FedUni and BCIA Scholarship Application

Project: Enhanced yield and quality of humic products from lignites

Location: Federation University Australia, Gippsland Campus Churchill 3842, and Omnia Specialities nearby in Morwell, 3840

Surname

Given name

Address

Telephone **Email**

Are you a current FedUni HDR candidate?

Yes ◯ Student ID:

No ◯ Complete the HDR Candidature application in addition to the Scholarship application

Successful applicants will be advised by 28/02/2019, and will be expected to commence by 1/04/2019. However, the commencement date may be negotiated by the successful candidate.

For questions related to the research project, please contact Assoc. Prof. Vincent Verheyen, (03 51226451 vince.verheyen@federation.edu.au)

Conditions

Scholarships are for a period of three years only. Extensions to scholarships will not be granted. Applications are only open to Australian citizens and permanent residents and will require the candidate to be domiciled in the Latrobe Valley region. This position and scholarship are full-time, with no possibility of being undertaken part-time during candidature. A top up scholarship of $5000 p.a. will be provided along with project support funds of $6500 p.a. The candidate will be required to commit to a minimum of four days per week on campus and participate in an industry placement with Omnia for 6 months equivalent at various times during the term of their candidature.

View the general conditions for Fed Uni HDR Scholarships on the Research Website. Where these conditions differ to those on this form, the conditions outlined for this specific scholarship take precedence.

Eligibility to undertake a PhD

Scholarship applicants must also be eligible to undertake a PhD. Verify you can meet eligibility requirements outlined on the Research website. If you are applying for 'Honours equivalence,' please ensure that you provide detailed information to support your case.

Referees

Nominate one referee who can comment on your academic and research experience and capacity, and one referee who can comment on your industry and work experience, particularly in relation to the research project

area. Referee reports must be returned to Research Services by Thursday 31/1/2019 for your application to be considered. Any applicant without referee report forms will not be forwarded for consideration.

Statement

All prospective candidates are required to provide a 2500 word statement covering the following areas:

- Discuss your motivations for applying for this PhD scholarship, and your intended outcomes (both for yourself (personally and professionally), and for the sector)
- Discuss some of the key policy imperatives/directions, and existing research literature, which impact this topic area
- Discuss the opportunities and constraints of the proposed methodology (or, where a methodology has not been explicitly identified, please identify a relevant methodology and discuss the opportunities and constraints)
- Discuss potential challenges and how you might overcome them
- Please note, you are not required to provide the 250 project summary requested on the HDR Application for Enrolment Form – however you must note that you are applying for Scholarship.

Please list all documents provided, including supporting information:

	Required Documents		**Other Supporting Documents**
	HDR Application for Enrolment Form		List of published works
	2500 word statement		Professional memberships
	Qualifications		
	Transcripts		
	Scholarship Application (this form)		

For questions regarding the application process for scholarships and candidature, please contact the Graduate Research School at: research.degrees@federation.edu.au.

Applications for the FedUni BCIA scholarship close Thursday 31 / 01 /2019 and can be submitted via mail, email or in person at the Graduate Research office Gippsland or Mt Helen campus.

For general scholarship and candidature information, please contact:

Graduate Research School,
Federation University Australia,
P.O. Box 663, Ballarat VIC 3353,
Telephone: 03 5327 9508
Email: research.degrees@federation.edu.au

Office Use			
Graduate Research School	Date of Receipt:		Scholarship Registration Number:
Returned to Graduate Research School	Date of Receipt:		2019 /……..

Research project outline

TITLE: Enhanced yield and quality of humic products from lignites

Commencement date: 1/04/2019

Executive Summary

The problem / opportunity this project is aiming to solve / realise;

The use of lignite in agriculture is restricted due to its low “added value” compared to established fertilisers, agrichemicals and competition from local composts. However, lignite’s are inherently rich in humic compounds, which are niche agricultural bio-stimulants enhancing food production with a worldwide market. The value of liquid humate concentrates and market demand has enabled the growth of a local manufacture/export industry in the Latrobe Valley. However, the yield and properties of humic compounds are coal dependent with significant variation (20-95%) across and within the various mines and deposits. The project involves developing a practicable tailored lab based oxidation process which converts any lignite to humic and fulvic acids. The value proposition for the candidate undertaking this project is the expert supervision, industry placement, commercial relevance, top up scholarship, additional funding support, state of the art lab facility and supportive team.

The technology base for the project;

Weathered lignites such as US Leonardite have been sold as humic acids for many decades. Chinese lignites have taken market share with a likelihood that several have had their humic acid content boosted by oxidation post mining. The proponent has conducted preliminary wet oxidation experiments on Victorian lignite resulting in marked increases in humic and fulvic acid yields. The chemistry involves the controlled use of oxygen and hydroxyl radicals. Research may include the use of reagents to introduce nitrogen and sulphur and modify the product’s ion exchange and surface properties. The ideal product will have properties that are desirable for the end-user (eg, suitable for foliar spray equipment) as well as maximising bio-stimulant properties.

The research plan to deliver the project’s objectives;

- Review state of the art (including literature) on extraction, production and beneficiation of humic materials.
- Develop and refine lab-scale production technology to prepare target products from lignites.
- Characterise brown coal humin, humic acid and fulvic acid products and compare to commercial products that are known to be more and less effective.
- Work placement (6 months total) with Omnia as the industry partner on related research

This project will utilise the lab scale preparation and analytical capabilities at Federation University to develop a commercially practicable and safe means of oxidising ROM brown coals. Coal type, oxidant cost and consumption along with reaction rate and product yield are key variables.
A Ph.D. student under direction by the Principal Investigator (PI) will develop targeted oxidation processes for brown coals. Criteria for the selection of oxidation methods include cost effectiveness, environmental impact, safety and practicality at industrial scale. The Ph.D. student will focus on research into optimising the oxidation process and its research its effect on the structure and yield of the humic products.

Outcomes
The HDR student will gain valuable research and industry experience whilst on regular placement with Omnia. The project will deliver the experimental lab data (proof of concept) and cost estimate to facilitate decision regarding progress to pilot scale optimisation and commercialisation of the coal oxidation process. The technology developed here to tailor the preparation of quality humics in high yield, regardless of coal source will negate the need for selective mining, which is a major barrier to their local production.

Industry Partner: Omnia Specialities Morwell
Academic Supervisor: Assoc. Prof. Vincent Verheyen
Industry Co-Supervisor: Dr. Teferi Belayneh