

UQ-TUM 4-6 OCT 2017 BIOECONOMY SYMPOSIUM

The Impact of Biotechnology
on the Economy of the Future



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA





Welcome

from the Vice-President and Deputy
Vice-Chancellor (External Engagement)



Welcome to The University of Queensland (UQ) and the Technical University of Munich (TUM) Bioeconomy Symposium.

This Symposium is an important opportunity to reflect on global interests in renewable biological resources, and to explore key measures and challenges identified by the Organisation for Economic Co-operation and Development (OECD) and the European Commission.

Global food security, renewable energy, and climate and environmental protection are some of the biggest issues of our time. Meeting these challenges will not only require great social, economic, and political effort, but will also demand intense research and new approaches to innovation.

Germany, through its National Research Strategy BioEconomy 2030, is on its way towards a natural cycle-orientated bio-based economy that is in accordance with cutting-edge technology and ecology. Australia too, has a committed interest in this space. A report from the Australia-Germany Advisory Group has called for greater cooperation between our nations on science and education. As one of the country's premier universities, UQ is poised to strengthen and deepen this relationship to accelerate the growth of bio-based products, energy, processes, and services. Importantly, we are ready to strengthen the competitiveness of German and Australian industry on a global scale

The economic, ecological, and social perspectives of the bioeconomy can only be realised through increased knowledge of underlying biological processes and systems. Our understanding of the diverse and dynamic interactions that occur within the bioeconomy – from the molecular level through to social perspectives – is still emerging. And, while attendees of this Symposium represent some of the world's leading researchers in this field, there is much we can learn from collaboration and joint investigation.

The better we are able to understand the complexity of biological systems, and to predict their application to a range of industries, the better we will be able to shape the future of global communities.

I would like to thank our visitors who have made the journey from Germany, and our colleagues from UQ for their contribution to this Symposium.

DAY
01
WED 4 OCT

UQ-TUM BIOECONOMY SYMPOSIUM

8.45 - 9.00	MC: Professor Gary Schenk, Group Leader, School of Chemistry and Molecular Biosciences, UQ Registration
9.00 - 9.10	Welcome address Professor Peter Høj, President and Vice-Chancellor, UQ
9.10 - 9.20	Welcome address Professor Volker Sieber, Chair, Chemistry of Biogenic Resources, and Vice-Dean, TUM School of Life Sciences Weihenstephan, TUM
9.20 - 9.40	Plenary presentation Profiling German-Australian science and innovation achievements Dr Michael Rosemann, Honorary Consul for Germany in Brisbane and Executive Director, Corporate Engagement, Division of International and Development, Queensland University of Technology (QUT)
9.40 - 10.20	Keynote presentation Bioeconomy in Brazil: potential areas for collaboration among UNESP, TUM and UQ Professor Carlos Vergani, Chief of Staff, São Paulo State University (UNESP)
10.20 - 11.00	Morning tea
11.00 - 11.40	Keynote presentation Australia's bioeconomy now and into the future Mr Glenn Cross, Chief Executive Officer, AusBiotech
11.40 - 12.20	Plenary presentation Visions for Biotechnology - Ultra-high resolution analytical methodologies for tracking chemodiversity during transformation of biogeosystems Professor Philippe Schmitt-Kopplin, Director, Research Unit Analytical BioGeoChemistry, Helmholtz Zentrum München
12.20 - 1.30	Lunch
1.30 - 3.00	SESSION ONE: THE APPLICATION OF BIOTECHNOLOGY TO FOOD AND HEALTH Moderators: Professor Michael Rychlik, Chair, Analytical Food Chemistry, TUM School of Life Sciences, TUM and Associate Professor Luke Guddat, Group Leader, School of Chemistry and Molecular Biosciences, UQ <i>Biotechnological approaches to fight folate deficiency worldwide</i> Professor Michael Rychlik, Chair, Analytical Food Chemistry, TUM School of Life Sciences, TUM <i>Queen Garnet plum – a successful case study for biofortification</i> Dr Michael Netzel, Senior Research Fellow, Centre for Nutrition and Food Sciences, QAAFI, UQ <i>Biotechnological platform for the production of aroma glucosides</i> Professor Wilfried Schwab, Chair, Biotechnology of Natural Products, TUM School of Life Sciences, TUM <i>The sustainable development of plant extracts to extend the shelf life and quality of food</i> Associate Professor Yasmina Sultanbawa, Principal Research Fellow, Centre for Nutrition and Food Sciences, QAAFI, UQ Q&A
3.00 - 4.00	Afternoon tea

WED 4 OCT *continued*

- 4.00 - 4.20 ● **Creating a meaningful global footprint - an overview of the UQ-TUM premier partnership**
Dr Jessica Gallagher, Director, Global Engagement, UQ
- 4.20 - 5.15 ● **UQ Saint Lucia campus tour**
- 5.15 - 5.30 ● **Official symposium photograph**, Forgan Smith Building
- 5.30 - 8.30 ● **Cocktail reception**, UQ Art Museum
Hosted by Professor Iain Watson, Vice-President and Deputy Vice-Chancellor (External Engagement), UQ
By invitation only

DAY
02
THU 5 OCT

UQ-TUM BIOECONOMY SYMPOSIUM

- 8.45 - 9.00 ● **Registration**
MC: Professor Gary Schenk, Group Leader, School of Chemistry and Molecular Biosciences, UQ
- 9.00 - 9.10 ● **Welcome Address**
Dr Jessica Gallagher, Director, Global Engagement, UQ
- 9.10 - 9.50 ● **Keynote presentation**
Food security and bioenergy
Professor Robert Henry, Director, Queensland Alliance for Agriculture and Food Innovation (QAAFI), UQ
- 9.50 - 10.15 ● **SESSION TWO: PARTNERING FOR GLOBAL IMPACT - CAREER DEVELOPMENT AND MOBILITY**
Supporting collaborative research between UQ and TUM
Professor Alastair McEwan, Dean, Graduate School, UQ
- 10.15 - 10.40 ● **Morning tea with PhD poster session**
- 10.40 - 11.30 ● **SESSION TWO *Continued***
Moderator: Professor Alastair McEwan, Dean, Graduate School, UQ
Dr Sergi Astals Garcia, Research Fellow, Advanced Water Management Centre, UQ
Ms Lisa Striegel, PhD Student, Analytical Food Chemistry, TUM School of Life Sciences, TUM
Dr Kinnari Shelat, Research Fellow, Centre for Nutrition and Food Sciences, QAAFI, UQ
Dr Daniel Garbe, Project Manager Biocatalysis, Industrial Biocatalysis, TUM Department of Chemistry, TUM
Q&A
- 11.30 - 1.00 ● **Lunch with PhD poster session**
- 1.00 - 2.00 ● **SESSION THREE: INDUSTRIAL BIOTECHNOLOGY**
Moderator: Professor Thomas Brück, Chair, Industrial Biocatalysis, TUM Department of Chemistry, TUM and Professor Gary Schenk, Group Leader, School of Chemistry and Molecular Biosciences, UQ
Exploration of microbial dark matter with culture-independent 'omics
Professor Phil Hugenholtz, Director, Australian Centre for Ecogenomics, UQ
Biotechnology for sustainable chemicals: A systems metabolic engineering approach
Dr Esteban Marcellin, Associate Group Leader, Australian Institute for Bioengineering and Nanotechnology (AIBN), UQ
Novel enzymes from metagenomes and new bacterial isolates
Professor Wolfgang Liebl, Chair, Microbiology, TUM School of Life Sciences, TUM

THU 5 OCT *continued*

- 2.00 - 2.30 ● **Plenary presentation**
Developing algae based biorefinery processes for production of aviation fuels and high performance lubricants
Professor Thomas Brück, Chair, Industrial Biocatalysis, TUM Department of Chemistry, TUM
- 2.30 - 2.45 ● Q&A
- 2.45 - 3.10 ● **Afternoon tea**
- 3.10 - 4.35 ● **SESSION FOUR: BIOMASS, METABOLISM AND BIOCATALYSIS**
Moderators: Professor Susanne Schmidt, Group Leader, School of Agriculture and Food Sciences, Faculty of Science, UQ and Professor Wolfgang Liebl, Chair, Microbiology, TUM School of Life Sciences, TUM

 - Sustainable use of plants and associated microbes as biofactories*
Professor Susanne Schmidt, Group Leader, School of Agriculture and Food Sciences, Faculty of Science, UQ
 - Cytochrome P450 enzymes from plants as versatile biocatalysts*
Adjunct Professor Dr Erich Glawischnig, Project Manager, Chemistry of Biogenic Resources, TUM School of Life Sciences, TUM
 - Large-scale microalgae farms for sustainable production of food, feed and fuel*
Professor Peer Schenk, Group Leader, School of Agriculture and Food Sciences, Faculty of Science, UQ
 - Computational investigations of enzyme-substrate recognition*
Professor Iris Antes, Head, Theoretical Chemical Biology and Protein Modelling Group, TUM School of Life Sciences, TUM
 - Smart use of microbes to produce methane from excess electricity*
Dr Konrad Koch, Assistant Professor, Urban Water Systems Engineering, TUM Department of Civil, Geo and Environmental Engineering, TUM

Q&A
- 4.35 - 5.00 ● **Closing remarks: Future Directions - Working together to address global challenges**
Dr Jessica Gallagher, Professor Carlos Vergani, Professor Volker Sieber and Professor Gary Schenk

DAY
03
FRI 6 OCT

UQ-TUM BIOECONOMY SYMPOSIUM

- TUM DELEGATES ONLY
- 9.15 ● Bus departs hotel
- 10.00 ● Morning tea and tour of Australian Institute for Bioengineering and Nanotechnology (AIBN) Labs, UQ St Lucia Campus
- 12.00 ● Lunch at Wild Canary Restaurant, Brookfield
- 1.45 ● Tour of UQ Algae Energy Farm, Pinjarra Hills
- 3.00 ● Official program concludes

KEYNOTE SPEAKERS



Professor Carlos Vergani

Chief of Staff, São Paulo State University (UNESP), Brazil

Professor Carlos Eduardo Vergani is a Full Professor at São Paulo State University (UNESP), Brazil and was the Head of the Graduate Program in Oral Rehabilitation from 2007 to 2013. He has a 26 year track record in dental research with more than 100 papers published. From 1998 to 2000, he was a research fellow at University College of London (UK) and gained his first international experiences. Since then, he has coordinated several international research projects and organised international meetings.

He is the Principal Investigator and Director of Internationalisation at the Center for Research and Development of Functional Materials, one of the Research, Innovation and Dissemination Centers (RIDC) funded by the São Paulo Research Foundation (FAPESP).

Besides his academic activities, Professor Vergani participated in a number of Councils and Commissions and from 2013 to 2017 acted as Deputy Head of the International Office of UNESP. He was in charge of collaborative programs, including the so-called "International Courses at UNESP". He has attended several conferences on international higher education, among them NAFSA, EAIE, AIEA and Going Global. Currently he is the Chief of Staff of UNESP.



Mr Glenn Cross

Chief Executive Officer, AusBiotech

Glenn Cross is the CEO of AusBiotech, where he is responsible for business development, finance and general operations for the past decade.

With 30 years' experience in general management, Glenn has spent most of his working life in life sciences having been a founder of DePuy Australia (now a J&J company), the first employee of Becton Dickinson Australia, CEO of Vision Systems Instrumentation and other senior executive roles in the industry.

Glenn has experience in finance, human resources and product development, with extensive experience in product development and distribution networks both locally and internationally.

He has extensive experience in key/large corporate account management and business development in Australia, Asia, Japan, Europe and North America.

Glenn Cross has been CEO of AusBiotech since 2016.



Professor Robert Henry

Director, Queensland Alliance for Agriculture and Food Innovation (QAAFI), The University of Queensland (UQ)

Professor Robert Henry conducts research on the development of new and improved products from plants. He is a Professor of Innovation in Agriculture and Director of the Queensland Alliance for Agriculture and Food Innovation (QAAFI), at The University of Queensland.

His research targets improved understanding of the molecular basis of the quality of products produced from plants and genome analysis to capture novel genetic resources for diversification of food and energy crops.

PLENARY SPEAKERS



Dr Michael Rosemann

Honorary Consul for Germany in Brisbane, and Executive Director, Corporate Engagement, Division of International and Development, Queensland University of Technology (QUT)

As a Professor in Information Systems, Dr Michael Rosemann's work is dedicated to corporate innovation systems, process management and revenue resilience. Passionate about the industry-university nexus, he established as the Head of QUT's Information Systems School, three Chairs funded by Brisbane Airport, Woolworths and PricewaterhouseCoopers.

Dr Rosemann is the author/editor of seven books, available in five languages. He authored more than 250 refereed papers attracting approx 16,000 citations (Google Scholar h-index 59) (September 2017). Michael has been the Chief Investigator on 6 ARC Discovery and 7 ARC Linkage projects and has been a member of the ARC College of Experts.

Dr Rosemann is a Visiting Professor at Viktoria Institute (Sweden), Advisory Board member at the Software Engineering Research Centre, Jiantong University (China) and has travelled five times to Brazil to conduct seminars and launch one of his books.

As the Honorary Consul for Germany in Brisbane, he chairs the German Language Roundtable, initiated the Brisbane German Week and engages with and connects relevant political, economic, scientific, educational and cultural communities across both countries.



Professor Philippe Schmitt-Kopplin

Director, Research Unit Analytical BioGeoChemistry, German Research Center for Environmental Health, Helmholtz Zentrum München, Germany

Professor Philippe Schmitt-Kopplin's team performs tailored and comprehensive metabolomics in food, health and geosciences. He has a strong profile in analytical chemistry with an integrated approach to combining (ultra)high resolution mass spectrometry, separation sciences, NMR-spectroscopy with (bio)informatics for the description of any complex organic systems on a molecular level.

A focus in the last decade was to implement magnetic resonance mass spectrometry into applications for a rapid and robust tool for deep metabotyping and small molecules profiling. One focus is on the chemical understanding of microbiomes in health and environments and integrating these information with existing biological, metaproteome or metagenome data. His interdisciplinary studies are related to relevant geochemical questions (C and S-cycling, halogens, origin of life) and important biology/health issues related to environmental factors (allergies, nutrition, metabolic diseases) at the interface of chemistry and biology.

He is member of the Technical University of Munich and heads the Comprehensive Foodomics Platform of the Institute of Analytical Food Chemistry (Prof. M. Rychlik) and is the Director of the Research Unit Analytical BioGeoChemistry of the Helmholtz Zentrum München, Germany.



Professor Thomas Brück

Chair, Industrial Biocatalysis, TUM Department of Chemistry, Technical University of Munich (TUM)

Professor Thomas Brück studied Chemistry (Major), Biochemistry (Major) and Management Science at Keele University (UK), where he graduated in 1996 with a Dual BSc. In 1997, he obtained his Master of Philosophy in Molecular Medicine from the same University. Thomas conducted his PhD studies in "Peroxidase enzyme reaction mechanisms" under the guidance of Prof. Dr. Patricia Harvey at the University of Greenwich (UK), where he graduated in 2002.

In 2003, Thomas postdoctoral academic career branched out to marine natural product biochemistry under the guidance of Professor Russell G. Kerr at the Centre of Excellence for Biomedical and Marine Biotechnology at Florida Atlantic University (USA). At the same institutes, Thomas Brück was appointed Assistant Professor for Marine Proteomics and Biocatalysis in 2004. In 2006, he returned to Germany, where he joined Süd-Chemie AG (now Clariant AG), and held the position Portfolio Manager IP and Technology. Since 2011, Thomas has been Associate Professor for Industrial Biocatalysis at the Technical University of Munich.

UQ SPEAKERS



Professor Gary Schenk

Group Leader, School of Chemistry and Molecular Biosciences

Professor Gary Schenk is an expert in biophysical chemistry, focusing on the investigation of the mechanisms of enzymes and their application in biotechnology. Gary received his Diploma in Chemistry from the University of Berne (Switzerland) in 1992 and was awarded an International Postgraduate Research Scholarship from The University of Queensland (UQ) in 1993. He graduated in 1997 with a PhD in Biochemistry at UQ, followed by postdoctoral research positions at UQ, University of Newcastle (UK) and Stanford University (USA).

In 2003 he was appointed at UQ as Lecturer in Biophysical Chemistry. This was followed by promotions to Senior Lecturer, Assoc. Professor and Full Professor. In 2007 Gary was awarded a UQ Foundation Research Excellence Award, and in 2013 he received a Future Fellowship from the Australian Research Council. Between 2011 and 2013 he also held a Joint Professorial Appointment at Maynooth University (Ireland).

His research achievements have been disseminated in nearly 160 publications and numerous plenary and keynote lectures. Gary is currently associated with the Editorial Boards of Journal of Inorganic Biochemistry, Journal of Biological Inorganic Chemistry and BMC Structural Biology, and has served on the Grant Review Panel of the NH&MRC. Recently he was awarded a Visiting Professorship from the Technical University of Munich.



Associate Professor Luke Guddat

Group Leader, School of Chemistry and Molecular Biosciences

Associate Professor Luke Guddat is a Research Scientist and Laboratory Head within the School of Chemistry and Molecular Biosciences. He is also a lecturer and undergraduate and postgraduate course coordinator for biochemistry at UQ.

Luke obtained his PhD from St Vincent's Institute of Medical Research (Melbourne, Australia) in 1990, followed by his postdoctoral research from 1991-1994 at University of Utah, and Harrington Cancer Centre (USA).

Luke's research focuses on the structure, function and inhibition of enzymes that are targets for drug discovery against infectious diseases including Candida, Malaria, Tuberculosis and Chagas.



Dr Michael Netzel

Senior Research Fellow, Centre for Nutrition and Food Sciences, QAAFI

Dr Michael Netzel is a graduate (Master and PhD) of the Justus-Liebig University Giessen (Germany). Before joining QAAFI as a Senior Research Fellow in August 2013, he was a Research Scientist at the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Other previous academic and professional positions held by Dr Netzel include, Feodor Lynen Research Fellow (Alexander von Humboldt-Foundation) at Food Science Australia, Visiting Research Scientist at Agriculture and Agri-Food Canada and Research Team Leader at the Friedrich-Schiller University Jena, Germany.

He is an Editor and Member of the Editorial Board of several Food Science Journals and edited two conference books. Dr Netzel is the current Secretary of the QLD-Branch of the Nutrition Society of Australia and a registered Mentor (RAMP). He has strong collaborative links to the Technical University of Munich.



Associate Professor Yasmina Sultanbawa

Principal Research Fellow, Centre for Nutrition and Food Sciences, QAAFI

Dr Yasmina Sultanbawa is a Principal Research Fellow at QAAFI. She completed a Master of Science at the University of Reading (UK) and PhD at University of British Columbia (Canada).

Her research is focused within the agribusiness development framework, specifically in the area of food processing, preservation, food safety and nutrition. Her current research includes the minimisation of post harvest losses through value addition and the search for natural preservatives to replace current synthetic chemicals.

In addition, her research area also includes the challenge of nutrition security, in particular micronutrient deficiency (hidden hunger), lack of diet diversity and nutritional losses in the food supply chain, which are addressed by her work with underutilized Australian plant species and potential new crops. Her work on Australian native plant foods is focused on incorporation of these plants in mainstream agriculture and diet diversification. Working with indigenous communities to develop nutritious and sustainable value added products from native plants for use in the food, feed, cosmetic and health care industries is a key strategy. The creation of employment, economic and social benefits to these remote communities is an anticipated outcome.



Dr Jessica Gallagher

Director, Global Engagement

Dr Jessica Gallagher is the Director of Global Engagement at The University of Queensland (UQ) where she is responsible for the strategic development and coordination of UQ's international partnerships, agreements, scholarships and a wide range of global programs designed to showcase and extend UQ's reach and reputation.

Prior to joining Global Engagement, she was the Director of the Office of Undergraduate Education/UQ Advantage Office, where she oversaw the development of a wide range of professional development, international mobility and enrichment programs for UQ students, including the UQ Advantage Award program. She has also held senior positions in the UQ Graduate School and Office of Prospective Students and Student Equity.

Jessica is also a research affiliate and sessional lecturer in the School of Languages and Cultures. She holds a PhD in Comparative Cultural Studies from UQ and is a graduate of the Australian Institute of Company Directors.



Professor Alastair McEwan

Dean, Graduate School

Professor McEwan is a BSc (Hons) graduate of the University of Leeds (UK) and was awarded his PhD in Biochemistry from the University of Birmingham (UK). He held a Science and Engineering Research Council NATO Postdoctoral Fellowship at the University of Illinois at Urbana-Champaign (USA) and a Royal Society University Research Fellowship at the University of Oxford (UK), before moving to a lectureship at the University of East Anglia (UK). Professor McEwan joined The University of Queensland in 1993 and was promoted to Professor in 2003. He was Head of the School of Chemistry and Molecular Biosciences from 2005-2010.

His research spans bacterial physiology and pathogenesis, redox biology and the role of transition metal ions in host-pathogen interactions and research in his laboratory is currently funded by NHMRC Project grants. Professor McEwan is currently the Chair of the Go8 Deans of Graduate Research and a member of the NHMRC Research Fellowships Peer Review Panel.



Dr Sergi Astals-Garcia

Research Fellow, Advanced Water Management Centre

Dr Sergi Astals-Garcia is an early career researcher in the fields of environmental biotechnology and anaerobic digestion. He did his master degree in Environmental Engineering and PhD thesis (2013) at the University of Barcelona (Spain). Following his PhD, he was awarded a postdoctoral research position at The University of Queensland to develop cost-effective treatment technologies for agri-industries.

Dr Astals-Garcia was recently awarded a Discovery Early Career Researcher Award (DECRA) fellowship, which aims to further the understanding of microbial inhibition in anaerobic technologies and expand anaerobic digestion application to a range of new substrates.



Dr Kinnari Shelat

Research Fellow, Centre for Nutrition and Food Sciences, QAAFI

Dr Kinnari Shelat received her PhD in Material Sciences from the Ian Wark Research Institute at the University of South Australia in 2008. Her area of expertise includes structure-property-performance characterisation of different materials (biopolymers, polymers) using mechanical, spectroscopic and microscopic techniques. Kinnari finished her postdoc at The University of Queensland working on the CSIRO Food Futures Flagship at the Centre for Nutrition and Food Sciences. She joined QAAFI in 2014 as a Research Fellow and is working on a range of different projects involving food product development for healthier options, physico-chemical analysis of native plants and shelf-life extension studies using natural plant extracts.

She also works at one of the state-of-the-art facilities, ANFF-Q at UQ providing training and expert advice for a range of instruments that includes confocal microscope, a range of Atomic force microscopes and Raman spectroscopy. She volunteers at Women in Technology and is a member of the Royal Australian Chemical Institute polymer division.



Dr Esteban Marcellin

Associate Group Leader, Australian Institute for Bioengineering and Nanotechnology

Dr Esteban Marcellin is a Queensland Accelerate Fellow and an Associate Group Leader at the Australian Institute for Bioengineering and Nanotechnology (AIBN) at UQ. After graduating with a Chemical Engineering degree he obtained a PhD at UQ. His research is dedicated to developing systems metabolic engineering toolboxes, with the goal of better understanding biological cells for enhancing production of fuel, chemicals and biopharmaceuticals. Systems metabolic engineering incorporates the concepts and techniques of systems biology, synthetic biology and bioprocess optimisation, offering a framework to modify pathways and bioprocesses for the optimal bioproduction of desired products.

Characterising cells at the molecular level, to efficiently manufacture natural and non-natural bioproducts, is possible through multi-omics data integration using computational models. The Group's research aims to integrate multi-omics data to accelerate the design of cells into efficient biological factories. For example, the group has recently established a state of the art gas fermentation facility, unique in Australia, which enables fermenting methane and syngas in instrumented fermenters and perform multi-omics studies to transform research findings into enhanced industrial strains.



Professor Ben Hankamer

Director, Centre for Solar Biotechnology

Professor Ben Hankamer obtained his PhD in Structural Studies on Photosystem II in 1994 from the Imperial College of Science Technology and Medicine (UK), where he continued as a Postdoctoral Researcher and Research Lecturer until 2002.

Later in 2002, Ben joined The University of Queensland as a Chief Investigator at the Institute for Molecular Bioscience. He received an Eisenhower Fellowship, awarded to individuals identified as international leaders in areas of energy technology and supply, in 2009. Ben also held an Australian Research Council (ARC) Discovery Outstanding Research Award (DORA) Fellowship from 2012-2015.

Currently, Ben is the Director of the Centre for Solar Biotechnology, which is focused on developing next generation microalgae systems.



Professor Philip Hugenholtz

Director, Australian Centre for Ecogenomics

Professor Philip Hugenholtz is the Director of the Australian Centre for Ecogenomics within the School of Chemistry and Molecular Biosciences. He is also a Fellow of the Australia Academy of Sciences in Canberra.

Beginning with the recognition that we have been ignorant of most microbial diversity due to a strong cultivation bias, Professor Hugenholtz has systematically directed his research to characterise "microbial dark matter" with the ultimate goal of a holistic understanding of microbial evolution and ecology. From 2004 to 2010, Hugenholtz directed the Microbial Ecology and Metagenomics Programs at the DOE Joint Genome Institute (JGI) in the US.

In 2010 he returned home to establish the Australian Centre for Ecogenomics. The Centre was founded around himself as Director, and Deputy Director, Professor Gene Tyson. The Centre comprises 50 researchers/core staff and state-of-the-art infrastructure for conducting ecogenomics research across a wide range of environmental, engineered and clinical ecosystems underpinned by a genome-based evolutionary framework. Hugenholtz was recently awarded an ARC Laureate Fellowship to obtain 100,000 genomes representing uncultured microbial dark matter which will be systematically organised into natural phylogenetic relationships.



Professor Susanne Schmidt

Group Leader, School of Agriculture and Food Sciences and Affiliated Professor, Centre for Plant Science, QAAFI

Professor Susanne Schmidt is leading UQ's Plant Nutrition and Ecophysiology research group (3 postdocs; 12+ postgraduates and research assistants) with a focus on natural, agricultural and silvicultural systems. Her research interests includes sustainable agriculture, biogeochemistry (greenhouse gases) and soil biology, biodiversity conservation and reforestation, soil fertility and carbon, and novel uses of native plants, and nitrogen (pollution, improved N supply to crops, recycling of 'wastes' as plant nutrients).

Suzanne coordinates the UQ courses 'Plant Biology', 'Plant Adaptation and Climate Change', and 'Food for a healthy Planet'. Her team has competitive funding from ARC, SRDC, DAFF (Dept of Agriculture), QLD Government, QLD DAFF and industry (\$400-500k/annum). Suzanne is a member of science and journal advisory boards, a fellow of the Alexander von Humboldt Foundation, and active in science communication and outreach.



Professor Peer Schenk

Group Leader, School of Agriculture and Food Sciences and Affiliated Professor, Centre for Plant Science, QAAFI

Professor Peer Schenk works to address food and energy security concerns by implementing new concepts from science and technology. He heads UQ laboratories in both Algae Biotechnology and Plant-Microbe Interactions.

Peer is internationally recognised for his expertise in plant biotechnology, including the development of new disease resistant plants and his extensive knowledge of algae cultivation and harvesting. In 2013, Peer and his team opened the UQ Algae Energy Farm, a demonstration farm that deploys new cost-saving technologies to produce food, feed, nutraceuticals or biodiesel from microalgae. The farm has served as a prototype for three commercial algae farms and can also be used as a zero-input “power plant” with full resource recycling capability to produce fuel (biogas and biodiesel).

Recognised for his R&D successes, his research has led to two dynamic start-up companies: QPonics Pty Ltd (www.qponics.com) and Nexgen Plants Pty Ltd (www.nexgenplants.com). He has commercialised technology from six patents and his published work is cited by more than 1000 papers per year. He was Australia’s APEC representative for biorefinery concepts and produced several new crop varieties that are now commercially grown in three continents.

Peer is currently overseeing the implementation of his low-cost algae cultivation technology.

TUM SPEAKERS



Professor Volker Sieber

Chair, Chemistry of Biogenic Resources, and Vice-Dean, TUM School of Life Sciences Weihenstephan

Professor Sieber studied chemistry at the University of Bayreuth and the University of Delaware (USA). He held a number of positions in the chemical industry between 2001 and 2008. He has been a full professor at the Technical University of Munich since late 2008. In parallel he has built up a research group at Fraunhofer Institute in the area of bio-, chemo- and electrocatalysis and developed it into an Institute branch.

Professor Sieber is deputy director of the Straubing Center of Science, which is focusing on biomass utilization. In 2015, he became one of the founding members of the council on Bioeconomy for the government of the Free State of Bavaria.



Professor Michael Rychlik

Chair, Analytical Food Chemistry, TUM School of Life Sciences Weihenstephan

Professor Michael Rychlik is the Head of the Chair of Analytical Food Chemistry at the Technical University of Munich (TUM). He graduated in food chemistry at the University of Kaiserslautern in 1988. His PhD studies on the flavour of bread were completed in 1996 and he was appointed full professor at TUM in 2010. In 2016 he was appointed an Honorary Professor at The University of Queensland (UQ). In 2016 he was also active as a Visiting Professor at the National University of Singapore (NUS).

His group has been working for 15 years in the field of developing analytical methods for bioactive food components, in particular for vitamins, mycotoxins, odorants and lipids. Since 2014 he serves as the Head of the "Committee on Contaminants in the Food Chain" at the German Federal Institute for Risk Assessment, Berlin.



Professor Wilfried Schwab

Chair, Biotechnology of Natural Products, TUM School of Life Sciences Weihenstephan

Professor Schwab studied food chemistry at the University of Würzburg and did his doctorate in 1989. Following a postdoctoral stay at Washington State University (USA), he spent three years working in Hoechst AG's agriculture division. He returned to the University of Würzburg to complete his lecturer qualification in 1999. He worked in research after that, notably at Plant Research International in Wageningen (Netherlands) and the Spanish National Research Council (CSIC) in Seville (Spain). In 2003, he accepted a position at TUM.

Professor Schwab is a member of the BfR Committee for Genetically Modified Food and Feed. As part of his research, Professor Schwab isolates and identifies secondary plant substances and investigates their biosynthesis and metabolism. The goal is biotechnological production of natural products which, due to their technological or physiological effect, determine the quality of foodstuffs (e.g. as additives for "functional foods").



Ms Lisa Striegel

PhD Student, Analytical Food Chemistry, TUM School of Life Sciences Weihenstephan

Lisa Striegel graduated in food chemistry from Technical University of Munich (TUM) and will complete her PhD thesis titled "Folate analysis and bioavailability" supervised by Professor Michael Rychlik at TUM in 2017.



Dr Daniel Garbe

Project Manager Biocatalysis, Industrial Biocatalysis, TUM Department of Chemistry

After studying chemistry in Marburg (Germany) and Edinburgh (UK), Daniel Garbe completed his PhD at the Universities of Marburg and Dortmund (Germany). His thesis dealt with protein engineering of semi-synthetic proteins applying protein trans-splicing.

Since 2009, Dr Garbe has been employed with the Technical University of Munich as a Project Manager for Biocatalysis. First, at the Chair of Chemistry of Biogenic Resources, he moved in 2011 to the novel Professorship of Industrial Biocatalysis. Here he was and is in charge of several projects dealing with the biotechnological conversion of biogenic waste streams into chemicals, pharmaceuticals or polymer building blocks.

Additionally, Daniel is looking into the transformation of extremophile microalgae into aviation fuel and high value products, like nutraceuticals. Therefore, he holds since 2015 the position of the Technical Director of the TUM-AlgaeTec Center, a unique algae research facility able to simulate global climate conditions and solar irradiation.



Professor Wolfgang Liebl

Chair, Microbiology, TUM School of Life Sciences Weihenstephan

Wolfgang Liebl studied biology with a major in microbiology at the Technical University of Munich (TUM), where he also carried out a PhD thesis and was awarded the PhD degree (Dr. rer. nat.) in 1986. He was a postdoctoral fellow at the Department of Biology, Massachusetts Institute of Technology, Cambridge (USA) from 1986 to 1987 and earned the Habilitation degree (Dr. rer. nat. habil.) in microbiology from the Faculty of Chemistry, Biology and Geosciences at TUM in 1997. From 1997 to 2003 he was an Associate Professor of Applied Microbiology and from 2003 to 2008 a Full Professor of Microbiology and Head of the Department of Genomic and Applied Microbiology at the University of Göttingen.

Since 2008, Wolfgang Liebl is a Professor and Head of the Department of Microbiology at TUM. His research interests lay in the area of applied microbiology, in particular the enzymology of microbial polysaccharide decomposition, genomics and metagenomics of extremophilic bacteria and archaea, and the physiology and genetics of biotechnologically relevant bacteria.



Adjunct Professor Erich Glawischnig

Project Manager, Chemistry of Biogenic Resources, TUM School of Life Sciences Weihenstephan

Erich Glawischnig studied biology and obtained his PhD at the Technical University of Munich (1997). After a postdoc period focused on central metabolism and auxin biosynthesis in maize he went to the lab of Barbara Halkier in Copenhagen (Denmark) as an EMBO-fellow studying glucosinolate biosynthesis.

From 2002 he worked as group leader at the Technical University of Munich, chair of genetics and habilitated in 2007. In 2012 he was awarded a Heisenberg fellowship. Recently, he joined the chair of chemistry of biogenic resources at the TUM campus in Straubing.

Erich's research focusses on tryptophan metabolism, in particular the biosynthesis of bioactive products involved in pathogen defence, and on cytochrome P450 enzymes in plants.



Professor Iris Antes

Head, Theoretical Chemical Biology and Protein Modelling Group, TUM School of Life Sciences Weihenstephan

Professor Antes studied Chemistry at the Universities of Tübingen, Marburg, Arizona (USA), and the École Nationale Supérieure de Chimie de Lille (France). She received her PhD in Theoretical Chemistry from the University of Zürich (Switzerland) for her work on QM/MM methods. Afterwards she moved into the field of computational biophysics, working in the groups of Professor M. Klein at the University of Pennsylvania (USA) and Professor D. Chandler at the University of California, Berkeley (USA). Upon her return to Germany she joined the "Department of Computational Biology and Applied Algorithmics" at the "Max-Planck-Institut für Informatik" in Saarbrücken, where she was responsible for the Computational Chemical Biology group and received her Habilitation in Bioinformatics (Faculty of Mathematics and Computer Science, University of the Saarland) in 2009. Since 2008 she has been a Professor for Protein Modelling at TUM.



Dr Konrad Koch

Assistant Professor, Urban Water Systems Engineering, TUM Department of Civil, Geo and Environmental Engineering

Dr Konrad Koch studied "Waste management and contaminated site treatment" at the Dresden and the Hamburg University of Technology, where he completed his diploma thesis in 2007. His PhD at the Institute of Water Quality Control at TUM was dedicated to the modeling of the anaerobic digestion of energy crops, which he finished in 2010. Between 2010 and 2012 he was the head of a research group at the Institute of Agricultural Engineering and Animal Husbandry of the Bavarian State Research Center for Agriculture in Freising, Germany.

Since 2012 Konrad has been an assistant professor at the Chair of Urban Water Systems Engineering at TUM, where he has masterminded several projects focusing on energy recovery from waste and wastewater streams with special emphasis on enhancing understanding, optimization of the process, and development of approaches for process monitoring and modeling.

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UQ Symposium planning committee

Professor Gary Schenk, Group Leader, School of Chemistry and Molecular Biosciences

Professor Peer Schenk, Group Leader, School of Agriculture and Food Sciences and Affiliated Professor, Centre for Plant Science, QAAFI

Dr Michael Netzel, Senior Research Fellow, Centre for Nutrition and Food Sciences, QAAFI

Professor Ross Barnard, Director, Biotechnology Program, School of Chemistry and Molecular Biosciences

Associate Professor Luke Guddat, Group Leader, School of Chemistry and Molecular Biosciences

Dr Jessica Gallagher, Director, Global Engagement

Ms Sally Wilson, Senior International Strategist, Global Engagement

Ms Simone Kerger, International Visits and Events Officer, Global Engagement