Message from Academic Chair

Our Environmental Engineering graduates work around the world, thinking on their feet to creatively solve current global challenges in water, energy and waste management. As Chair of Environmental Engineering at Murdoch University, I get to work with students who present original and innovative solutions to complex problems. Here are some examples of their great stories...

Murdoch Environmental Engineering student Yi Xin addresses the challenges facing developing countries, specifically Cambodia. During her work experience program she was able to work with local communities on building low cost, appropriate technology water supply and waste management facilities. Back in Australia, Yi Xin has now taken up a placement with WA’s premier land development agency Landcorp and is applying her independent thinking to new solutions for urban village sustainability in the developed country context.

The Environmental Engineering program at Murdoch University is cosmopolitan through and through. Om is another good omen of this theme. He was born in England, did his schooling in Melbourne and spent a number of years snowboarding in the USA before coming to study Environmental Engineering at Murdoch University. He joined the construction waste audit team during his studies where he learnt to think for himself to design solutions for recycling. Passionate about travel, Om went to New Zealand for his work experience placement at the Central Technology Park near Wellington where he was tasked with preparing environmental management plans. Now in his final year, Om is working in the urban development sector for his Honours thesis to research and develop a novel micro-grid concept for a new industrial park. Located south of Perth the industrial park will integrate solar energy and battery storage with water treatment.

A group of six Environmental Engineering students, Aravinda Ella Nishi Rachel Om and Ray, flew to China for their winter semester break, courtesy of the New Colombo Plan funding they have received, to work on solutions that decontaminate a polluted lake as well as local agricultural soils. They will report back soon.

Ready to join these award-winning students? To learn how to think for yourself and work collaboratively? To solve major global environmental problems for a better approach to sustainable development?

Thanks again to Nishi Verma for her work on this issue. Enjoy reading about our work.

Dr Martin Anda, July 2017.

Graduate Profile
Max Ploumis is the engineering manager of Direct Energy Australia. The company is involved with geothermal heating and cooling and climate control systems as well as other renewable energy projects.

OzWater’17 Gala Awards
Ashwin Nayak and Dr. Martin Anda, the State Award Winners, were invited to attend the National Awards in Sydney this year.
Murdoch University over a span of three months. Particularly, it was linked to sustainable development.

They were placed in a group alongside Dr Martin Anda’s Environmental Engineering Design students tasked to develop innovative water and energy systems for an apartment complex at 7 Quarry Street, Fremantle. A number of options were developed through researching innovative case studies of sustainable water/energy systems around the world, conceptual modelling, numerical analysis, current regulation compliances and architectural aspects of the building. Their goal, as a team, was to assess the preliminary architectural design and incorporate innovative solutions for the energy and water nexus. Other than being creative, their design needed to focus on housing affordability and meet nationally and internationally recognised best practice standards for environmentally sustainable building design, such as LEED, One Planet Living (zero carbon), Passivhaus, Triple Bottom Line (TBL), NatHERS, Green Star Rating and, most important of them all, Living Building Challenge. To achieve affordability and innovation within the project, an innovative option was created for submission to the Australian Renewable Energy Agency (ARENA) for funding.

While being taken to several site visits by Dr. Martin Anda, the young engineers developed a better understanding of how sustainable a project could be. They were able to gain a better understanding of new technologies currently being employed in the field, allowing them to broaden their horizons.

“It was a great experience to be able to perform our internship at Murdoch University and given the chance we would definitely share this experience with our peers back home in Singapore.”

We wish the boys all the very best with their studies!

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OzWater’17 Gala and Awards

The Ozwater Gala Dinner and Awards are coveted by leading professionals in the water industry. Last year, Ashwin Nayak won WA Student of the Year while Dr. Martin Anda won WA Water Professional of the Year in the awards. They were invited to attend the national awards this year in Sydney.

Sponsored by TRILITTY and ANZ, the gala dinner and awards ceremony brought together top minds across the industry, from engineering to governance, research, academia, utilities and more. With over 900 people in attendance, managing director of TRILITTY showcased the talent of the industry, saying “I’m glad to see the water industry taking the lead to solve some of our biggest issues, and there is evidence of this throughout the entire conference.”

Starting from the group awards, Sydney Water’s clever customer education campaign “Keep Wipes out of Pipes” netted the utility the Program Innovation Award, which recognises innovative environmental and sustainability programs. Other parties such as the University of Queensland and Water Corporation Western Australia also took home awards. Moving on to the individual awards, Kaitlyn Bell won Student of the Year for her studies into the monitoring of sewer pump stations. Water Professional of the Year went to Professor Craig Simmons, director of the National Centre for groundwater research and training.

for the chance it gives this growing and changing industry to highlight innovation and best practice among its ranks. Although, Nayak and Anda were unsuccessful in getting awards, the hospitable atmosphere and pyrotechnic shows certainly added to the amazing experience.
Research Students
Ivonne

After their undergraduate studies, students have the option of pursuing a PhD degree. Ivonne Tshuma, one of the PhD candidates at Murdoch University, has developed a self-desalinating device to purify inland water. The technology she has developed will purify impaired waters with use of minimal energy and is mainly going to be used in remote areas. This technology uses osmotic pressure from extremely salty sea water and brackish water to generate energy to drive the process.

Reverse osmosis (RO) is one technology that provides an encouraging, partial solution to the water requirements of today. RO is a pressure driven process where permeate flux and recovery are controlled by the hydraulic pressure applied to the feed water. Unlike RO, forward osmosis (FO) operates on the principle of osmotic transport of water across a semi-permeable membrane from a dilute feed solution into a concentrated draw solution. The difference in concentration across the two sides of the membrane produces osmotic pressure and this becomes the driving force for water flux across the membrane in FO.

Reverse osmosis has been reported to have high energy requirements and problems of brine disposal. This technology (self-desalinating device) uses brine as the source of energy and eliminates the high energy requirements of reverse osmosis. The technology works by the principle whereby the energy produced by FO (termed pressure retarded osmosis) is directly coupled with RO to provide the pressure required by the RO process.

Ivonne hopes that her device will help those in rural areas where access to supplies may be limited.

Students in the Workplace
Landcorp

As the premier land development agency in Western Australia, Landcorp offers young professionals a great start in applying what they’ve learnt at university and developing their skills. In a time where the focus has shifted to new materials and renewable energy and water efficiency technologies, it has become vital to present such technologies as marketable, sustainable alternatives. In this manner, Landcorp has been the leading agency for many years. For the past month, students from Murdoch University have been working at Landcorp, completing various tasks in their work placement and thesis projects. While they are all present at Landcorp for varying lengths of time, the students are making headways in their respective projects.

Academic Chair of Environmental Engineering at Murdoch University, Dr. Martin Anda, explained “The industry partnership with Landcorp is very important for the students. The partnership is providing placements that enable the students to complete their 450 hours of work experience and thesis projects that enable valuable industry-focused research to be undertaken before graduating.”

Om Dolasia and Swapna Krishnakumar are completing their final year ENG470 thesis project with the state-owned government enterprise. “Everybody at Landcorp has been nothing but helpful, giving essential advice on industry and recent developments,” Om says. “They really encourage you to be the best that you can be and put yourself out there.” Working on design of an industrial estates at Nambelup, he hopes to find a new solution for a solar/water micro grid.

Meanwhile, undergraduate student Nishi Verma works on the Hamilton Hill High School redevelopment. As the surrounding flora and fauna is such a hot point for conservation, the need to apply ecological design principles is imperative. Environmental Engineering allows the retention of natural identity in the landscape while continuing to make sustainable advancements in technology.

In her role at Landcorp, Murdoch graduate Yi Xin Shaw is doing research on converting a trailer park in Bunbury to a sustainable, residential development. Her main focus is application of Environmental Engineering methods as an important step in achieving Landcorp’s vision for its developing sites. “Not only are sustainability initiatives key to the agenda, it is important to understand the balance between all sectors and how they all work collectively to create a successful project.”

Sustainability and Innovation Manager at Landcorp, James Butterfield says “All students are making significant progress in their tasks. The questions that they ask and the ideas they input into discussions are always well thought out and useful. Landcorp aims to strengthen its partnership with Murdoch University in the future.”
Graduate Profile

Max Ploumis

Murdoch University takes great pride in all of its graduates and the work that they’re doing in society after completion of their studies. Environmental Engineering graduate Max Ploumis recently gave an interview for EELS.

Hi Max, thank you for doing this interview!

No problem. I’m really glad you guys thought of me!

Where do you work now and what types of roles are you involved in?

I currently work as the Engineering Manager for Direct Energy. I have been designing and managing the installations and commissioning of geothermal heating and cooling systems in large buildings around Australia, particularly in Melbourne and Sydney. Geothermal heat pump systems are able to save a lot of energy on the heating/cooling requirements of buildings, particularly when they are coupled with solar power systems and smart controllers. I have worked on some very innovative buildings such as the 5x4 Hayes Lane house in Melbourne http://www.fivexfour.com/, and the Royal Botanic Garden in Cranbourne Victoria.

Were there any opportunities that led to you getting your current position?

There were a few key opportunities that helped. One was my final year project at Murdoch University where I had to design a geothermal system for the South Fremantle High School - I was lucky enough to have Dr. Martin Anda as my advisor. Then, upon graduating with a double major degree in Environmental and Renewable Energy Engineering, I commenced work with a geothermal consulting firm - GT Power. After a stint there I joined EMC Solar where I helped to design commercial scale solar power systems. Then, I joined Direct Energy as a junior engineer which promotions ultimately led me to my current role as Engineering Manager where I now oversee the work of our new junior engineers.

What was your experience like at Murdoch University?

My experience at Murdoch University was very unique. I built strong working relationships - a network which I still use today. It also provided me with a very good hands on approach to learning with many site visits and access to industry leaders’ who shared their knowledge and learning experiences from the field. This combined with our coursework made studying at MU a great platform for graduating into the workforce with knowledge and experience that was very applicable.

Any advice or recommendations for future students?

My main recommendation to students unsure of what to study would be to get started no matter what. You won’t know exactly what you will like until you try it. You’ll also find opportunities you won’t know exist until you get out and talk to people. I chose Environmental Engineering as I thought that it would be great to work and reduce our environmental impact at the same time. After one year, I realized that combining Environmental Engineering and Renewable Energy Engineering was exactly what I was after personally. I have never looked back and cannot be happier working in the sector.

I always recommend Murdoch University for a Bachelor in Environmental or Renewable Energy Engineering as I know that it prepared me well for the industry. This is the experience I now look for when recruiting new engineers.

Lastly, have fun and make the most of your time with your peers and lecturers. You never know when or how you will cross paths in the future. And it goes really fast.

Geothermal energy is the main source of energy in Iceland. 87% of homes are heated by geothermal energy. Environmental Engineers enable these developments.