Staff Snapshot- Nicolas Barraud

The EBCRC PhD programme is unique in that, as well as requiring extra commitments from students, such as contributions to TAC meetings and regular reporting, we also offer a range of workshops and programmes that aim to ease the transition from student to working life.

Mimi Leith recently caught up with Nic Barraud, former PhD student, now a postdoc on the Biofilm Applications project to ask him about the EBCRC PhD programme, and how he is finding life in the work place.

ML: How did the EBCRC PhD programme prepare you for life in the workplace?
NB: I think the main thing it gave me was an increased confidence in my knowledge of both the fundamental and application aspects of science. I am able to have an idea of possible applications in my head while working on fundamentals. I find this is very important to the workplace, because we are talking about both of these all the time.

ML: And do you think this is specific to the EBCRC programme?
NB: Yes. It gave me all the knowledge and confidence of a regular PhD but with a very specific focus on the relationship between fundamentals and applications.

ML: We require our students to go above and beyond what is required in a regular PhD, in that you must regularly present at TAC meetings, and submit student reports to the education and training manager. Have you found these extra requirements to be of benefit now that you are in the workplace?
NB: Yes. I have found that I can quickly create and deliver reports. Because of the variety of projects conducted by EBCRC, I have been exposed to a broad range of science. Also, through the TAC's I have learned about how to conduct efficient meetings, and have improved my people management skills.

ML: As well as asking a bit extra of our students, we provide different workshops and seminars for our students. Do you find these have practical use in the workplace?
NB: I thoroughly enjoyed the various workshops and courses I attended. During my PhD I attended an IP and commercialisation, a communications, and a scientific writing workshop. I find that these have given me a solid set of skills to draw upon that constantly apply to life in the workplace. Also, I enjoyed the travel opportunities provided to me during the PhD. I had the chance to go to two international and two national conferences. At these conferences I was able to interact with other scientists and build valuable professional relationships.

Interested in EBCRC activities?

We welcome enquiries from organisations who wish to participate in EBCRC research and commercial activities.

For more details please visit http://www.ebcrc.com.au/About/how_participate.htm or contact EBCRC.

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Enviro BioText

Environmental Biotechnology CRC Newsletter November 2008

World environmental focus on smart clean technology

Whether it has been Prof Tony Allen, the innovator of the groundbreaking "virtual water" concept, talking at the Water Environment Federation's annual meeting in Chicago and Stockholm Water Week or Dr Andrew Benedek, Lee Kuan Yew Water Prize Winner, at the Singapore Water Week, the current call around the world is to improve sustainable environmental management practices.

I have recently had a chance to discuss some of these broader these issues with both of them. Based on this, I have come to two conclusions. Firstly, there is an increasing need to apply our knowledge to the root causes of environmental problems, and secondly that smart environmental technologies are going to come from outside our conventional ways of understanding these problems.

Many authorities are encouraging innovation to understand the complex problems facing us today. For example Dr Benedek donated his Lee Kwan Yu prize money - $300,000 to establish a 'Don Quixote' prize for innovations from young water professionals. As a sign of his commitment, he also topped it up with his own money to make a $1m fund. Don Quixote refers to an idealist who often got things wrong and made mistakes – but nevertheless had unbounding enthusiasm to do the right thing. The prize is hoped to encourage young inventors to stray outside conventional thinking to come up with new solutions.

Recently the Federal Government also approved new funding for venture capital funds investment as part of its continued commitment to innovation in the environmental and climate change areas. This presents us with a guide to where we might go with a new CRC proposal. We are considering biotechnology, nanotechnology and smart processes linked with good engineering. These trends are common to the thinking of many contemporary innovators and investors.

However, if I heard one measure of caution, it is that we need to have at least one truly blue sky tilt at a technology to revolutionise the world. And we need to be able to convince our supporters that this will be worthwhile. We are putting our thoughts together as we speak and discussing them at many levels around the world. EBCRC has made good progress with its work so far, but is not quite there yet with the application of the new technologies.

I believe that we have something novel to contribute in this area and that a new CRC will be a good way to go. The present financial crisis will be a new impediment and we will need to be creative in getting funding as well as in putting ideas together I welcome your ideas, after all innovation never grows in isolation.

Dr David Garman

Electronic version of Enviro BioText

This is a promotional copy of Enviro BioText which has been published in electronic format from August 2007 onwards.

If you would like to subscribe to Enviro Biotext or change your contact or subscription details please contact Michaela Lauren on m.lauren@ebcrc.com.au or +61 (0)2 9209 4969.

In this issue:

Smart biotechnology for toxic waste

Australian scientists have discovered a new technology that can easily break down recalcitrant chlorinated hydrocarbons (CHC) on-site. Most CHCs are highly toxic products or by-products of chemical reactions and are associated with some well known environmental problems.

“Our technology is based on the use of granulated activated carbon which together with a common solvent and an electron enhancer helps hydrogen turn a CHC into a hydrocarbon and salt, thereby converting a harmful compound into harmless ones”, said Dr David Garman, Executive Director of Environmental Biotechnology CRC (EBCRC).

“We also add a biologically based compound, such as a vitamin, to assist an inorganic reduction of CHCs. These are very stable organic compounds and without the additional boost the reaction is so slow and inefficient that it had previously been rejected as a viable clean-up process. “
“The technology mimics a biological process by using molecules to assist with reactions that wouldn’t occur under normal conditions.”

The novel process, developed by EBCRC researchers at Murdoch University and the University of New South Wales, allows the re-use of activated granulated carbon used to remove and breakdown CHCs. The process regenerates activated granulated carbon by solubilising the bound halogenated hydrocarbons to a gas and a liquid which will allow their safe destruction. The activated carbon is then recycled for reuse or disposed of as a low impact waste.

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...Continues...Current CHC disposal methods include rotary kiln incineration which involves the establishment of expensive infrastructure and makes the activated carbon less active, thus compromising its future use. Therefore, due to its expensive nature and the loss of activated carbon, existing users simply store the contaminated material.

“Cleanup of halogenated hydrocarbons from industrial and commercial processes is an ongoing and expensive undertaking. One of the great features of our technology is that the novel in-vessel process can be transported to the contaminated site. This is a critical feature when transport or incineration of waste material is undesirable”, Dr Garman continued.

“There is an increasing awareness of the detrimental effects of CHCs on human health as well as the environment at large. Our technology will definitely contribute towards a cleaner and healthier environment”, Dr Garman concluded.

Local councils and water utilities to benefit from next generation wastewater treatment

A new treatment technology will harness natural biological processes to eliminate potentially damaging nutrients from domestic wastewater. It has the potential to reduce overall energy consumption and greenhouse gas emissions of wastewater treatment by a third.

Granular activated sludge can be used treat wastewater more efficiently and it presents a more robust alternative to current systems. The excellent settling properties of granules remove a capital and energy intensive step for the dewatering treatment of biosolids which are a by-product of the treatment process.

Granules are an environmentally friendly technology that eliminates the need to use harsh chemicals for nutrient removal. Naturally occurring bacteria in wastewater can be formed into granules and selectively made to remove nutrients such as phosphorus, nitrogen and carbon. Dr Phil Bond, project leader for Environmental Biotechnology CRC (EBCRC) at the Advanced Water Management Centre (AWMC) at the University of Queensland, will apply the granular technology to remove nutrients from domestic wastewater.

“Initially the technology was developed for the treatment of high strength (industrial) wastewater. There is now an opportunity to apply the technology for the treatment of domestic (lower strength) wastewater which will enormously benefit local councils and water utilities “, said Dr Bond.

“Aerobic granular activated sludge is a novel biological treatment technology that has potential to make considerable savings with regard to costs of capital outlay, operation, land usage and energy in wastewater treatment“, Dr Bond continued.

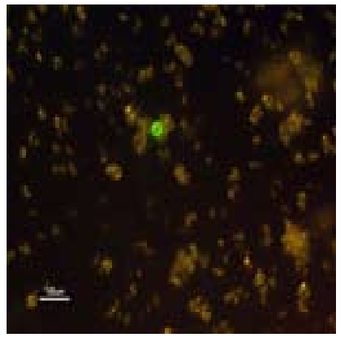
The de-watering process is by far the most energy intensive part of wastewater treatment. “In comparison to conventional activated sludge treatment, granular sludge has exceptional de-watering characteristics. A plant running on granular technology will produce biosolids from wastewater that contain much lower water content than conventional treatment produces sludges.”

“So the new technology significantly reduces the footprint and energy consumption of the de-watering phase, resulting in improved operational efficiencies and cost savings”, Dr Bond continued.

”The technology will be extremely beneficial as councils and industry attempt to minimise energy use and greenhouse gas emissions”, Dr Bond concluded.

Research funding was recently boosted by a Queensland Smart State fellowship awarded to Dr Bond. Other project partners include EBCRC, AWMC and Meat and Livestock Australia.

Clean water? Getting the answer in minutes



“New rapid in-field diagnostic devices will detect the presence of pathogenic organisms or chemical contamination in water in minutes. They will significantly improve water safety and reduce health risk from use of contaminated drinking water in areas affected by major catastrophes and in the developing world”, said Dr David Garman, EBCRC Executive Director and President of IWA at the World Water Congress in Vienna.

Environmental Biotechnology CRC researchers at Macquarie University in Sydney and Murdoch University in Perth have developed a diagnostic platform that can quickly turn around results presently achieved in twenty four to forty eight hours.

“We are developing novel technology to overcome the many challenges that rapid pathogen detection presents. New developments include effective sample concentration methods, improvement of the sensitivity of tests and design of portable in-field detection devices.”
“Our technology mimics the human body’s ability to detect pathogens. By using antibodies in combination with nano and micro particles, we can easily identify pathogens in an environmental sample.”

“A key to our success is our ability to break up the organisms and then multiply parts of it by using a special chemical at body temperature. Other systems similar to ours require complex lab equipment or high temperatures, which are just not viable in remote field operations.”

The simple-to-use system will provide results directly to portable devices via simple electronic readouts, laptops and PDAs. The system will be based on proprietary technology, which integrates sample preparation and analysis and will be applicable for the detection of a broad range of organisms for example common water borne contaminants such as faecal coliforms, E. coli, Legionella, Cryptosporidium and Giardia. The system is highly adaptable to food, environmental and point of care applications.

Currently methods used to identify waterborne microbes are either sensitive but slow (requiring up to 3 days for a result), or relatively fast but insensitive when used with dilute samples.

“There is a great unmet need to rapidly detect micro-organisms and contaminants in water partly because of increased stringency in the regulatory environment, but also because of increased concerns about the biosecurity of critical infrastructure.”

“By providing robust, highly specific results in the field, the system will enhance the early detection and management of disease outbreaks and contamination”, Dr Garman concluded.

Notice of address change

The Australian Technology Park has assigned EBCRC headquarters a new postal address, which is already effective. The new address is:
Environmental Biotechnology CRC
Australian Technology Park
Locomotive Workshop, Suite 3010
2 Locomotive Street
EVELEIGH NSW 2015
AUSTRALIA

WTA licenses EBCRC’s wastewater treatment technology

EBCRC member Waste Technologies of Australia has confirmed it will install EBCRC’s biological nutrient removal technology to one of its wastewater treatment sites later this year. WTA licensed the technology, which is based on one of the earliest inventions at EBCRC. The technology is based on automatically controlled multiple phases that give simultaneous nitrification, denitrification and phosphorus removal from high strength wastewater.has had the privilege to work with over the years.

Enviro BioText

Enviro BioText is the quarterly newsletter of the Environmental Biotechnology Cooperative Research Centre.

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