exposure panels. • Increase confidence in laboratory-based accelerated exposure results. • Reduce exposure assessment time. 	Up to 25%

4.	<p>Support other research activities within Project B3.1:</p> <p>(i) Related to Theme 1 of Project B3.1 viz. the development of an IoT sensor network for monitoring of environmental conditions in real-time. This work will be primarily undertaken by another research team.</p> <p>(ii) Related to Theme 2 of Project B3.1 viz. assist in the development of mechanistic corrosion models for coated steel products which cover changes in surface and local conditions such as pH, ion concentrations, etc. This work will be primarily undertaken by chief investigators and researchers located in Deakin/ANU.</p> <p>(iii) Related to Theme 3 of Project B3.1 viz. assist in the development of quantitative physical models for the formation of native oxide layers and response to chemical treatments etc. This work will be primarily undertaken by chief investigators and researchers located in Monash.</p>	<ul style="list-style-type: none"> • The successful development, integration, and deployment of IoT sensors to collect local environmental data in real-time on test panels. • The successful development of mechanistic corrosion models for coated steel products. • The successful development of physical models showing native oxide layer formation. 	Up to 25%
5.	<p>Provide expertise, training, maintenance, and technical support in all aspects related to Responsibilities 1 to 4 to BSL and UOW staff, and HDR and/or Honours students engaged with Project B3.1 of the Steel Research Hub.</p>	<ul style="list-style-type: none"> • Support project staff and students in collecting and interpreting high quality data. 	Ongoing
6.	<p>To work collaboratively with staff within the BlueScope Steel Ltd (BSL) Innovation and Weather laboratories, research staff within UOW, AIIM and EMC, and HDR and/or Honours students.</p>	<ul style="list-style-type: none"> • Contribute to research objectives under Themes 1, 2, and 3 as described in Project Agreement B3.1 of the Steel Research Hub. • Support project staff and students in collecting and interpreting high quality data. • Contribute to authorship of high impact journal publications. • Present publishable data at international/national workshops and conferences. • Positive feedback from project staff and students. 	Ongoing

7.	Consult and coordinate with BSL and UOW managers, staff, and students, by communicating in writing and/or orally.	<ul style="list-style-type: none"> Information is delivered in a clear and professional form. 	Ongoing
8.	Contribute to the marketing activities of the Steel Research Hub, as required.	<ul style="list-style-type: none"> Help organise outreach activities in support of the Steel Research Hub. 	Ongoing
9.	Observe principles and practices of Equal Employment Opportunity	<ul style="list-style-type: none"> To ensure fair treatment in the workplace. 	Ongoing
10.	Have WH&S responsibilities, accountabilities and authorities as outlined in the http://staff.uow.edu.au/ohs/commitment/responsibilities/ document	<ul style="list-style-type: none"> To ensure a safe working environment for self & others. 	Ongoing

Reporting relationships:

Position Reports to:	Dr Azdiar Gazder, Chief Investigator and Senior Research Fellow
The position may supervise the following positions:	HDR and/or Honours students
Other Key Contacts:	Chief Investigators Project Agreement B3.1 (Deakin/ANU, Monash) BSL Innovation and Weather Laboratories staff Other UOW/AIIM/EMC staff HDR and/or Honours students AIIM Workshop staff and Laboratory/Safety Operations Officer

Key relationships:

Contact/Organisation:	Purpose & Frequency of contact
Senior Research Fellow, EMC	Project management, daily
BSL Industry Champion, Project Agreement B3.1	Project management, as required
CIs/Researchers, Steel Research Hub Project B3.1	Project implementation, weekly/fortnightly
PIs/Researchers, BSL Innovation and Weather Laboratories	Project implementation, weekly

Key challenges:

1.	Developing a system to catalogue corrosion products as a function of corrosion mechanisms and kinetics.
2.	Correlating corrosion products with environmental parameters.
3.	Developing protocols that accurately replicate key outdoor exposure parameters in accelerated exposure tests.
4.	Successfully reproduce outdoor corrosion products in laboratory-based accelerated exposure panels.
5.	Provide expertise and technical support in all aspects related to Responsibilities 1 to 4.

SELECTION CRITERIA – Knowledge & skills:

Essential:

- Demonstrated experience in materials, especially coated metals or alloys.
- Demonstrated knowledge and experience of corrosion, corrosion products, mechanisms, and kinetics.
- Publication record demonstrating expertise in and ability to correlate any combination of the following experimental analytical techniques with at least one from each of the Groups I to IV:
 - Group I: Electrochemical methods such as electrochemical impedance spectroscopy measurements or electrochemical noise analysis measurements, voltammetry such as Tafel-evaluation (potentiodynamic polarization measurements) and linear polarization resistance measurements (LPR), chronopotentiometry such as open circuit potential measurements (OCP) and scanning probe microscopy such as scanning ion-selective electrode technique (SIET) and/or scanning vibrating electrode technique (SVET).
 - Group II: Non-electrochemical spectro-electrochemical methods such as electro-reflectance spectroscopy, vibrational spectroscopies (IR and Raman spectroscopy), X-ray photo-electron spectroscopy (XPS), Auger electron spectroscopy (AES), X-ray diffraction (XRD), absorption, soft X-ray scattering spectroscopies (e.g.- resonant inelastic X-ray scattering (RIXS)), scanning probe methods (e.g.- scanning Kelvin probe force microscopy (SKM), confocal laser scanning microscopy, or atomic force microscopy (AFM)).
 - Group III: Other methods such as electrochemical quartz-crystal microbalance (EQMB), inductively coupled plasma-atomic emission spectroscopy (ICP-AES), photothermal or photocurrent spectroscopy, ellipsometry, weight-loss determination, electrical resistance, or SQUID-magnetometry.
 - Group IV: transmission and scanning-transmission electron microscopy (TEM & S-TEM), electron energy loss spectroscopy (EELS), focussed ion-beam microscopy (FIB), scanning electron microscopy (SEM), energy dispersive x-ray spectroscopy (EDS).
- Demonstrated record of developing and/or implementing algorithms and software to catalogue and correlate data and return predictions.
- Demonstrated capacity to work independently and within multidisciplinary/industry teams to solve scientific and technical problems.
- Excellent English communication skills (both verbal and written) and the ability to interact with individuals at all levels and from culturally diverse backgrounds.

Desirable

- Experience in delivering training courses.
- Experience in electrical and mechanical maintenance.
- Supervisory skills.

SELECTION CRITERIA – Education & experience:

Essential:

- PhD degree in materials science/engineering or related fields.
- Publication record demonstrating expertise, specialty, skills, and experience in corrosion science.
- Publication record demonstrating expertise in and ability to correlate multiple experimental analytical techniques.
- Demonstrated experience in developing and/or implementing algorithms and software to catalogue and correlate data and return predictions.

Personal attributes:

Essential:

- Ability to plan and conduct high-quality scientific research, working both independently and collaboratively.
- Ability to mentor and support peers within the research team and transfer knowledge to others.
- Ability to detect technical problems and find solutions.
- Ability to plan research work and deliver to the plan, engaging relevant stakeholders.
- Ability to communicate scientific and technical knowledge fluently.
- Excellent interpersonal skills.

Special job requirements:

May be required to work outside of standard business hours and perform other duties as required in support of Project Agreement 3.1 of the Steel Research Hub. After-hours attendance may be required to deal with sensor-based emergencies.

Roles and responsibilities in relation to Workplace Health and Safety (WHS):

The University of Wollongong is committed to providing a safe and healthy workplace for its workers, students, and visitors. All members of the University community have a collective and individual responsibility to work safely and be engaged in activities to help prevent injuries and illness.

In addition to the major accountabilities/responsibilities required for your position, you also hold the following roles and responsibilities in relation to Workplace Health and Safety:

All Staff

- Take reasonable care for your health and safety as well as others.
- Comply with any reasonable instruction by the University.
- Cooperate with any reasonable policies and procedures of the University including reporting of hazards or incidents via the University reporting process.

- Certain staff have specific responsibilities for Work Health and Safety (WHS), further information is available in the document [Roles And Responsibilities for WHS](#) and [WHS Management System](#).

Additional Responsibilities for Staff with supervisory responsibilities

- Ensure work area, equipment and practices are compliant with applicable legislation, standards, codes of practice and University guidelines.
- Ensure risk management activities are undertaken to minimise WHS risk including hazard and incident reporting, risk assessment and safe work procedures.
- Provide the necessary instruction, information, induction, training, and supervision to enable work to be carried out safely.
- Ensure Work Health and Safety (WHS) activities and requirements are implemented for area as outlined in the [Roles And Responsibilities for WHS](#) and [WHS Management System](#).

Inherent requirements:

This position description outlines the major accountabilities/responsibilities and the selection criteria against which you will be assessed as suitable for the position. As such there will be specific job requirements that we refer to as Inherent Requirements.

Inherent Requirements refer to your ability to:

- Perform the essential duties and functional requirements of the job.
- Meet the productivity and quality requirements of the position.
- Work effectively in the team or other type of work organisation concerned and
- Do the job without undue risk to your own or others health, safety, and welfare at work.

If you have any injuries, illness, disorder, impairment, condition, or incapacity that may affect your ability to perform the inherent requirements of the position, we encourage you to discuss this with the University to assist in the process of identifying reasonable adjustments to enable you to perform the duties of the position. The University wants to place you in the best situation to use your skills effectively in the position you are applying for at the University.