

## Researcher's Spotlight: Prof. Michael Oelgemöller

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**Name:** Associate Professor Michael Oelgemöller

**Faculty:** Division of Tropical Environments and Societies; College of Science, Technology and Engineering; Discipline of Chemistry

**Key research areas:** Green and Applied Photochemistry

**Homepage:** <https://research.jcu.edu.au/portfolio/michael.oelgemoller/>



### Which are your key research areas?

My research is dedicated to applied and green photochemistry, so almost everything that deals with the chemical effects of artificial or natural light. Our projects span across the entire spectrum of pharmaceutical and chemical research, ranging from the development of miniaturized early drug discovery tools to the large-scale production of chemicals, photostability testing and photolytic degradation. All of these processes match seamlessly with JCU's motto 'crescente luce – light ever increasing'.

### Why did you choose your field of research? What is driving you?

I was literally enlightened when conducting a research project in photochemistry as an undergraduate student at the University of Münster (Germany) in 1993. I was fascinated that organic molecules would undergo strange and complex reactions with a 'flick of a light switch'. I particularly enjoy those reactions that work in sunlight as they use very colorful photocatalysts (called photosensitizers) and bubbles of air as a reagent gas. These reactions demonstrate the true beauty of photochemistry. For a long time organic photochemistry was seen as a curiosity with very few industrial applications. Recently and also thanks to our work on flow and solar photochemical syntheses, this has changed and photochemistry has seen a remarkable renaissance.

### Why do you think your research area is important?

Light is a very powerful but clean reagent. It can be easily controlled, dosed and tuned. This makes it unique as an energy source. Light can likewise be constructive (synthetic) or destructive and thus finds applications in many industries. Due to the climatic conditions of Northern Australia, solar chemistry is particularly interesting for this region. The development of continuous flow reactors has likewise sparked a massive interest in this so far neglected methodology. It is thus very exciting to lead research in this field and my group is literally 'lighting the way' in some areas.

### What do you like best/most about supervising postgraduate research?

I love my research group and the atmosphere caused by my many domestic and international students is truly stimulating. Postgraduate students are at the start of their careers and full of ideas and ambitions. I feel blessed that I can guide them during their projects until they finally graduate. I especially enjoy it when discussing unexpected results, designing a new photoreactor or just talking over a beer. The Germans use the term 'Doktorvater' (Doctoral father), which describes the special relationship very well. Of course it is always sad when students finally leave. It is rewarding, however, when they find positions in industry or academia. With many of my former students I still keep in contact.

### What makes a successful supervisor and student partnership?

It works best when expectations are realistic and both maintain a friendly but professional relationship. I once said that postgraduate supervision is like training a dog. At the beginning you need to keep them on a short lead but as the project progresses you can give more and more lead until you can let them run freely. Ultimately I try to adapt to every student's needs and skills individually. Some students require a bit more attention, time and help than others. Due to my heavy teaching and administration load, my time for supervision is often limited. Fortunately, I always have some well-trained senior students who work independently and can thus help with the supervision. Ultimately, research is team-work and affects every member of the group.

### How important is international research experience for young researchers?

I encourage all of my students to spend time abroad. I was also able to send most of my former students to collaborators in Europe or Asia, which is always a big experience or even adventure for them. Personally, I had never planned to leave Germany or even my little province in Westphalia, but thanks to excellent and supporting supervisors I was able to spend time in the USA, South-Korea and Japan. As part of my academic career I have later lived and worked in Japan, Ireland and now Australia. I would have never dreamed of this back in 1983. Chemistry is a truly international science and it can take you anywhere, if you want it! You may speak different languages, but the chemical formula of water is everywhere H<sub>2</sub>O. All of my students who have returned from an international exchange fully enjoyed the experiences. My group also always hosts international visiting students, in particular from Europe. This multicultural and international environment is very enjoyable. My students claim that 'our' group is the most fun and I couldn't agree more.

### Short facts/ Overview:

#### Awards and Prizes:

- JCU TropEco Sustainability Research Award 2014 for the 'Eradicate Insect-borne Diseases with Sunlight Initiative'
- European Photochemistry Association – Photochemical & Photobiological Sciences Prize 2014 (presented to Dr. Norbert Hoffmann)

- Distinguished Lectureship award of the Chemical Society of Japan 2011
- Bayer CropScience Employee award of the Research Centre in Yuki (Japan) 2004
- Kurt-Alder award of the University of Cologne (Germany) 2000
- Fellowship of the Korean Science and Engineering Foundation (KOSEF) and the Deutscher Akademischer Austauschdienst (DAAD) 1997

**Visiting Professorships:**

- Visiting Professorship at the University of Toulouse, Toulouse (France) 2016
- Visiting Research Fellowship at the CNRS, Toulouse (France) 2015
- Visiting Professorship at King Mongkut's University of Technology, Bangkok (Thailand) 2015
- Visiting Professorship at the CNRS/University of Pau, Pau (France) 2012
- Visiting Professor at the Nara Institute of Science and Technology, Nara (Japan) 2012
- Visiting Professorship at Osaka Prefecture University, Osaka (Japan) 2011
- Visiting Professorship at the CNRS/University of Pau, Pau (France) 2009
- Guest Lecturer at the University of Osaka, Osaka (Japan) 2006

**available PhD/research projects:**

for more informations, see [here](#).

- Continuous Flow Photochemistry – 'Lab & Light on a Chip'
- Solar Manufacturing of Commodity Chemicals with Sunlight
- 'Safeguarding Australia from Insect-borne Diseases' – Sustainable Insect Repellents and Antimalarials from Tropical Plants
- 'Medicinal Chemistry with Light' – Photochemical Synthesis of Bioactive Compounds
- Combinatorial Photochemistry – 'Photochemistry on, to & off Polymer Beads'
- 'Cleaning Water with Light' – Photochemical and Photocatalytic Degradation of Pharmaceutical Residues in Water
- 'Climate-smart Aquaculture' – Sustainable Water Disinfection for Aquaculture Applications
- 'So you think you are sun-safe?' – Photostability of Sunscreen Agents

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