



Forum for European-Australian Science and Technology cooperation

Deutsche Forschungsgemeinschaft delegation in Australia
March - April 2008

FEAST-Germany a snapshot of Australian-German research cooperation



Foreword

This document represents a snapshot of bilateral research collaboration between Australia and Germany and has been prepared by members of the FEAST-Germany network.

The examples of research projects listed below do not attempt to make any sort of exhaustive repository of the collaborations. It also does not represent any assessment of qualitative and quantitative measure of institutional engagement and research excellence compared to other projects not included.

A limited list of projects has been provided by members of FEAST-Germany (whose details are attached to each chapter) and selected by the FEAST secretariat in order to reflect the diversity of research fields and research performers, within Australia and Germany.

This document will be updated regularly to include other projects not listed in the current version.

Version: March 2008

Contents

Foreword	2	Tomorrow's aeronautics.	16
Introduction	3	TATEM	16
FEAST-Germany. . . . .	.3	Cocomat	16
Germany-Australia research overview . . . . .	.3	MOJO.	17
Bilateral programmes . . . . .	.5	Social Change and Wellbeing	18
Tackling land and water challenges	7	Youth culture and music.	18
Risk assessment. . . . .	.7	The history of Anthropology in the Context of Cross-cultural Relations in the Pacific, 1750-1900	18
Organic matter . . . . .	.7	History of Science / Transcultural Studies.	19
Solar cooling	8	Retaining social diversity	19
The challenge. . . . .	.8	Violence Research and Prevention	19
The partnership. . . . .	.8	Collaboration with ANSTO.	20
Outcomes. . . . .	.9	Climate change	20
Colloidal crystals	10	Neutron and x-ray scattering	20
The challenge.	10	Structural integrity	21
About the project.	10	Radioactive waste management	21
The partnership.	10	Collaboration with Adelaide.	22
Evolution!	12	Plant genetics.	22
Explorations	12	Metal-carbide nanocrystals	23
Marie Curie	13	The University of Sydney	24
Adaptive Services Grid	14	Sustainable industry	24
An EU framework project	14	GerMANY Innovations.	25
The partnership.	15	Weightlessness research	26



Introduction

FEAST-Germany

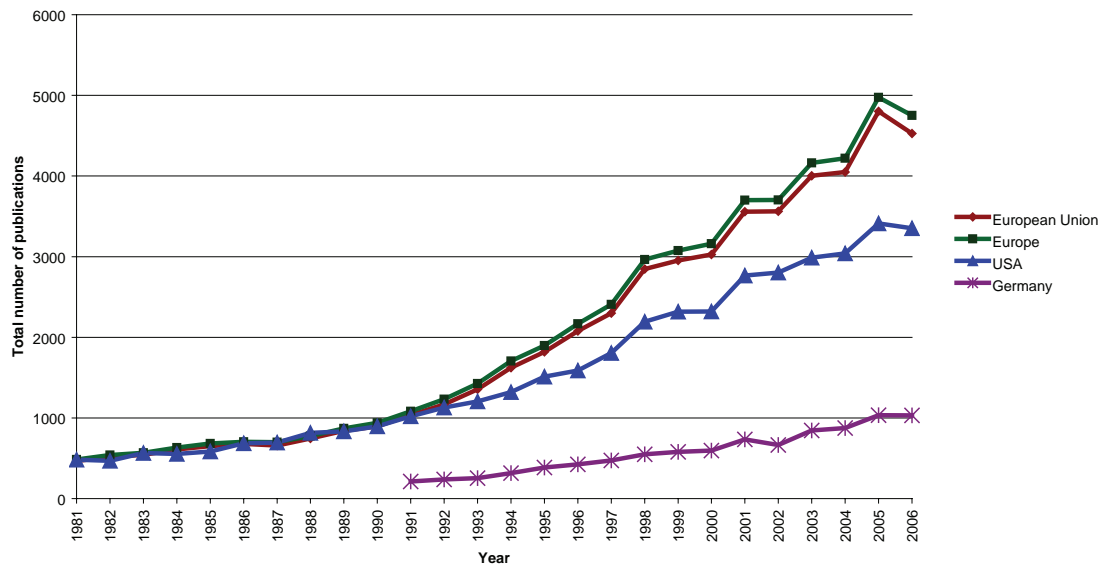
Germany is one of Australia's largest scientific partners. There is a long history of collaboration between the two countries, enhanced by formal intergovernmental links, and by organisations such as the Alexander von Humboldt Foundation (AvH), the German Academic Exchange Service (DAAD), the German Research Foundation (DFG) and others. There is, however, no common resource that provides the opportunity for German and Australian researchers to meet, interact, share experiences, and learn from each other.

FEAST-Germany intends to fill this gap by working closely with key stakeholders in both countries. It will be a distributed network of members in Australia and Germany interested in all disciplines of research (academic, applied, and industrial), who work together in a coordinated manner to promote the results of successful German–Australian collaboration, and to provide information or assistance to those interested in such collaboration.

FEAST-Germany's activities started in 2007 with the establishment of local groups throughout Australia and a website: www.feast.org/germany

FEAST is a facilitator aiming to:

- highlight existing multilateral and bilateral cooperation between Europe and Australia;
- improve this cooperation, bilateral and multilateral cooperation, through identifying priorities and enhancing the quality, quantity and visibility of future action.



Graph 1. Australian collaborations estimated by the number of publications with the European Union, Europe, USA and Germany

Germany-Australia research overview

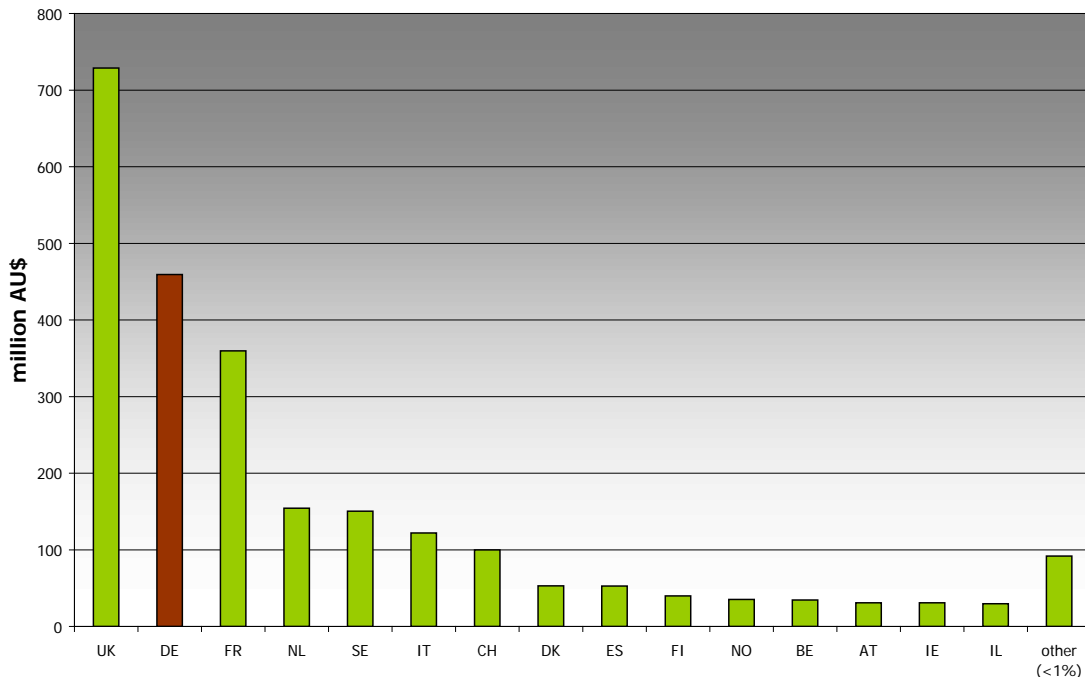
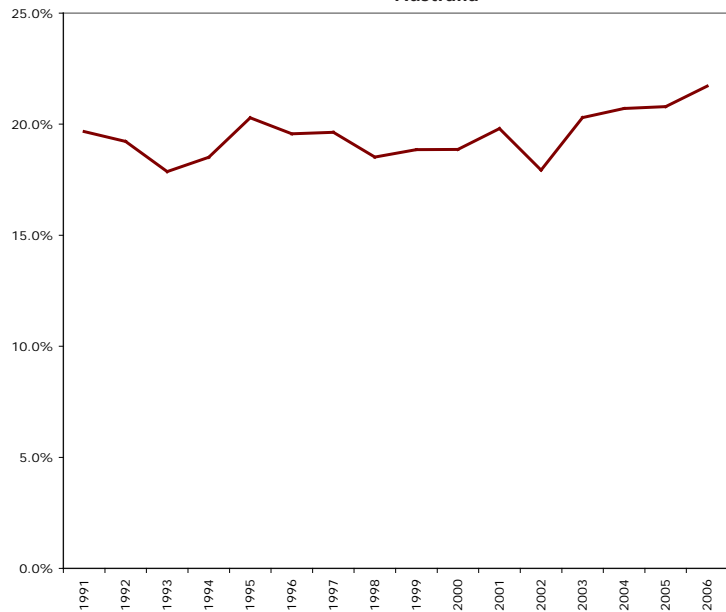
Available metrics of international engagement confirms anecdotal evidence, when visiting Australian research facilities, that the level of interaction between Australia and Germany is very important.

Currents trends

In a global landscape where the number of scientific publications is on the rise, the share of Australian internationally co-authored papers quickly outnumbers domestically co-authored papers. As illustrated in Graph 1., European countries are becoming an important part of this increase in the Australian engagement with international S&T, at a rate higher than with Australia's main partner: USA. With more than 20% of the European engagement, Germany is an important component of this trend (Graph 2).

Data from the Australian Research Council (ARC) shows that German researchers represent the second largest group of collaborators in Europe, behind the UK and before France (Graph 3). These 3 countries lead the other European S&T performers. With, respectively, 40, 32, and 21 projects, UK, France and Germany are also the most privileged countries where Australia has participated in the EU's 6th Framework Programme (out of 168 projects, including Marie Curie fellowships).

Graph 2. Germany as a percentage of total European collaborations with Australia

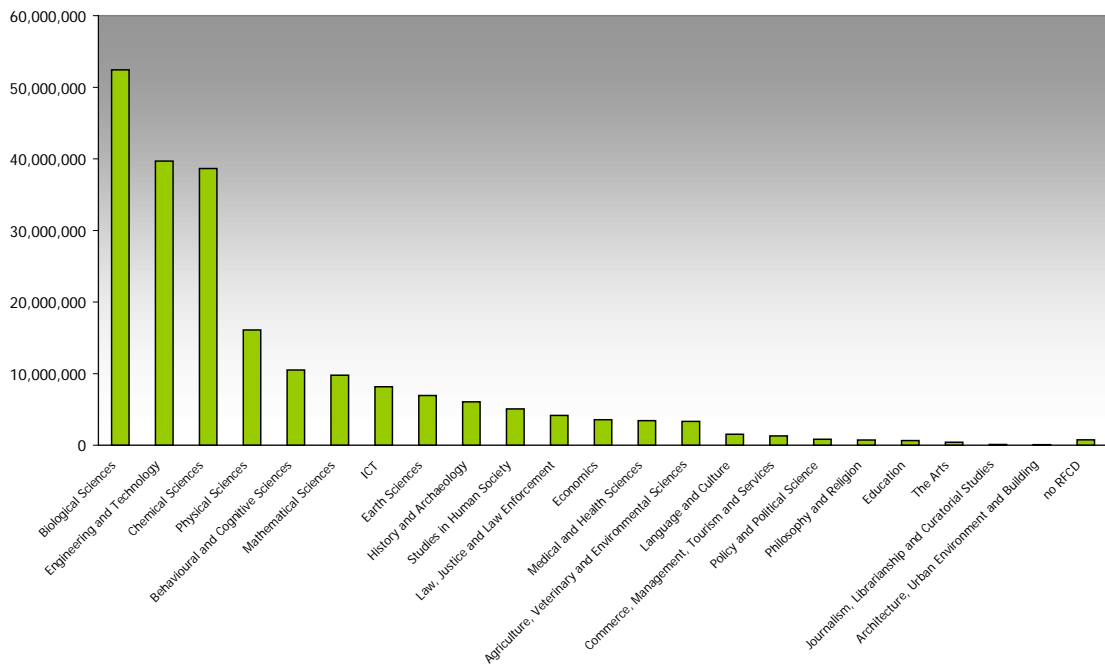


Graph 3. Comparison of the ARC grants awarded (in AUD) between 2003 and 2006 for research activities with partner investigators from European countries.



Joint research investigations span numerous fields and thematics, as illustrated in the research snapshot (pp. 7-26). Data from the ARC exhibited in Graph 4 shows the diversity of research fields across ARC categories (measured by the amount awarded to the projects). A review of joint publications gives a better outlook on some of the key research outcomes (considering that the ISI data used in the study underestimate some disciplines, including the Humanities and Social Sciences). Life sciences represent almost half of the intensity of scientific publications between Germany and Australia (Graph 5).

Graph 4. ARC grants awarded (in AUD) between 2003 and 2006 for research activities with partner investigators from Germany per research fields (RFCD codes).



Bilateral programmes

Go8 - DAAD Joint Research Co-operation Scheme

The DAAD is Germany's national agency for the support of international academic co-operation and has a budget of over €250 million (AU\$410 million). The Go8 represents Australia's eight leading research intensive universities.

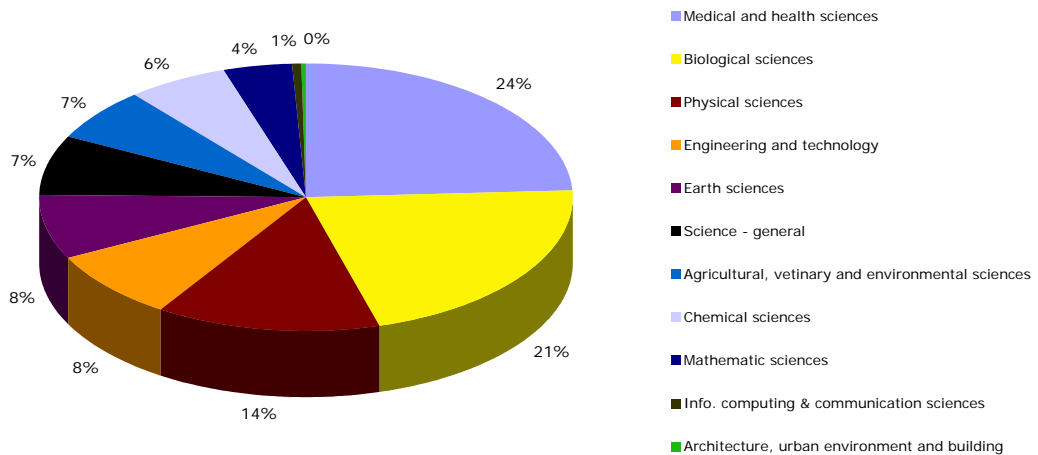
Under this scheme the Go8 and the DAAD have each agreed to provide AU\$200,000 a year from 2008 to 2010 to meet the travel and living costs of researchers who spend time at collaborating institutions in Australia or Germany. The scheme is the first initiative of its type for the Go8 and follows a pilot initiative led by the Australian Department of Education Science and Training, DEST, (completed in 2001) which enhanced linkages between Australian universities and German research organisations. The Go8/DAAD research exchange scheme





was officially launched in Berlin and Canberra in July 2007, with the first round of academic exchanges to commence in 2008.

In general, the maximum amount of funding available per Australian application is AU\$12,500 per project per year. Grants will cover the costs of economy airfares and living expenses to a fixed maximum. Research costs (staff salary and equipment) are not funded from this scheme.



Graph 5. Australian collaborations with Germany in 2006, for fields handled well by ISI data: note data is subject to some double counting between fields of research

DIISR’s International Science Linkage (ISL)

From 2008, competitive grants offered by the Australian Department of Industry, Innovation, Science and Research (DIISR) will focus on support for collaboration with specific countries and in specific fields of research. DIISR recognises that beneficial and important outcomes may arise from collaborations involving good researchers irrespective of the countries or the fields of research involved. However, through the adoption of this more targeted approach, DIISR expects to achieve greater impact in terms of the standing and influence of Australian science, and of our broader strategic interests. The change also brings these competitive grants into better alignment with Australia’s bilateral research funds (with India, China and France), all of which adopt a targeted approach, and is consistent with broader international trends by other countries in this area. Applications for joint research projects will be invited from Australian researchers collaborating with partners from Germany and the following areas of research:

- *Nanotechnology*
- *Water resources*
- *Clean energy technologies*

DIISR also focuses in fields including clean energy technologies, Bioeconomy (including industrial biotechnology and agriculture) and climate change with the European Union Framework Programmes.

Data by the FEAST secretariat and the ANU Research Evaluation and Policy Project, March 2008





Tackling land and water challenges

CSIRO Land and Water (CLW) research activities reflect national and international priorities in new ways to use less water in agriculture and other industries, to re-use or recycle urban and industrial waters and wastes, while also protecting Australian soils, rivers and estuaries, catchments and groundwater reserves, problems posed by contaminants in the environment, designing the farming systems of the future and investigating options for policy-makers. With more than 500 staff throughout Australia, most of its work is performed in partnership with government and partners in industry. CLW is a major contributor to the Water for a Healthy Country National Research CSIRO Flagship Program.

Risk assessment

Dr Stauber, who leads the Aquatic Contaminants Group, has an ongoing collaboration with the Fraunhofer Institute in Hannover, Germany, developing and harmonising chemical risk assessment methods for aquatic ecosystems. This involved regulators/researchers from Germany, Canada, Japan, UK and Australia who, with funding from the German government and the World Health Organisation (WHO), worked on supplied toxicity datasets for 5 chemicals. The aim was to determine the major sources of variation in risk assessment procedures from the different jurisdictions. The major significance of this work is that WHO will use the methodologies in their International Program on Chemical Safety (IPCS) documents.

Organic matter

Dr Jeff Baldock leads the oil Process and Function research team at CLW and actively collaborates with researchers from the Institute of Soil Science and Plant Nutrition at the Martin-Luther University in Halle-Wittenberg on lignin dynamics in soil organic matter as well as protection of organic matter by adsorption to clays.

Dr Evelyn Krull, who leads the Aquatic Biogeochemistry and Ecology research group at CLW, is currently co-convenor of one of the Biogeoscience sessions organised for the EGU conference in Vienna in April 2008 in conjunction with Dr Ingrid Koegel-Knabner from the Department für Ökologie, Wissenschaftszentrum Weihenstephan, Technische Universität München.

Further research collaborations are actively pursued on compound-specific isotopic research with Dr Gerd Gleixner at the Max-Planck Institute für Biogeochemie in Jena, Germany. Joint publications have resulted from these collaborations, as well as overseas visits and joined conference organisations.

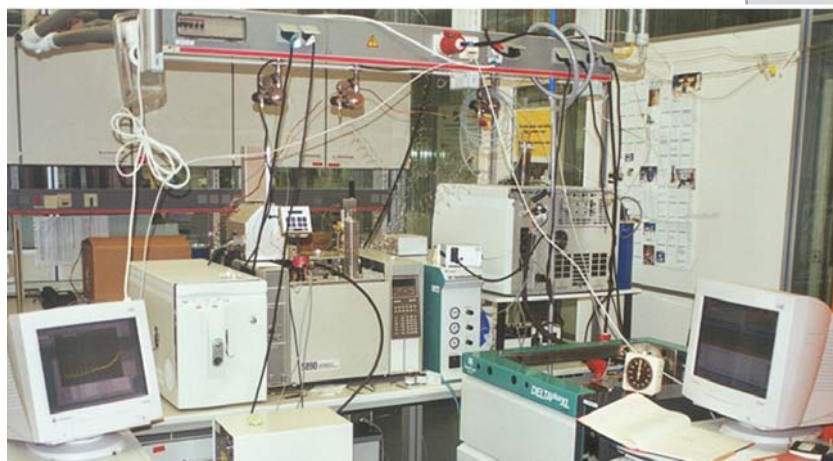
Dr Evelyn Krull
Senior Research Scientist

Rivers and Estuaries research program

CSIRO Land & Water

Glen Osmond, South Australia

Evelyn.Krull@csiro.au



Compound-specific isotopic mass spectrometer coupled to a pyrolysis GC-MS at the Max-Planck Institute in Jena, Germany.



Solar cooling

The challenge

Dr. Paul Kohlenbach is leading a project within CSIRO to develop a solar-powered air-conditioning unit for residential houses, which utilises a desiccant-evaporative process to provide cool and dehumidified air. This innovative approach is emerging as a very promising R&D area for the recovery of low-grade solar energy or waste heat. Consuming only a very small amount of electrical power, thermal energy and water are used to provide air-conditioning. There are many advantages to this system, including:

- *decreased power consumption for customer*
- *decreased GHG emission*
- *reduced peak load*
- *replacement of “dirty” conventional air-conditioning units*
- *Energy Efficiency Rating (EER) improvement for residential houses*

Using heat to provide cooling or air-conditioning is a promising alternative to conventional chillers or air-conditioning units. Conventional, thermally driven ab- or adsorption chillers have many drawbacks. They are expensive and bulky; chill water instead of air; and are ill-designed for the average Australian ambient temperature.

Desiccant-evaporative (DEC) air-conditioning systems are an attractive alternative to conventional chillers. DEC air-conditioning systems directly dehumidify and cool the air stream using a desiccant material and the latent heat of evaporation of water. The regeneration of the desiccant material can be accomplished using waste heat or solar energy at approx. 60-80°C, making the DEC system a flexible option for most low-grade heat sources.

In this project a small, light-weight and low-cost air-conditioning module is being developed which, in combination with solar thermal collector panels, provides air-conditioning to a residential house, using very little electric energy (approx. 20% of the electricity consumption of a standard air-conditioner).

The partnership

In 2006, CSIRO Division of Energy Technology and the Technische Universität Berlin began a collaboration which has seen two German master students (German Diplomarbeit) undertake highly successfully projects at the facilities in Newcastle, Australia.

Dr. Kohlenbach was awarded a PhD from the Technische Universität Berlin, Germany in 2006 for his work on control strategies and transient performance of solar cooling systems. His professional career includes energy consulting work for the B.U.N.D., a German environmentally-focussed non-governmental organisation in 2001. From 2001 to 2005 he was director of the research and development department at Phoenix SonnenWärme AG, Berlin, Germany, leading a special research project on the development of a small-scale solar cooling

Dr.-Ing. Paul Kohlenbach
Research Scientist

Demand-Side Energy Systems
Group

CSIRO Energy Technology
Newcastle, NSW, Australia

paul.kohlenbach@CSIRO.au

system for residential purposes. In 2005 Dr. Kohlenbach was appointed research scientist at CSIRO Energy technology in Newcastle, NSW. His areas of research include concentrating solar energy, solar cooling systems, waste heat recovery, microCHP systems and transient system simulations. Dr. Kohlenbach is a member of commission E2 of the International Institute of Refrigeration (IIR) and of the Task 38 'Solar air-conditioning and refrigeration' of the International Energy Agency (IEA).

In 2007, Dr. Kohlenbach was awarded a visiting research fellowship from CSIRO Energy Technology to work for 7 weeks at the Technische Universität Berlin in March/April 2007. During that time he worked with Prof. Ziegler, and colleagues, on desiccant cooling and other sorption technologies. Prof. Ziegler has been Dr. Kohlenbach's PhD supervisor and they have enjoyed an active collaboration since Dr. Kohlenbach completed his studies in 2006. This fellowship specifically encourages technology and knowledge transfer through personal training.

Outcomes

Dr. Kohlenbach and Prof. Ziegler have co-authored numerous papers on simulation models of absorption chiller performance. They have also worked together on peer-reviewed conference presentations at two international conferences.

Prof Ziegler's institute is a world leader in sorption technology research and provides a prestigious alignment of expertise with CSIRO. Most significantly, the transfer of knowledge through fellowship and shared students has been invaluable to grow Australian knowledge in this field. Indeed, there are few in Australia who gain this kind of specific sorption cooling technology training. Dr. Kohlenbach, in his work for CSIRO, personally attests to the value of this collaboration and highlights the work undertaken by the master students from Berlin which significantly contributed to ongoing CSIRO project work.

CSIRO strongly welcomes the opportunity to host Prof. Ziegler's students working in Australia.



CSIRO's Solar Cooling concept: Cooling, heating and hot water using only the sun



Colloidal crystals

The challenge

The most spectacular evidence for colloidal crystallization is the existence of naturally occurring opals. The ideal opal structure is a periodic close-packed three-dimensional array of silica microspheres. While opals' reputation is widespread, there is a pressing need for research into the fundamental nature of the processes that lead to the formation of macroscopic self-assembled crystals of colloids, polymers and other micro- and nano-scale objects. For example, colloidal crystal structures can be used for nano-materials in photonic circuits, white-light LEDs or as a photocatalyst. The potential use of these processes to develop templates for the manufacture of photonic crystals and a range of other nano-devices has been widely touted, but developments in this field have been hampered by a lack of understanding of the fundamental processes at play.

One of the main difficulties in creating macroscopic sized crystals of densely packed colloidal particles is that colloidal particles always have a range of particle sizes - ie, they are polydisperse. This changes the way that crystallization occurs, and limits the development of these new technologies.

About the project

In this project we studied the crystallization kinetics of a hard-sphere colloids as a function of polydispersity, with an aim to understanding the fundamental processes of nucleation and crystal growth in these systems.

This project was funded by a 12 month Feodor-Lynen Fellowship from the Alexander von Humboldt Foundation for Dr. Schöpe, with extra funds provided by RMIT. This work contributes directly to the national priority research area of Advanced Materials.

The soft condensed matter group at RMIT is the world's leading centre for the study of crystallization in hard spheres using light scattering techniques. The unique facilities available at RMIT include a purpose built Bragg spectrometer (the only one of its type in the world), and a two-colour light scattering spectrometer (the only fully automated instrument in the world). This collaboration thus brought together a group of people and facilities which could not be replicated anywhere else in the world.

The partnership

This involved combining the expertise of Dr. Hans-Joachim Schöpe from the University of Mainz, with that of the RMIT Soft Condensed Matter group, led by Associate Professor Gary Bryant (an ex Humboldt Fellow), and Professor Bill van Meegen. Dr. Schöpe is an expert in the experimental measurement of crystallization rates in charged colloidal systems. Associate Professor Gary Bryant is an expert on light scattering and phase transitions. Professor van Meegen is one of the world's leading experts on colloidal hard sphere systems.

Assoc. Prof. Gary Bryant

School of applied physics

RMIT

Melbourne, VIC, Australia

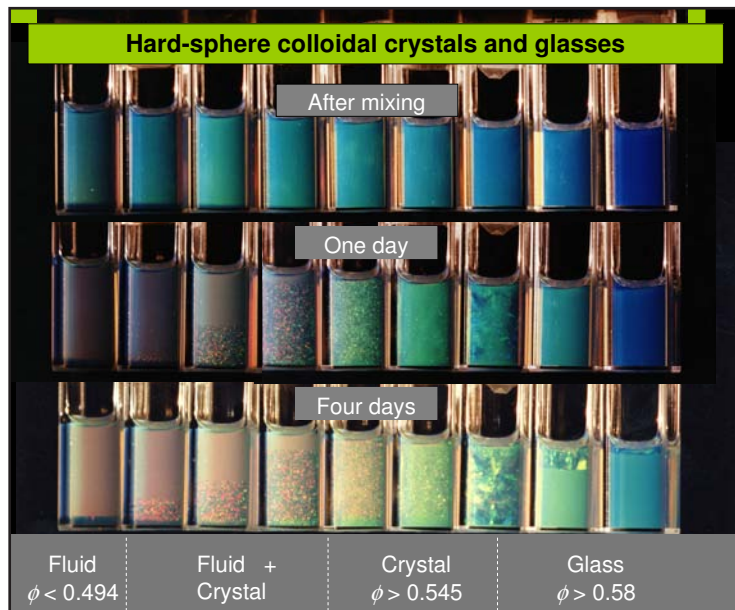
gary.bryant@rmit.edu.au



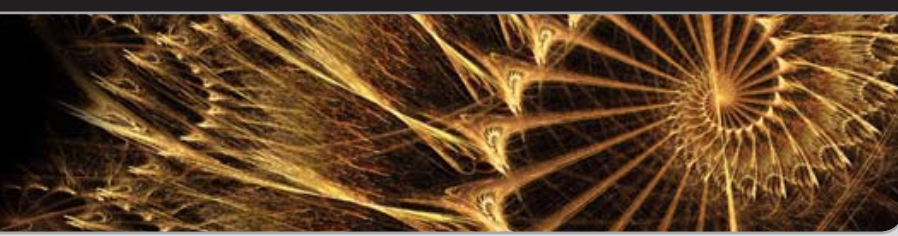


The collaboration worked well because the expertise of the participants was complimentary, and formed the first part of an ongoing relationship between (in particular) Dr. Schöpe and Associate Professor Bryant. Both Prof. van Megen and A/Prof. Bryant have visited Dr. Schöpe in Mainz since the collaboration began.

The primary outcomes of this work were numerous publications in well regarded journals (including Physical Review Letters) in 2006 and 2007. In addition, this work formed a core part of the Habilitation of Dr. Schöpe. From the Australian perspective, in addition to publications in high profile international journals, this collaboration has led to an ongoing collaboration with Germany, improved knowledge of German research in this area, as well as a better understanding of the way research is carried out in Germany. The teams in Germany and Australia are now looking to continue the collaboration, to exchange PhD students and postdoctoral researchers, and for long term exchanges for Dr. Schöpe and Associate Professor Gary Bryant. In addition, the groups are hoping to develop new instrumentation, and extend current measurements to more complex colloidal systems.



Crystallization in hard spheres. The image shows various stages of the crystallization process following mixing. The concentration of particles is increasing from left to right. Image courtesy of Peter Pusey and Bill van Megen.





Evolution!

Explorations

The Deutsche Forschungsgemeinschaft (DFG) is supporting for 2 years, starting in 2008 an extensive exploration of relict faunas on the deep slopes of the Queensland Plateau (Coral Sea, Australia) under the lead of the Georg-August-Universität Göttingen and in cooperation with the Museum of Natural History at the Humboldt-Universität Berlin. This “Deep Down Under” project works closely with Australian partners at the University of Queensland and the Queensland Museum in close collaboration with Project “Deep Ocean Australia” (ARC Linkage Project, co-ordinated by Prof. Justin Marshall at the University of Queensland).

An exceptional sessile invertebrate fauna was discovered in the 1970s on the Norfolk Ridge in the SW Pacific. This fauna is remarkable because it contains populations of animals that were previously thought to be extinct but have persisted almost unchanged on the deep reef slopes since the late Mesozoic (>65 MYA). Other expeditions to the Coral Sea in Australia in the mid-1990s discovered components of this deep-water fauna around Osprey- and Shark Reefs, but detailed exploration was not possible at that time. In this project we now aim to deploy scientific submersibles to investigate in detail the biodiversity of Mesozoic relict faunas and mud mound-structures down to a depth of 1000 m around Osprey- and Shark Reefs on the Queensland Plateau (Coral Sea, Australia). These remnant relict faunas (‘living fossils’) are of great interest to the biodiversity and geobiological sciences as they provide a window into past environments.

The project will capitalize on the unique opportunity provided by the arrival of Deep Ocean Quest’s “Deep Ocean Australia” voyage of discovery with the newly refitted privately funded research vessel “MV ALUCIA” and its two deep rover and one Dual Deep Worker submersibles, capable of diving to the required depth, in the Coral Sea. This project will provide substantial new knowledge on a completely overlooked and unique marine biodiversity and new genetic resources to promote a further understanding of ecology, (molecular) diversity, phylogeography, phylogeny, and trends in evolution of these ‘living fossils’ and their environments. For further details see www.deepdownunder.de.

This project is also the latest instalment of a series of long lasting relationships between Göttingen and Australia. During the last 2 years the groups have collaborated on DFG supported projects on deep metazoan phylogeny and on the biodiversity, phylogenetics and biomineralization of sponges. Other related investigations on the phylogeny of calcareous sponges (Porifera: Calcarea) are also involving the Museum of Western Australia, South Australian Museum.

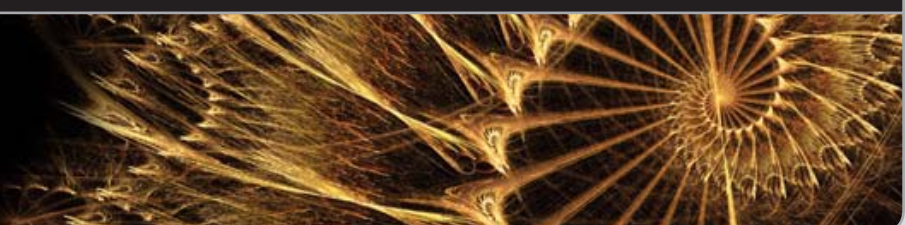
The outreach of the collaboration is also recognised by the Australian Research Council (ARC) which awarded in 2007 an International Linkage Project grant, and previously a Discovery Project for a collaboration on the making of a sea shell: function and evolution of genes encoding calcareous architectures of phenomenal strength, purity and beauty, both a partnership of the University of Queensland (Prof. Bernard M. Degnan) and Göttingen.

Prof. Dr. Gert Wörheide
Courant Research Center
Geobiology

Georg-August-Universität
Göttingen

Göttingen, Germany

[gert.woerheide](mailto:gert.woerheide@geo.uni-goettingen.de)
[@geo.uni-goettingen.de](mailto:gert.woerheide@geo.uni-goettingen.de)





Marie Curie

Dr. Dirk Erpenbeck was awarded a Marie Curie Outgoing International Fellowship in 2005 to work at the Biodiversity Program at the Queensland Museum. His project develops a first comprehensive molecular phylogeny of “keratose” (horny) sponges on all taxonomic levels with the aim of acquiring knowledge in sponge phylogeography and biodiversity in combination with applications for pharmaceutical industry.

Dirk is experienced in creating molecular data sets and analysing phylogenetic patterns, and in particular with an extended background in metazoan (animal) molecular phylogeny and particularly its application in sponges. The aim of the project is to combine this familiarity with acquiring robust taxonomic knowledge of keratose demosponges and obtaining expertise in assessment and statistical evaluation of phylogeography and biodiversity for which the host team at the Queensland Museum are well-recognized experts. Dr. John Hooper is currently Head of the Biodiversity Program, Queensland Museum, director of the Queensland Centre for Biodiversity, and is among the most recognized sponge taxonomists and the expert for sponges and their biodiversity in the region.

The Indo-West Pacific is a hotspot for sponges in general and many of the keratose sponge taxa are distributed in this area. The Queensland Museum in Brisbane harbours one of the largest collections of Indo-West Pacific sponges. They have performed numerous exhaustive collecting surveys, resulting in a large collection of keratose sponges suitable for molecular research. Dirk has returned in Europe to the Department of Geobiology of the Geoscience Centre of the University of Göttingen in Germany. He is working in the group of Prof. Gert Wörheide.

The overall outcomes between this network of collaborations and all projects include more than 20 joint publications or presentations in the past 5 years.



A typical vase-like demosponge (*Haliciona* sp.) under an overhang of a coral reef (image from the Red Sea)



Adaptive Services Grid

An EU framework project

This project relates to the engagement of an Australian team in the EU' FP6 Integrated project called Adaptive Services Grid (ASG). The goal of ASG is to develop an open development platform for adaptive services discovery, creation, composition, and enactment. To achieve its goal, ASG addresses scientific and technological issues making use of the knowledge and expertise of major European research institutions with significant contributions from the software, telecommunications, and telematics industry. ASG provides the integration of these related sub-projects in the context of an open development platform, including tool development by small and medium sized enterprises. ASG will allow companies to register services they provide through standardized interfaces. Based on semantic specifications of requested services by service customers, ASG discovers appropriate services, composes complex process services and if required generates software to create new application services on demand. Subsequently, application services will be provided through the underlying computational grid infrastructure based on adaptive process enactment technology. In the proposed project, methods and concepts from software architectures, software development methodologies, Web services composition and workflow process planning and coordination will be complemented by recent results in domain engineering, software generation and Semantic web and agent negotiation research. The project benefits from strong industry involvement both with respect to platform development, deployment, and exploitation in the areas of telecommunications and telematics.

Professor Kowalczyk, jointly with Professor Han, has received a funding of \$AU665,000 from DEST's International Science & Technology – International Access Program (preceded DIISR's ISL) and secured additional support from the Australian partners for the project to a total value of around \$1.5 million over 2 years.

“Our project called Adaptive Service Agreement and Process Management in Services Grid (AS-APM) is a central component of an Integrated Project Adaptive Services Grid (ASG) supported by the Sixth Framework Programme of the European Commission under the Information Society Technology Objective Open Development Platforms for Software and Services”, says Prof. Ryszard Kowalczyk

The ASG project involves 21 research and industry partners from seven countries. In addition, in the ASAPM project they collaborate with five Australian industry, government and research partners as follows: Defence Science and Technology Organisation, Everyday Interactive Networks, Telstra Corporation, University of Queensland and Victoria University of Technology

The ASG project sought about 20 million Euro over five years from EU FP6. After negotiations the EU has granted 7.5 million Euro for the first two years with further funding decision at the end of the first stage. Although support for Swinburne's participation was initially sought from EU FP6, it had to be secured from Australian sources.

Prof. Ryszard Kowalczyk

Director, Centre for Information Technology Research

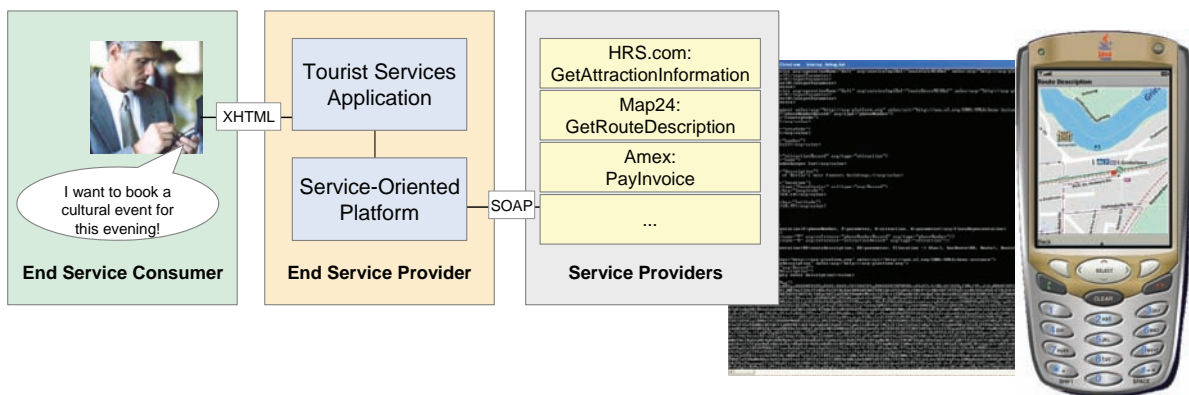
Faculty of Information and Communication Technologies

Swinburne University of Technology

Melbourne, VIC, Australia

rkowalczyk@ict.swin.edu.au

The overall goal of the ASG project is to enable complex ICT services construction and their quality-of-service delivery that has recently become a major area of focus in ICT research and practice. It represents an emerging paradigm of service-oriented computing that utilises services as fundamental elements in building agile networks of collaborating business applications distributed within and across organisational boundaries. *“We envisage that the project will contribute to wide adoption of the service-oriented computing paradigm and will enable harnessing new and existing ICT resources and services (computation, storage, services, etc) available within and across the organisations around the world”.*



An example of Adaptive service grid usage: Location-Based Tourist Service

The partnership

Swinburne University is the only non European member of this integrated project. Such an involvement is the fruit of an ongoing collaboration with Germans institutions, including the Hasso-Plattner-Institut at the Universität Potsdam that coordinates the project, Daimler Chrysler, Siemens AG, transit, the University of Leipzig, FH Furtwangen, Fraunhofer IESE, and the University of Koblenz-Landau. In effect the Centre for Information Technology Research at Swinburne was one of the 3 initiators of the projects with its German partners. They are now on the Scientific Board and one of the work packages leaders.

Today the project has enabled the publication of more than 300 publications and reports, integrated software prototype with 2 demonstrators. Technically the consortium achieved the development of Semantic Service Provisioning Architecture, Service Integration and Development Tool-Chain and Methodologies and Business Scenarios for Semantic Services (attraction Booking and dynamic Supply Chain. Some of the industry partners (Daimler Chrysler, Siemens AG, transIT GmbH among others in Germany) have started the exploitation of the project's results.

Tomorrow's aeronautics

The Cooperative Research Centre for Advanced Composite Structures Ltd (CRC-ACS) is a full partner in one Integrated Project and two STREPs under FP6. The following is a brief account of each of them.

TATEM

CRC-ACS is the only non-EU Member State organisation to participate in the 'TATEM' ('Technologies and techniques for new maintenance concepts') IP under FP6.

Launched in March 2004, the four-year TATEM project involves almost 60 organisations and has a total budget of EUR 40 million. The project has the objective of developing techniques that will reduce the maintenance costs associated with civilian aircraft by 20 % in a 5–10 year timeframe, and by 50 % in a 10–20 year timeframe.

Within the TATEM project, CRC-ACS is evaluating diagnostic systems that can advise the aircraft operator on the maintenance actions relevant to the airframe. Specifically, the job of CRC-ACS is to help conduct a technical survey of available 'Structural health monitoring' (SHM) systems, identify those best suited to future maintenance requirements and conduct a test programme to evaluate these airframe monitoring systems. In performing this work, CRC-ACS staff are working closely with EADS Military Air Systems staff in Munich, Germany.

CRC-ACS has completed a series of tests which utilised the horizontal tail plane from an F/A-18 aircraft as a test bed. This carbon/epoxy composite skin, aluminium honeycomb structure was subject to impact events under loaded conditions. The ability of selected SHM technology to identify, characterise and monitor impact and any damage created is being evaluated against the future maintenance requirements developed within the TATEM project.

Cocomat

CRC-ACS is a full partner in the STREP 'Cocomat', ('Improved material exploitation at safe design of composite airframe structures by accurate simulation of collapse'). The Cocomat consortium consists of 15 international aerospace manufacturers, software developers, research institutions and universities; it is being led by the DLR – German Aerospace Center in Braunschweig, Germany. The four-year project aims to exploit the considerable strength reserves of composite postbuckling stiffened panels through a more accurate prediction of the damage mechanisms leading to final collapse.

CRC-ACS has been active in all of the Cocomat work packages throughout the project. Work commenced with a comprehensive literature review and contribution to the Cocomat benchmarking study to assess the state-of-the-art for damage modelling and structural analysis. From this, CRC-ACS has developed a validated analysis methodology and software tool for analysing composite postbuckling structures taking delaminations and other material degradation into account. CRC-ACS has also contributed to the design and analysis of various

Prof. Murray L. Scott
Chief Executive Officer

Cooperative Research Centre
for Advanced Composite
Structures Limited

Fishermans Bend, VIC,
Australia

m.scott@crc-accs.com.au



specimens for experimental testing, including characterisation coupons, single-stiffener specimens and large multi-stiffener curved panels representative of composite fuselage designs. The Australian team continues to collaborate widely with partners across the various work packages, which involves exchanging researchers with partner institutions and co-authoring several papers for journals and international conferences.

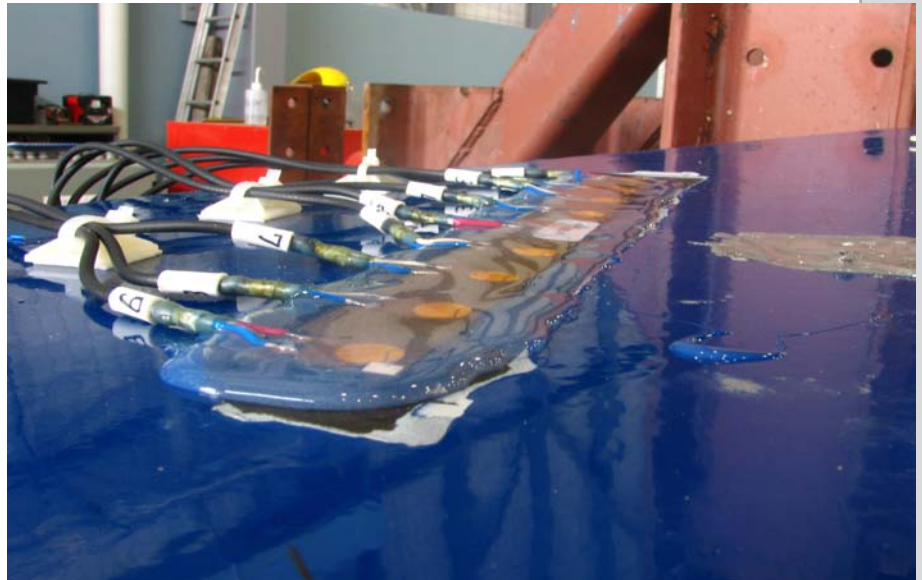
MOJO

The STREP entitled 'Modular joints for composite aircraft components' (MOJO) was officially launched in September 2006. CRC-ACS is 1 of 12 partners in MOJO and the only research partner from a non-EU country. MOJO will run for three years and is being coordinated by EADS (European Aeronautic Defence Company) Innovation Works centre in Ottobrunn, Germany.

The project will develop and demonstrate a new type of bonded joint for aerospace structures made from advanced composite laminates. These joints will be based on dedicated highly loaded modular sections that are intended to be integrated into composite skin panels using 3-D fibre reinforcements to resist the out-of-plane loads.

Simplified structural composite elements are intended to be inserted into these modular joint sections and bonded using adhesives. It is expected that a MOJO structure will lead to weight and cost savings of 15 and 20 % respectively.

CRC-ACS is concentrating on characterising, modelling and optimising the flow of adhesives during assembly of the joints, which are among the key issues for the cost-effective and successful manufacture of the joints. A strong research team has been formed to ensure the fulfilment of the above challenging task.



Sensors in position on the F/A-18 tailplane (Copyright CRC-ACS)



Social Change and Wellbeing

The Strategic Research Program for Social Change and Wellbeing (SRP) at Griffith University is a new initiative to bring together over 200 researchers to focus on contemporary global challenges to society and community wellbeing. One of the major reasons for the establishment of the SRP is to support and enhance international research collaboration. The following are examples of current projects, and partnerships.

International Industrial Relations Issues

Professor Greg Bamber, Professor Philippe Pochet, Dr Cameron Allan, Ben French and Dr Liz Todhunter

Funded by the Commonwealth of Australia, Department of Employment and Workplace Relations (DEWR), this project investigates internationally key industrial relations issues relevant to the introduction of WorkChoices and emerging developments in other key jurisdictions. The overseas systems include Germany, Sweden, UK, USA, Canada, New Zealand and Japan. These jurisdictions include a range of different types of industrial relations systems and cultures. The same seven specific countries were also selected for analysis in an earlier project, resulting in the publication *Workplace Bargaining in the International Context* (Petz et al. 1992).

Youth culture and music

Professor Andrew Bennett,

Professor Bennett is a sociologist who has spent three years working in Frankfurt am Main and has maintained his collaboration with German colleagues on youth culture and music. He is currently discussing future collaboration with the University of Lueneburg, including exploring visiting professorships. His recent invitations to Germany to provide key note presentations include "Heritage rock": Music, Culture and DIY Preservationism? and Hip Hop am Main, Rappin' on the Tyne: Local Hip Hop Cultures in two European Cities.

The history of Anthropology in the Context of Cross-cultural Relations in the Pacific, 1750-1900

Professor Paul Turnbull,

Professor Turnbull has established relationships with colleagues in Germany who similarly have interests and expertise in the history of anthropological research and scientific collecting in the Pacific and Australia between 1750 and 1900.

He is currently in discussion with colleagues at the University of Konstanz, who are seeking funding from the German Academic Exchange Service to explore establishing a long term research project, involving academic and research student collaborations between Griffith University and their German counterparts. As part of this project, he is exploring the de-

Jenny Wilson
Strategic Development
Manager

Strategic Research Program for
Social Change and Wellbeing

Griffith University

Brisbane, QLD

Jenny.Wilson@griffith.edu.au



velopment of research with Dr Elfriede Hermann, of the Institute of Cultural and Social Anthropology, at the University of Göttingen, focused on creating a major online catalogue of the unique Cook / Forster Collection of Pacific artefacts at that university.

History of Science / Transcultural Studies

Associate Professor Regina Ganter

Associate Professor Ganter has been collaborating for many years informally with her German colleagues. In 2006 she spent a semester at the University of Heidelberg, followed in 2007 by a Foerderpreis granted by the Robert Bosch Foundation to work with the IGM in Stuttgart, in its world class archives on the history of homeopathy. Associate Professor Ganter is currently in discussion with the University of Tübingen, to collaborate on a project related to the history of tropical medicine and would like to formalise a larger collaboration with all three German institutions in the future. Associate Professor Ganter's most recent collaborations have enabled hosting of a German student for a semester on a heritage project in Far North Queensland, which received much local media attention, and a publication in 2007.

Retaining social diversity

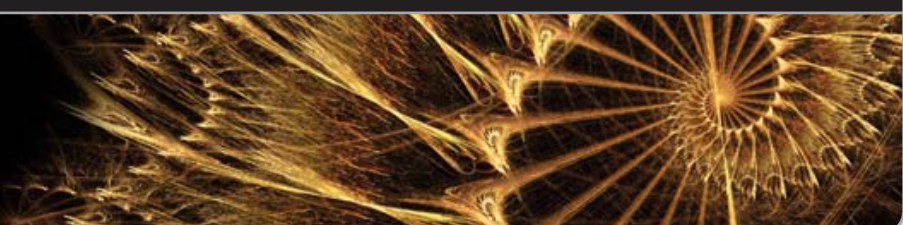
The Urban Research Program

In 2008, the SRP's Urban Research Program will host Dr. Doreen Jakob from the Berlin Center for Metropolitan Studies Berlin (Transatlantic Graduate Research Program Berlin – New York) . Dr Jakob recently completed her doctorate "Beyond creative production networks: The development of intra-metropolitan creative industries clusters in Berlin and New York City" for the Department of Sociology, University of Humboldt. She will be with the URP from April to September 2008 where she will undertake research into retaining social diversity in Brisbane's knowledge precinct development. Her research focus provides a great opportunity to establish longer term collaborations with both our Urban Research Program and our Centre for Public Culture and Ideas.

Violence Research and Prevention

Professor Mazerolle, Director of the Key Centre for Ethics, Law, Justice and Governance, is in the early stages of exploring formal collaborative links between Griffith University and the University of Tübingen. Professor Mazerolle is hoping to secure support to undertake and host exchange visits to discuss research synergies and future collaborative opportunities.

A more detailed description of the Strategic Research Program for Social Change and Wellbeing (SRP) at Griffith University with publications of researchers is available in the appendix.



Collaboration with ANSTO

Climate change

ANSTO's Cosmogenic Climate Archives of the Southern Hemisphere project has initiated collaborative research with Professor Frank Lehmkuhl of the Geographisches Institut of the Rheinisch-Westfälische Technische Hochschule Aachen on applications of cosmogenic exposure dating to landscape evolution processes and glacial climate change. This collaboration is supported by a DFG grant that Prof Lehmkuhl has for research in Central Asia and Tibet, and an International Science Linkages grant awarded to Dr David Fink of ANSTO for research in Tibet in collaboration with the Institute of Geophysics and Geology, China Academy of Science (Beijing).

Prof Lehmkuhl invited and funded an ANSTO postdoctoral fellow, Dr Henrik Rother, to join him on a one-month Mongolian field trip for sample collection of glacial deposits in October 2006. These samples are being initially processed in Aachen. Prof Lehmkuhl will send a student to Australia in March for three months (co-funded with ANSTO) to learn a technique for cosmogenic dating using beryllium-10. Dr Rother has been invited to visit Aachen and meet the RWTH-Aachen vice chancellor after he goes to the European Geophysics Union conference in Vienna in April 2008.

CcASH is identifying, collecting, measuring and analysing unique records of climate change in the Southern Hemisphere. It aims to deliver geo-chronological frameworks, and a better understanding of environmental change, landscape evolution of the Australian continent and processes of climate variability in the past. It applies ANSTO's accelerator facilities and dating capabilities.

Neutron and x-ray scattering

ANSTO's neutron and x-ray scattering team is involved in a range of collaborations with German researchers. For example, Dr Frank Klose, who joined ANSTO's Bragg Institute last year, is working with Dr Dieter Lott from the GKSS-Forschungszentrum, a National Research Centre that operates a research reactor at Geesthacht near Hamburg. Their collaboration on spintronics materials and thin magnetic films has resulted in a number of publications in development and invitations to speak at conferences.

Professor Michael Loewenhaupt, professor of experimental physics at the Technische Universität Dresden has been on sabbatical at the Bragg Institute for two months to 14 March. Professor Loewenhaupt is the project leader of the PANDA triple axis spectrometer at the *Forschung-sneutronenquelle Heinz Maier-Leibnitz* (FRM2) research reactor, which belongs to TU Munich. PANDA is funded by FRM2 but run by Professor Loewenhaupt's Magnetism and Neutron Scattering group, which has 30% of the beam time. All scientific projects are funded by the DFG through SFB 463, in which Professor Loewenhaupt has three projects.

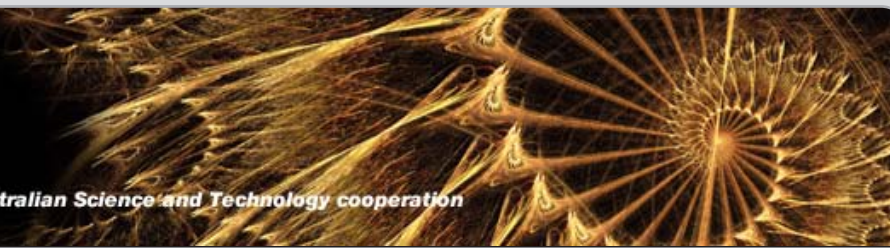
Because PANDA and the TAS (thermal and cold) spectrometers on ANSTO's OPAL research reactor have many details in common, Professor Loewenhaupt is using his time at ANSTO to exchange ideas and instrumental knowledge concerning triple axis spectrometers. He is also building linkages with other users of neutron scattering in Australia. He will be seeking to

Dr Miriam Goodwin
Senior Adviser - Research
Management and Policy

Australian Nuclear Science
and Technology Organisation
(ANSTO)

Menai, NSW

miriam.goodwin@ansto.gov.au



return to Australia to conduct neutron scattering experiments that have had to be postponed on this occasion as OPAL is not operating. Because OPAL is new, its neutron beam instruments will also be more advanced by the time Professor Loewenhaupt returns.

Of the 41 research staff working in the Bragg Institute, at least 10 are of German citizenship, undertook their PhDs at German universities and/or have worked in German research institutions. The Hahn-Meitner Institute in Berlin features most commonly among German institutions in the careers of Bragg Institute staff. The Bragg Institute is the strongest neutron and X-ray scattering group in Australia. Its staff have been extensively involved in the development of the neutron beam instruments on the OPAL research reactor – which is the only reactor in Australia – as well as in the Australian Synchrotron Research Program.

Structural integrity

ANSTO's Structural Integrity program is informally collaborating with the Fraunhofer Institute for Non-Destructive Testing IZFP in Saarbrücken. The collaboration started in 2005 in a Welded Structures Cooperative Research Centre project on non-destructive testing methods to detect creep damage. ANSTO was a member of this CRC. Dr Gerd Dobmann from the Fraunhofer Institute provided technical direction based on his extensive previous experience in this field. He also offered the use of specialised testing equipment. ANSTO sent some samples for assessment to the Institute, which generously conducted testing at no cost to evaluate whether a novel technique (eddy current microscope) was a potentially useful technique. The initial, limited testing was promising, but the CRC project did not have any provision to fund travel, so ANSTO was not able to pursue this any further.

Although the CRC project has finished, Dr Bob Harrison and Michael Drew of ANSTO's Institute for Materials Engineering maintain contact with Dr Dobmann. Dr Harrison has visited him and Dr Dobmann has been invited to Australia. The Fraunhofer Institute contributes to a German Association of Major Power Utilities (VGB) program on creep damage detection and ANSTO sees many advantages in maintaining a relationship between the two institutions.

The Structural Integrity program undertakes materials engineering R&D to underpin assessment of structural integrity of critical engineering infrastructure, nuclear plant and power system components. Its foundation is knowledge needed for the operation of ANSTO's research reactor.

Radioactive waste management

Jennifer Harrison of ANSTO's RadWaste project visited the Institute of Radiochemistry at the Forschungszentrum Dresden Rossendorf for three weeks in late 2007, at the invitation of Dr Vinzenz Brendler. Their investigations included time-resolved laser-induced fluorescence spectroscopy – for which FzD has a unique facility and world-class expertise – and attenuated total reflectance Fourier-transform infrared spectroscopy. The Radwaste project will be building on this collaborative work, for example with a joint application to the actinide beamline at the European Synchrotron Radiation Facility in Grenoble, France. Dr Brendler and the leader of the Radwaste project, Dr Tim Payne, are members of the technical direction team of an OECD Nuclear Energy Agency project and their past collaboration includes co-authorship.

A more complete list of collaborations with ANSTO is available in the appendix.



Collaboration with Adelaide

Plant genetics

Professor Jeremy N. Timmis from the School of Molecular and Biomedical Science at the University of Adelaide University has a number of recent successful collaborations with German Scientists. Dr Andreas Houben (now a Research Group Leader at Leibniz-Institute of Plant Genetics and Crop Plant Research, Gatersleben, Germany [IPK]) brought a DFG Post-doctoral Fellowship to work in Timmis' laboratory and was later awarded an ARC QEII Fellowship to continue for a total of 5 years with Timmis, ending in 2001. A series of influential papers on plant B chromosomes that resulted from this collaboration. In 2004 Timmis coauthored a major, highly cited review for Nature Reviews Genetics with Professor William Martin, Institute of Botany III, University of Düsseldorf, Düsseldorf, Germany. He also collaborates with Professor Hans-Ulrich Koop (München) and recently hosted Gregor Schmidt (Jena) for 12 months on an undergraduate research internship following a research seminar that Timmis gave in Jena to undergraduates in 2005 (a manuscript resulting from Schmidt's research is in preparation).

Prof. Timmis visited IPK, Gatersleben for several weeks during 2002 and 2004 partially funded by a AusIndustry/DAAD travel grant. During these periods he gave invited seminars in Universities and Institutes in Gatersleben, München, Düsseldorf, Braunschweig, Berlin (Humboldt), Leipzig, Halle and Jena. Later he was an invited keynote speaker at the 8th Gatersleben Research Conference in 2005. Also in 2005 he was invited to give a talk at a Symposium of the DFG (SFB Transregio 1), held in Hamburg and organised by Professor J. Soll (München) to celebrate "100 years of the endosymbiotic theory – from Prokaryotes to Eukaryotic organelles."

More recently Professor Ralph Bock (Max-Planck-Institut für Molekulare Pflanzenphysiologie, Potsdam-Golm, Germany) and Timmis have coauthored an authoritative review that is currently in press in BioEssays. Timmis' and Bock's research groups separately and almost simultaneously demonstrated movement of DNA from the chloroplast to the nucleus by real-time experiments. These experiments have significantly changed the understanding of eukaryote nuclear evolution. It is now apparent that endosymbiotic evolution has made a major contribution to the complexity and heterogeneity of the eukaryotic nucleus and the organelles and their ancestors have been donors of many new nuclear genes.

Experiments by the two laboratories have provided unique plant genetic lines that contain de novo integrants of chloroplast DNA in their nuclei. The behaviour of these integrants has proved that nuclear DNA evolves at a rate that is far higher than was previously considered possible. Both laboratories are highly active in pursuing and extending the many leads that have ensued from their experiments. A visit for Timmis to do research in Bock's laboratories is planned for August 08 to March 09, to further develop the collaborative links that already exist, and allow discussions that would act to increase the rate of progress in this dynamic and very novel area. In addition Germany holds many key players in the field of endosymbiotic evolution and Timmis plans to visit some of them to further enhance progress and collaboration between laboratories.

Dr Don McMaster

Research Grants Officer
(International)

Research Branch

Visiting Research Fellow,
School of History & Politics

The University of Adelaide

Adelaide, SA

don.mcmaster@adelaide.edu.au



Metal-carbide nanocrystals

Dr Gregory Metha, Senior Lecturer at the Department of Chemistry, works on spectroscopic and reaction studies of small transition-metal radical molecules in the gas-phase. Of particular interest are molecules in which the metal atom is coordinatively unsaturated but multiply bonded to a single ligand moiety such as transition-metal oxides, nitrides and carbides, as well as metal-carbide clusters like Nb_4C_4 which have been shown to adopt a crystalline structure of nanometre dimension and have been dubbed “nanocrystals”. Since these molecules are unstable and highly reactive they need to be generated in the gas phase using laser ablation and studied under vacuum conditions using techniques such as supersonic molecular beams coupled with laser ionisation.

Dr Metha is in the early stages of developing research ties into Germany on two fronts briefly outlined below.

↻ Free electron laser studies

The first involves researchers at the Fritz Haber Institute of the Max Planck Society in Berlin, whose links facilitate Australian access to a large scale infrastructure: the Free Electron Laser for Infrared eXperiments (FELIX) in The Netherlands. Indeed the group from the Fritz Haber Institute have exceptionally good access to the facility because the group leader (Prof Meijer) was previously the Director there. Dr Metha has visited the Facility twice with the collaborators and has a pending request for joint beam-time where they will be using techniques developed by the German scientists but applied to chemical systems that Metha’s group have expertise in, namely metal-carbide nanocrystals.

↻ Catalytic nanocrystals

The second collaboration with Prof. Dr. Ulrich Heiz at the Technische Universität München (TUM) and involves investigating the potential catalytic properties of the metal-carbide nanocrystals. Exploring such properties require exceptionally sophisticated equipment that just doesn’t exist in Australia. To date, two students have joined the group in Munich (for 1 month and 4 months) and Dr Metha has twice visited the facilities.

By working closely with the Bavarian group, Metha’s Laser Chemistry Lab has been accepted to join COST Action D41, “Inorganic Oxides: Surfaces and Interfaces”, to work on supported nanoparticles. The main objective of this network is to increase the knowledge and understanding of the properties of oxide surfaces and interfaces at an atomistic level and to develop the means of predicting and controlling their structures and functions at the nanometre scale.

“Finally, I’d just like to add how absolutely impressed I am with the state of research in Germany. They have a very definite sense of collaboration which is in complete contrast with my previous experience within the North American system” concludes Dr Metha.

A more detailed list of collaborations with Adelaide University is available in the appendix.





The University of Sydney

Sustainable industry

∞ The challenge

The world is standing at the technological threshold of a revolution that is driven by the need for truly sustainable (industrial) processes, both in the production of chemicals as well as in the generation of power.

At current rates of resource usage, a world population operating with Australian standards of living would require between 4 – 6 planets. Clearly, this is untenable and, from a chemical viewpoint, the inherent challenges can only be met by devising strategies for increased use of renewable resources, waste reduction, energy optimisation and process intensification as outlined in the 12 principles of “Green Chemistry”.

∞ About the project

The group led by Professor Thomas Maschmeyer, Professor and Federation Fellow, School of Chemistry, aims to tackle these issues by generating and using new fundamental insights on the molecular and nanoscopic level to develop feasible leads for the design of new catalytic chemical routes and processes that will enhance sustainability.

They focus strongly on the use of renewables, such as the conversion of biomass to fuels (biodiesel and lignocellulosic ethanol) and feedstocks for the chemical industry (monomers, resins, low calorific sugars) or the photocatalytic splitting of water to generate hydrogen. Furthermore ionic liquids and super-critical solvents such as carbon dioxide, alcohols or water, which can act both as solvent and catalyst, form the backbone of our activities in process innovation.

The Laboratory's key expertise is in designing, preparing and characterising multi-functional assemblies, operating at various length-scales (from centimetres to picometers). These assemblies are used principally in catalysis, including the integration of conversion and separation, as well as in drug-delivery and medical imaging.

∞ The partnership

Professor Thomas Maschmeyer's team uses Professor Wolfgang Kläui's (University of Duesseldorf) mono-disperse crystalline palladium nanoparticles and supports them on a mesoporous silica to stabilise them. Then they use these supported particles to hydrogenate cinnamaldehyde to selective make cinnamylalcohol. Such a process is important in the flavours and fragrance industry and they are achieving very high selectivities (95%).

Diane Ranck

Executive Manager (International and Development)

Office of the Deputy Vice-Chancellor (International)

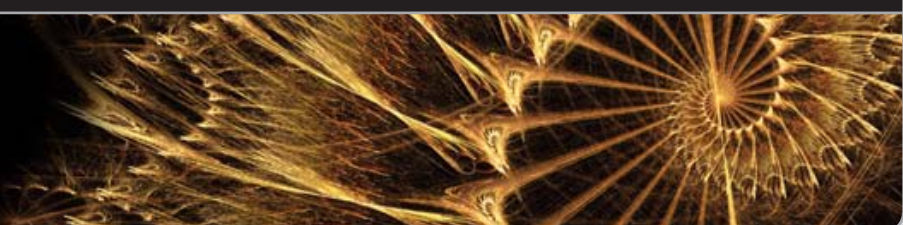
The University of Sydney

Sydney, NSW

d.ranck@usyd.edu.au



Thomas Maschmeyer, Professor of Chemistry and Federation Fellow





GerMANY Innovations

In September 2007, the University successfully organised “GerMANY Innovations” in partnership with the German Consulate and the Goethe Institut. This was an exciting first-ever University of Sydney event, where major German companies, such as Siemens, BMW, Schenker, Allianz and many more, together with top academic researchers, students and the public were brought together. The overall themes encompassed “Health” and “Sustainability”; Professor Götz was one of many who played an active role both in the organisation and as a keynote speaker.

Professor Jürgen Götz, Director of the Alzheimer’s and Parkinson’s Disease Laboratory at the University of Sydney’s Brain and Mind Research Institute, is a world-leader in the race to develop treatments for these devastating neurodegenerative conditions.

In 1995 Professor Götz was the first scientist to successfully reproduce Alzheimer’s symptoms in mice; this major breakthrough was largely funded by Bayer. Since then Professor Götz has succeeded in the treatment as well as reproducing early symptoms of Parkinson’s disease in an animal model.

☞ The challenges of the project

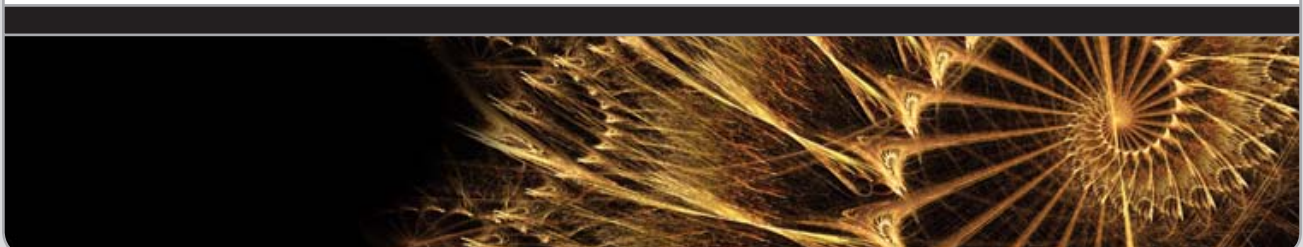
The formation of amyloid fibrils is a common biochemical characteristic that occurs in Alzheimer’s disease and several other amyloidoses. The unifying structural feature of amyloid fibrils is their specific type of β -sheet conformation that differentiates these fibrils from the products of normal protein folding reactions.

A research group from the University of Sydney, German institutions including the Leibniz Institut für Altersforschung, the Friedrich-Schiller-Universität Jena, Charité – Universitätsmedizin Berlin generated an antibody domain, termed B10, which recognizes an amyloid-specific and conformationally defined epitope. This antibody domain was selected by phage-display from a recombinant library of camelid antibody domains. Surface plasmon resonance, immunoblots, and immunohistochemistry show that this antibody domain distinguishes A_{β} amyloid fibrils from disaggregated A_{β} peptide as well as from specific A_{β} oligomers. The antibody domain possesses functional activity in preventing the formation of mature amyloid fibrils by stabilizing A_{β} protofibrils. These data suggest possible applications of B10 in the detection of amyloid fibrils or in the modulation of their formation.



Professor Jürgen Götz, Brain and Mind Research Institute

A more detailed list of collaborations with the University of Sydney is available in the appendix.



Weightlessness research

University of the Sunshine Coast (USC) exercise scientist Dr Chris Askew is still “coming back down to earth” after recently taking part in research aboard a parabolic flight campaign over Paris. Dr Askew, a lecturer in exercise physiology, jumped at the chance to join a German Sport University research team investigating the effects of weightlessness on fine motor skills and central neural activity. He was invited by German Sport University senior lecturer in exercise physiology, Dr Stefan Schneider, to be a subject and assistant for testing of the influence of weightlessness (zero-gravity) on brain activity, mood changes and blood hormonal responses during flight aboard a modified Airbus A300. The NOVESPACES’ Airbus A300 ZERO-G is the world’s largest flying laboratory for research in Microgravity (0G). The aircraft will fly up to 31 parabolas during each flight, producing around 22 seconds of weightlessness each parabola.

Dr Askew said the plane soared skyward at 47 degrees for 20 seconds, free-floating for 22 seconds and then plummeted to earth at 47 degrees for 20 seconds. “It’s like going through really bad turbulence, you’re losing your stomach for 22 seconds at a time,” he said. “But you’re in safe hands with seven pilots and flight engineers on board.” Dr Askew said the Airbus — called the “A300 Zero-G”, but nicknamed the “Vomit Comet” by scientists — was pushed to its limits for the purposes of conducting 12 scientific experiments at a time in human, biological and industrial research. The plane’s previous parabolic campaign featured medical research into the first ever laparoscopic surgery in weightlessness which gained world-wide media attention.

Dr Schneider said his research had been funded by the German Space Agency (DLR) to the tune of about A\$400,000. He said he aimed to assess how differently the human brain reacts to weightlessness (at the top of the parabola), under normal gravity (straight flying) and under double gravity (during the rapid ascents and descents). “This was a unique opportunity. There would be very few people in the world who get a chance to do this. It has given me a much greater appreciation of the effects of gravity on the body and the functioning of the body in weightlessness.”

Dr Schneider arrived in February 2007, at the University of the Sunshine Coast to embark on another combined exercise physiology project with Dr Askew. The German sports scientist and two of his students, Julia Diehl and Andreas Mierau, will help conduct experiments into the effects of high and low intensity exercise and how “positive stresses” can affect brain activity and how that is connected to people’s mood. Dr Schneider said the research, jointly funded by USC, would assess differences in the psycho-physiological stress-relaxation thresholds of individuals during aerobic and anaerobic exercise.

“On the parabolic flight we have looked at negative stress, or distress, on the body,” he said. “We now want to determine the effects of positive stress, like how a jog in the park can have a positive effect on brain activity and mood.” Dr Schneider said some people seemed to find relaxation after a short, fast run, while others did so after a long, slow jog. The USC study will seek to determine the scientific reasons for this difference, using the same testing devices that were used on board the Airbus A300 Zero-G to assess brainwave activity, mood changes and blood hormonal responses.

Dr Chris Askew

School of Health and Sport Sciences

University of the Sunshine Coast

Maroochydore QLD, Australia

caskew@usc.edu.au



Forum for European-Australian Science and Technology cooperation

Deutsche Forschungsgemeinschaft delegation in Australia
March - April 2008

FEAST - Germany a snapshot of Australian - German research cooperation Appendix

This document is the companion of the Germany-Australia collaboration snap-shot prepared in March 2008 by the FEAST secretariat. It includes more detailed but not exhaustive over views of bilateral research collaborations. This document also includes a more detailed description of some institutions. FEAST Germany members have proposed to compile such overviews in their respective universities.

Contents

The University of Adelaide 2	Violence Research and Prevention 8
Faculty of the Sciences 2	History of Science / Transcultural Studies 8
Faculty of Health Sciences 3	Retaining social diversity 8
Faculty of Humanities and Social Sciences 4	University of Sydney 9
Faculty of Engineering, Computer and Mathematical Sciences 4	Health Faculties 9
Griffith University 5	School of Physics 10
Multi Disciplinary Centre Structure. 5	School of Chemistry. 11
International Experts and world leading research programs. . 5	School of Information Technologies 13
International Collaboration 6	School of Geosciences 14
German – Australian Collaboration in the Strategic Research	School of Biological Sciences 14
Program for Social Change and Wellbeing 7	Australian Nuclear Science and Technology Organi-
International Industrial Relations Issues 7	sation (ANSTO) 15
Youth culture and music. 7	Modern Diffraction Methods for the Investigation of Thermo
The history of Anthropology in the Context of Cross-cultural	Mechanical Processes 15
Relations in the Pacific, 1750-1900 7	Other opportunities. 15

The University of Adelaide

The following report shows some of the research collaborations the University of Adelaide has with German research institutions. This list is not exhaustive but provides an overview of some of the research collaborations between researchers at the University of Adelaide and German research institutions.

Faculty of the Sciences

- **Associate Professor Mark Buntine, School of Chemistry and Physics**

Collaboration with laboratories at the Institut für Physikalische und Theoretische Chemie, Universität Frankfurt researching the chemical nature of non-covalent intermolecular interactions.

- **Professor Andrew Abell, School of Chemistry and Physics**

Two collaborative projects:

The first is with a DAAD sponsored fellow, Dr Markus Pietsch from University of Bonn, who is working on a pharmaceutical-based treatment for cataract of the eye. This is part of a major collaboration with industry and academics from a number of countries and the work is currently progressing down a commercial path

The second is a project sponsored by an ARC international linkage grant with collaborators at GKSS Germany (www.gkss.de/index_e.html) to look at: The controlled interaction of an artificial material with a biological system which offers the promise of important advances in medicine (e.g. suture materials, implants, artificial organs, drug release etc.) and biology (e.g. cell cultures). GKSS is providing cutting edge expertise in the research of biocompatible and biodegradable materials with stimulus sensitive behaviour.

- **Professor Jeremy Timmis**

Professor Jeremy N. Timmis from the School of Molecular and Biomedical Science has a number of recent successful collaborations with German Scientists including at Leibniz-Institute of Plant Genetics and Crop Plant Research, Gatersleben, the University of Düsseldorf, and the Max-Planck-Institut für Molekulare Pflanzenphysiologie in Potsdam-Golm.

- **Dr Greg Metha, School of Chemistry and Physics**

Two Collaborative projects:

The first involves researchers at the Fritz-Haber Institute and provides access to large scale infrastructure (the Free Electron Laser in The Netherlands called FELIX). The project is a joint one in that Dr Metha will be applying techniques that he has expertise in, namely metal-carbide nanocrystals to chemical systems the Fritz Haber Institute has developed.

The second project is a collaboration with the Technische Universität München (TUM) involving the same chemical systems as mentioned above, but looking at investigating their potential catalytic properties. As part of the collaboration Dr Metha has been accepted into a COST Action.

Dr Don McMaster

Research Grants Officer (International)

Research Branch

Visiting Research Fellow, School of History & Politics

The University of Adelaide

Adelaide, SA

don.mcmaster@adelaide.edu.au



- **Dr Frank Grutzner, School of Molecular & Biomedical Sciences**

Collaboration with the Johannes Gutenberg University Mainz, in the fields of Gene Expression and Genome Structure

- **Dr Gavin Rowell, School of Chemistry and Physics,**

Collaboration with the Max Planck Institute fuer Kernphysik, in the fields High Energy Astrophysics

- **Dr Petra Marschner, School of Earth and Environmental Sciences (Go8 – DAAD project).**

Collaborations with the University of Hohenheim in the fields of the rhizosphere and detritusphere.

- **Frank Reith (APDI fellow Geol. Geophys EES)**

Has established an informal research collaboration with colleagues at the University of Halle-Wittenberg to conduct microarray work on gold precipitating bacteria.

Faculty of Health Sciences

- **Professor Julie Owens, School of Paediatrics and Reproductive Health. (Go8 DAAD project)**

Collaboration with the Martin Luther University in the fields of metabolic programming, reproductive biology.

- **Dr Anna Ma-Wyatt, School of Psychology.**

Collaboration with the Justus-Liebig-University Giessen in the fields of the design of multi-sensory displays in both civilian and defence settings.

- **Dr Christine Feinle-Bisset, School of Medicine,**

Collaboration with the University of Tübingen in the fields of endocrinology, gastroenterology and hepatology, nutrition and dietetics, biological psychology. Also collaboration with Prof Michael Schemann Institute of Human Physiology University of Munich-Weihenstephan

- **Professor Ray, Rodgers, Obstetrics & Gynaecology**

Collaboration with Lydia Sorokin, PhD, Prof. Institute for Physiological Chemistry and Pathobiochemistry Muenster University Waldeyerstrasse 15, D-48149 Muenster, Germany

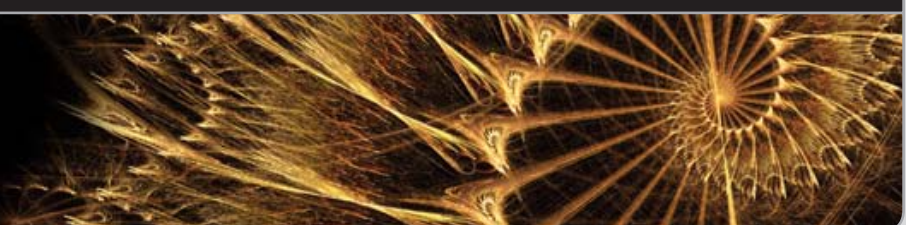
In the area of cell biology, specifically extracellular matrix

Also collaboration with Univ.-Prof. Dr. med. Katharina Spanel-Borowski Direktorin Institut für Anatomie der Universität Leipzig Liebigstraße 13, D-04103 Leipzig

In the area of reproductive biology, specifically ovarian cellular biology

- **Professor Andrew Somogyi, Pharmacology**

Collaboration with Professor Michel Eichelbaum and Professor Uli Zanger Dr Margarete Fischer Bosch Institute for Clinical Pharmacology Stuttgart, Germany Both are also members of the Department of Pharmacology, University of Tübingen, Tübingen, Germany Research Subject: Pharmacogenetics of Drug Metabolising Enzymes and Transporters.



Opportunities: I see opportunities for sending my PhD students to Stuttgart for short periods (1-3 months) to conduct part of their research. Perhaps a policy of funding from both countries to support this type of exchange should be considered.

- **Dr Baerbel Otto**

Collaborative ties with Dept of Gastroenterology and Endocrinology University of Munich

Faculty of Humanities and Social Sciences

- **Professor Peter Muhlhausler, School of Humanities**

Collaboration with the Institute fur Deutsche Sprache in the fields of linguistics

Faculty of Engineering, Computer and Mathematical Sciences

- **Professor Doug Gray, School of Electrical and Electronic Engineering.**

Collaboration with the University of Siegen in the fields of Radar signal processing.

- **Associate Professor Gus Nathan, School of Mechanical Engineering**

Collaboration with the Technical University of Darmstadt in the field of coupled dependencies of soot in turbulent flames by advanced laser diagnostics, fluid mechanics.

This list is not exhaustive but provides an overview of some of the research collaborations between researchers at the University of Adelaide and German research institutions.



Forum for European-Australian Science and Technology cooperation

Griffith University

The Strategic Research Program for Social Change and Wellbeing (SRP) at Griffith University is a new initiative to bring together over 200 researchers to focus on contemporary global challenges to society and community wellbeing.

<http://www.griffith.edu.au/strategic-research-programs/social-change/>

One of the major reasons for the establishment of the SRP is to support and enhance international research collaboration. As a relatively new initiative, we are still in the process of formalising our direction and priorities in this area. We are expanding our international partnerships with leading global centres, institutes and research teams, and welcome expressions of interest from international research organisations with complementary expertise and interests.

Our Core objectives are to:

- *explore the nature of societal and individual 'wellbeing';*
- *understand the reasons for trends and patterns in individual, family, community and societal wellbeing in post-industrialised societies; and*
- *Develop ways of improving wellbeing in Australia and internationally.*

Multi Disciplinary Centre Structure

The Strategic Research Program comprises eight leading research centres:

- *ARC Centre of Excellence in Policing and Security*
- *Centre for Public Culture and Ideas*
- *Centre for Work, Leisure and Community Research*
- *Griffith Institute for Educational Research*
- *Institute for Ethics, Governance and Law (IEGL) (including the Griffith Islamic Research Unit)*
- *Key Centre for Ethics, Law, Justice and Governance*
- *Socio-legal Research Centre*
- *Urban Research Program*

Through the Strategic Research Program, researchers focus their disciplinary expertise in 3 core themes:

- *Pathways, transitions and interventions for change;*
- *The causes and prevention of violence;*
- *Space and place.*

International Experts and world leading research programs

Our researchers include some of the world's leading disciplinary experts in:

Jenny Wilson

Strategic Development
Manager

Strategic Research Program for
Social Change and Wellbeing

Griffith University

Brisbane, QLD

Jenny.Wilson@griffith.edu.au

- Criminology
- Governance and Ethics
- Law
- Industrial Relations and Workplace organisation
- Public Culture and identity
- School leadership, curriculum and policy
- Social Policy and community wellbeing

We have developed specialist and innovative approaches and research programs that are leading new global research directions and responses by policy makers. Examples include:

- *Policing and Security research – Australia's only Research Centre of Excellence in Policing and Security that brings together leading researchers from Australia, UK, USA, South Africa and Israel, with national and international police services and security agencies.*
- *Justice Modelling – a specialist program integrating criminological theory advanced computing and statistical modelling to inform government policy decisions within criminal justice.*
- *Griffith Youth Forensic Service – a unique university based assessment and intervention program that provides specialised state wide services for youth who have appeared in court in relation to sexual offence matters*
- *Pathways to Prevention and Early childhood intervention. The Pathways to Prevention program led by Professor Ross Homel has contributed to the development of government early intervention initiatives across the world and was acknowledged as a catalyst for the multi-million dollar Australian Government program "Communities for Children"*
- *Community Indicators. Researchers are part of a developing international network engaged in the development of global indicators that can be used to measure the quality of life experienced in our communities.*
- *Violence Research and Prevention, a truly interdisciplinary program focusing on all aspects of violence, from workplace and school bullying to domestic violence and sexual crimes.*

International Collaboration

Researchers in the Strategic Research Program's constituent centres collaborate with some of the world's leading research centres and institutes. Within Europe, collaboration is taking place on specific projects and institutional initiatives as well as through personal disciplinary networks. Initiatives that support our international linkage strategy include:

- *Griffith is a member of the Innovative Research Universities Europe Centre: (<http://www.iueu.edu.au/index.html>)*
- *The Institute for Ethics, Governance and Law is one of a limited number of university institutes globally to be recognised as an associated institution of the United Nations University (<http://www.griffith.edu.au/arts-languages-criminology/institute-ethics-governance-law>)*
- *Professor Anna Haebich, a leading researcher from our Centre for Public Culture and Ideas, holds the Orbicom UNESCO Chairholder in Communication*

Our research is informed by long term and globally integrated perspectives, and researchers are engaged in international collaboration on a project basis, and also through developing formal links with key international institutions in specialist areas of social policy, that increase our capacity to contribute to a global understanding of the future challenges and opportunities that face societies.



German – Australian Collaboration in the Strategic Research Program for Social Change and Wellbeing

Although the current collaborations between our researchers and colleagues in Germany are small, we have several projects that are presently seeking funding support, and many more informal connections. We are fortunate to have recently been joined by a number of senior researchers from Europe who have longstanding networks and collaborations with German colleagues which they wish to continue, should support be available. Due to the limited national public funding support in Australia for major social sciences collaboration, the projects tend to be bilateral rather than European wide. The following are examples of current projects, and partnerships for which we are seeking support to formalise over the next 12 months.

International Industrial Relations Issues

Professor Greg Bamber, Professor Philippe Pochet, Dr Cameron Allan, Ben French and Dr Liz Todhunter

Funded by the Commonwealth of Australia, Department of Employment and Workplace Relations (DEWR), this project investigates internationally key industrial relations issues relevant to the introduction of WorkChoices and emerging developments in other key jurisdictions. The overseas systems include Germany, Sweden, UK, USA, Canada, New Zealand and Japan. These jurisdictions include a range of different types of industrial relations systems and cultures. The same seven specific countries were also selected for analysis in an earlier project, resulting in the publication *Workplace Bargaining in the International Context* (Peez et al. 1992).

Youth culture and music

Professor Andrew Bennett,

Professor Bennett is a sociologist who has spent three years working in Frankfurt am Main and has maintained his collaboration with German colleagues on youth culture and music. He is currently discussing future collaboration with the University of Lüneburg, including exploring visiting professorships. His recent invitations to Germany to provide key note presentations include:

“Heritage rock”: Music, Culture and DIY Preservationism?: New Frontiers in Arts Sociology: Creativity, Support and Sustainability?, Conference of the European Sociological Association (ESA) Network for the Sociology of the Arts, University of Lüneburg, Lüneburg, Germany, 27 March - 1 April, 2007.

Hip Hop am Main, Rappin’ on the Tyne: Local Hip Hop Cultures in two European Cities. com.unity - Transformationen musikalischer Praktiken, Zentrum für Kunst und Media, Karlsruhe, Germany. (8 May 2004)

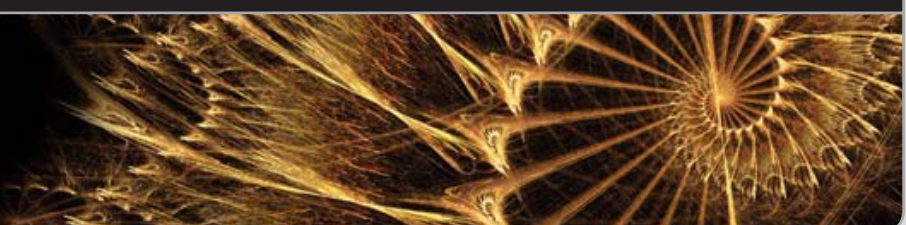
His publications also include:

Bennett, A. (2003) Hip Hop am Main: Die Lokalisierung von Rap-Musik und HipHop-Kultur?, in J. Androutsopoulos (ed.) *HipHop: globale Kultur - lokale Praktiken*. Bielefeld: Transcript Verlag [Cultural Studies 3].

The history of Anthropology in the Context of Cross-cultural Relations in the Pacific, 1750-1900

Professor Paul Turnbull,

Professor Turnbull has established relationships with colleagues in Germany who similarly have interests and expertise in the history of anthropological research and scientific collecting in the Pacific and Australia between 1750 and 1900.



He is currently in discussion with colleagues at the University of Konstanz, who are seeking funding from the German Academic Exchange Service to explore establishing a long term research project, involving academic and research student collaborations between Griffith University and their German counterparts. As part of this project, he is exploring the development of research with Dr Elfriede Hermann, of the Institute of Cultural and Social Anthropology, at the University of Göttingen, focused on creating a major online catalogue of the unique Cook / Forster Collection of Pacific artefacts at that university. Professor Turnbull's publications include the following German publication:

Die Leichen- und Seelenfledderer, in Leipziger Beiträge zur Universalgeschichte und vergleichenden Gesellschaftsforschung vol. 10 (2002) 5/6, pp. 46-54.

Violence Research and Prevention

Professor Paul Mazerolle

Professor Mazerolle, Director of the Key Centre for Ethics, Law, Justice and Governance, is in the early stages of exploring formal collaborative links between Griffith University and the University of Tübingen. Professor Mazerolle is hoping to secure support to undertake and host exchange visits to discuss research synergies and future collaborative opportunities.

History of Science / Transcultural Studies

Associate Professor Regina Ganter

Associate Professor Ganter has been collaborating for many years informally with her German colleagues. In 2006 she spent a semester at the University of Heidelberg, followed in 2007 by a Foerderpreis granted by the Robert Bosch Foundation to work with the IGM in Stuttgart, in its world class archives on the history of homeopathy. Associate Professor Ganter is currently in discussion with the University of Tübingen, to collaborate on a project related to the history of tropical medicine and would like to formalise a larger collaboration with all three German institutions in the future.

Associate Professor Ganter's most recent collaborations have enabled hosting of a German student for a semester on a heritage project in Far North Queensland, which received much local media attention, and a publication in 2007:

Regina Ganter "Career moves: German speakers in the ethnographic field" in Susan Cochrane and Max Quanchi (eds) *Hunting the Collectors; Pacific Collections in Australian Museums, Art Galleries and Archives*. Newcastle (UK): Cambridge Scholars Press 2007:99-118.

Retaining social diversity

The Urban Research Program

In 2008, the SRP's Urban Research Program will host Dr. Doreen Jakob from the Berlin Center for Metropolitan Studies Berlin (Transatlantic Graduate Research Program Berlin – New York). Dr Jakob recently completed her doctorate "Beyond creative production networks: The development of intra-metropolitan creative industries clusters in Berlin and New York City" for the Department of Sociology, University of Humboldt. She will be with the URP from April to September 2008 where she will undertake research into retaining social diversity in Brisbane's knowledge precinct development. Her research focus provides a great opportunity to establish longer term collaborations with both our Urban Research Program and our Centre for Public Culture and Ideas.

University of Sydney

NB This list is by no means complete but provides some recent examples of collaborations from the University of Sydney.

Health Faculties

- **Pharmacology (Prof Judy Black)**

Research collaboration with Altana Pharma AG in Constance Germany. Since 1999 a senior researcher assoc Prof Michael Roth and starting in Jan 2007 a post doc for the CRC for Asthma and Airways Mr Markus Weckman from Lörrach.

- **Anatomy (Prof Cris dos Remedios)**

Research collaboration with labs around the world including one in Germany: Dr Wolfgang Linke, Professor and Head, Physiology and Biophysics Unit , University of Muenster. Study of the special elastic protein in hearts and is currently using SU. Tissue to determine if it is altered in heart failure. Collaboration is still at an early stage but active.

- **Pathology**

- *Prof Nick Hunt: collaboration with Professor Katja Becker from Giessen (University ?) on an enzyme, indoleamine dixygenase.*
- *Prof Nicholas King: collaboration with Professor Kühn, Head of Virology and Professor Schäfers, Head of Imaging at the University of Münster.*

- **The Brain & Mind Research Institute (Prof Jürgen Götz)**

- **ANZAC Research Institute/Department of Endocrinology (Prof Markus Seibel)**

Osteoporosis research with Strateg

- **Institute of Respiratory Medicine (Prof Norbert Berend)**

Asthma research with Boehringer Ingelheim

- **School of Medical Sciences (Prof Nicholas King)**

Brain research with Zeiss

- **Hepatology (Principal Research Fellow Mark Gorrell)**

Interaction with a group in Magdeburg for many years: study of enzymes in relation to diabetes. The collaborators were academic but are now in a company, IMTM which plans to continue the collaboration.

- **Genetics (Prof John Christodoulou)**

Students from University of Applied Sciences in Mannheim who spend 6 months in research lab undertaking a project as part of their Bachelor of Biotechnology degree.

Diane Ranck

Executive Manager (International and Development)

Office of the Deputy Vice-Chancellor (International)

The University of Sydney

Sydney, NSW

d.ranck@usyd.edu.au



- **Rehabilitation Research Centre (Assoc Prof Glen Davis)**

Longstanding research collaboration with Otto Bock GmbH whose head office is in Germany, R&D office in Austria and office in Australia.

- **Medical Radiation Sciences (Prof Richard Banati)**

- *An on-going collaboration with Professor Christoph Korbmacher at the University of Erlangen. As part of this, one of his students has just spent 1 month in my labs.*
- *An on-going collaboration with Professor Karl Kunzelmann at the University of Regensburg. He and one of his colleagues will be working in my lab for 2 months.*
- *Frequent visits from German academics (e.g. Professor Irene Schulz (Hamburg))*
- *Close contact with Siemens who we hope to interest in choosing the University of Sydney as one of their collaborative centres for biomedical imaging research.*

- **Dept of Physiology , Developmental Neurobiology (Dr Catherine Leamey)**

Ongoing collaboration with Professor Reinhard Fassler from the Dept of Molecular Medicine at the Max-Planck Institute in Martinsreid. Analysing the distribution of the proteins and changes in the organisation of the nervous system of the knockout mice.

- **School of Medical Sciences and the Bosch Institute (Dr Andrea Markus)**

Native German, did her PhD at GSF, Munich. Collaboration with Prof Stefan Stamm at the University of Erlangen. Good connections with her former PhD lab

- **School of Medical Sciences (Prof David Cook)**

Ongoing collaboration with Professor Karl Kunzelmann at the University of Regensburg.

Frequent visits from German academics eg Professor Irene Schulz from Homburg

School of Physics

- **Astrophysics (Dr Peter Tuthill, QEII Research Fellow)**

Works with Dr Michael Scholz (Heidelberg) and Prof Gerd Weigelt (Bonn). Formerly had a funded ARC linkage with these scientists, which ran approx 2002-2005. Michael Scholz is a regular visitor to the School.

- **Applied Physics (Dr Alexey Kondyurin Postdoctoral Researcher)**

Cooperation with German organizations: Institute of Polymer Research (Dresden), Rossendorf Research Center (Dresden), APT GmbH (Dresden) on plasma and ion beam implantation of polymers; and with HTS GmbH (Coswig) on space materials and constructions.

- **Medical Physics (Adjunct A/Prof Roger Fulton)**

Research relationship with the Institute of Medicine at the Research Center Juelich (FZJ) (www.fz-juelich.de/portal/home) spent three periods totalling about 2 years, most recently over our summer of 2003/4. Also hosted four German biomedical engineering students for periods of 6mo to a year for research projects related to the collaboration at the request of Prof Herzog



who heads the PET facility at FZJ. It would be good if this expo could result in strengthening these ties and even bring one or two of the staff out here for a visit which has until now never been possible.

- **Biophysics (Dr Serdar Kuyucak)**

Research collaboration with Prof. Artur Baumgaertner at the Research Center Juelich

- **Astrophysics (Prof Bryan Gaensler, Federation Fellow)**

Closely collaborates with radio astronomers at the Max-Planck Institute for Radio Astronomy in Bonn, on both science projects and on development of the Square Kilometre Array telescope.

- **Applied Physics (Prof Marcela Bilek, Federation Fellow)**

Research collaborations with:

- *The Ion Beam and Materials Research Centre, Rossendorf in Dresden (also known in German as the Forschungszentrum Rossendorf). My collaborator there is the director of the Institute, Prof Wolfhard Moeller. Tom Oates my first PhD student just finished a 2 year post-doc there on a EU Marie Curie fellowship that we jointly applied for.*
- *Materials Chemistry Department at Aachen University. My collaborator there is the department head, Prof Jochen Schneider - he is also PI on my most recent ARC DP grant. His recently completed PhD student, Johanna Rosen, has just spent a year's visiting stint with me and we plan to continue the visits next year.*

- **Nuclear Physics (Dr Seyed Reza Hashemi-Nezhad)**

For over 10 years I have collaborative research with German scientist from Kernchemie, Fachbereich Chemie, Philipps-Universität, Marburg, Germany. Research concerns

- *1) Interaction of high-energy ions with metallic targets*
- *2) Spallation neutrons*
- *3) Nuclear waste transmutation*
- *4) Accelerator Driven Subcritical Nuclear Reactors*

School of Chemistry

- **Dr Nigel Lucas**

An Alexander von Humboldt Research Fellowship took me to Germany in 2003 where I spent 2 years undertaking research in organic materials chemistry at the Max Planck Institute for Polymer Research (MPI-P) in Mainz. The experience and knowledge gained in Germany was crucial in the establishment of my current research program in the School of Chemistry, and links with the MPI-P are ongoing.

- **Dr Elizabeth Carter**

The Vibrational Spectroscopy Facility, a research facility of the School of Chemistry, has three spectrometers that are manufactured by Bruker Optics who are based in Karlsruhe, Germany. The sole supplier of their equipment in Australia is Analytical Technologies a division of Biolab (Aust) Limited. The equipment is used by staff and students primarily from the School of Chemistry but also by researchers from Physics, OFTC, Biochemistry, Pharmacy, Agricultural Sciences, Chemical Engineering, Mechanical Engineering and Pathology as well as researchers from other universities and private industry. The equipment is used for characterisation, identification, reaction monitoring, and structural elucidation.

- **Dr Mat Todd**

Collaborates with Dr David Benoit, University of Ulm, on computational chemistry. We are interested in the prediction of thermodynamic properties of molecules dimerising in solution, as a mechanism for the generation of a high enantiomeric excess in the case of nearly racemic solutions. We are also collaborating on the barrier to rotation of various unusual amide bonds.

- **Dr Ron Clarke)**

Numerous connections with Germany and German institutions. I've grouped them into a few different categories below:

- *Positions and qualifications: Privat-dozent of the in the Faculty of Biochemistry, Pharmacy and Food Chemistry, University of Frankfurt/Main, Habilitation in Physical Chemistry, University of Frankfurt/Main, Habilitation in Physical Chemistry, Free University of Berlin, Former Alexander von Humboldt Fellow, Former Liebig Fellow of the Fonds der Chemischen Industrie*
- *Current Collaborations: Prof. Hans-Juergen Apell, Faculty of Biology, University of Constance, Prof. Ernst Bamberg, Department of Biophysical Chemistry, Max-Planck-Institute for Biophysics, Frankfurt/Main*

- **Dr Timothy Schmidt**

- *C=C: modelling: New theoretical and experimental knowledge of the :C=C: molecule (dicarbon) generated by Sydney researchers has caused scientists to revise models of :C=C: astrophysics. The :C=C: molecule is abundant in the interstellar medium and its spectroscopic properties can be used as a probe of extraterrestrial environments. The world leader in :C=C: astrophysics is Prof. Roland Gredel, *Max*-Planck*-Institut für Astronomie, Heidelberg. Gredel is collaborating with Sydney Uni Researcher Tim Schmidt and Astronomer Rob Sharp (Anglo-Australian Observatory) to develop a :C=C: model for use as a probe of protoplanetary nebulae thousands of light years away.*
- *Lasers: The laser spectroscopy group headed by A/Prof Scott Kable and Dr Tim Schmidt utilize lasers made in Germany. The group possesses a 308nm XeCl Excimer laser, and two LPD dye lasers manufactured by Lambda Physik, AG, Göttingen. These lasers have enabled the researchers to probe molecular structure and dynamics in the gas phase. Kable has used these lasers to unravel the mechanisms of photodissociation of various aldehydes. Most recent achievements include the observation of a new electronic state of the fundamental :C=C: species (dicarbon) for the first time, and the observation of a new photodissociation mechanism for acetaldehyde.*

- **Prof Peter Lay**

Long-standing relationship with Philipps-University Marburg in Germany. The fact that we have at least one student per year that joins my group is a good indication of the value of the training that the students receive, as measured by comments from both the students and the Faculty at this institution. This program has involved the exchange of at least one Diploma student a year who spends six months in my group completing research as an Occupational Trainee. Students have been visitors: Robert Luxenhofer, from the Technische Universität München, also completed a research project in my group as an undergraduate student and is coauthor on a paper. Their visits have resulted in a number of papers in international journals of high ranking and several others are in preparation. Extensive interactions with Bruker through the EPR instrumentation and the vibrational spectroscopy equipment in two of the School's largest facilities.

- **Prof L. F. Lindoy**

Professor Lindoy and his Sydney group has had a long standing research collaboration with Professor K. Gloe's group at the Technical University, Dresden. The project has involved the design and testing of new materials for heavy metal separation using unique facilities available in each of Sydney and Dresden. This collaboration is now about 10 years old and so far has resulted in publication of 18 joint research publications.

Since 2002 the above collaboration has been funded by two successive ARC Linkage International Grants from Australia and the DFG from Germany. On average, there have been about six interchanges of the Chief Investigators and their students between Dresden and Sydney each year since 2003.

In 2006, Professor Lindoy was appointed a Mercator Guest Professor at the Technical University, Dresden - a distinguished professorship for foreign academics sponsored by the Deutsche Forschungsgemeinschaft. This 5 month appointment involved presentation of a 12 lecture course on Nanoscience as well as continuing research in Dresden.

- **Prof Thomas Maschmeyer**

- *German academics: Wolfgang Kläui, Uni Duesseldorf Nanoparticles as catalysts, Johannes Lercher, TU Munich Student exchange and catalytic processes, Matthias Epple, Uni. Essen, Ferdi Schueth, Max Planck (Muehlheim) Prof. Robert Schloegel Fritz Haber Institut, Berlin, Surface chemistry*
- *Companies: BASF, Sumitomo (Germany), AMTECH (Chemnitz) Supply one of our high throughput robots, Various standard Lab. equipment *Buechi, Schott, Heidolph, etc.)*

- **Dr Pall Thordarson**

DAAD Fellowship in smart materials: Dr. Sabrina Dehn (PhD Aachen) has recently obtained a Deutscher Akademischer Austauschdienst (DAAD) Fellowship to work with Dr. Pall Thordarson, an ARC Australian Research Fellow at the School of Chemistry, The University of Sydney. Dr. Dehn will start work in June 2007 on her project titled Using lanthanides to enhance the stability and potential applications of anion sensitive self-assembled gels. Dr. Dehn and Dr. Thordarson, will be working with a novel class of smart materials, called self-assembled gels, that are showing great promise in tissue engineering and biomedical applications, with the explicit aim of incorporating lanthanides in these materials, but lanthanide play a major role in many modern bio-imaging techniques including magnetic resonance imaging (MRI)

School of Information Technologies

- **Dr Masahiro Takatsuka**

Collaborating with Dr Falk Schreiber from Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)(<http://www.ipk-gatersleben.de/en/>)

- **Dr Uwe Roehm**

Connections to Universities and academics in Germany, and strong link to the German-Australian Chamber of Industry and Commerce here in Sydney.

- **Prof Jon Patrick**

Research collaborations with Dr Franz Baader, Uni of Dresden; Dr Stephan Schultz, Uni of Freiberg

- **Prof Peter Eades)**

My group has lots of research contact with Germany: Many incoming interns from Germany, both PhD and Masters level We send PhD students to German institutes regularly Many German research collaborators, sabbatical visitors etc

- **Ass Prof Judy Kay**

Supervising Carolin Plate, who is doing a thesis jointly with Judy and University of Osnabrueck, with Prof. Hamborg; also have some links with researchers at DFKE at Saarbrücken



School of Geosciences

- **Ass Prof Dietmar Muller**

Has strong connections with the Alfred Wegener Institute for Polar Research, mainly through Dr. Karsten Gohl. His group is involved in various activities related to the International Polar Year (which just started), including a joint research cruise to Antarctica (Prydz Bay). One of his students will be participating in the cruise on the German Icebreaker Polarstern, from February to April 2007. Other relationships with German institutions, including the University of Munich (geodynamic modelling and e-research group), the Leibnitz Institute for Marine Science at the University of Kiel, and the “Bundesanstalt fuer Geowissenschaften und Rohstoffe” with whom he has a joint research cruise to the northern Indian Ocean planned (on the German Research vessel “Sonne” in 2008).

School of Biological Sciences

- **Dr George Humphrey**

Since 1971, I have been on the Editorial Board of “Marine Biology”, an international journal belonging to Springer Verlag. The journal was started in 1971. Springer sends me at least 30 papers a year to edit. I am an Hon. Ass. in Biological Sciences.



Australian Nuclear Science and Technology Organisation (ANSTO)

This additional material complements the overview of some of ANSTO's major collaborations with Germany.

Modern Diffraction Methods for the Investigation of Thermo Mechanical Processes

ANSTO Senior Research Fellow Dr Klaus-Dieter Liss is investigating structural details and phase transformations on titanium aluminides in a multinational collaboration between Privatdozent Dr Arno Bartels of the Hamburg University of Technology; Prof. Helmut Clemens of Montanuniversität Leoben, Austria, Dr Thomas Buslaps from the European Synchrotron Radiation Facility, France; and Dr Dominic Phelan of the University of Wollongong and their groups.

Light weight alloys are novel developments for high-temperature applications in the aerospace and transportation industry. Unprecedented, multidimensional investigations using high-energy x-ray diffraction in-situ at high temperatures and in real time give a unique approach to modern materials studies and have been published on multiple occasions. The results are complemented by off-situ light- and electron microscopy and in-situ laser scanning confocal microscopy. This collaboration is also seeking to use the DESY synchrotrons and the OPAL neutron source for future studies. Most of the data evaluation has been developed and undertaken at ANSTO.

Further contacts in Germany were created in October 2007 when Dr Liss undertook visits and presentations at several German institutions. Recently, Dr Ulf Garbe from the GKSS research centre joined the project at ANSTO, which will bear further German-Australian collaborations.

Other opportunities

- **The Impact of Nuclear Activities on Environment, Health and Security**

ANSTO has a Framework Agreement, titled 'The Impact of Nuclear Activities on Environment, Health and Security,' with the Institute for Transuranium Elements, an EC Joint Research Centre in Karlsruhe. This three-year agreement came into effect on 27 February 2006. Among common areas of interest are materials and nuclear forensics.

- *Two natural uranium samples from the 1940s are being prepared in Germany for shipment to ANSTO for analysis to determine if the materials had been subjected to significant irradiation. The collaboration involves Drs Klaus Mayer, Maria Wallenius and Maria Betti of the ITU, and Michael Colella and colleagues at ANSTO.*
- *The two teams are also planning a researcher exchange. It is proposed that a member of ANSTO's Counter Terrorism Research project, Elizabeth Keegan, will visit the ITU later in 2008. She leads research on the provenance determination of uranium ore concentrates. Undertaking research at ITU will give Ms Keegan access to state-of-the-art instrumentation and a larger sample set than available at ANSTO. The work program is envisaged to take about ten months, of which five months will be at the ITU. ITU scientists are world leaders in nuclear forensic research, and nuclear trafficking is a global challenge that requires knowledge transfer between countries.*

Dr Miriam Goodwin
Senior Adviser - Research
Management and Policy

Australian Nuclear Science
and Technology Organisation
(ANSTO)

Menai, NSW

miriam.goodwin@ansto.gov.au

• *Dr Greg Lumpkin and Dr Kerry Whittle of ANSTO's Advanced Nuclear Solutions Group are developing a proposal with Dr Rudy Konings and Dr T Wiss from the Materials Research unit at ITU. They intend to explore properties of fluorite structure types and related compounds and to examine their behaviour when irradiated. In addition to the scientific knowledge to be gained, ANSTO would have access to unique facilities at ITU for experimental work on radioactive materials. Both groups would also explore the possibilities for atomistic modelling of the proposed systems.*

- **Positron beamlines**

German leadership in positron beamlines is of interest to Australia's Centre for Antimatter-Matter, in which ANSTO is involved



Forum for European-Australian Science and Technology cooperation

Jenny Wilson

Strategic Development
Manager

Strategic Research Program for
Social Change and Wellbeing

Griffith University

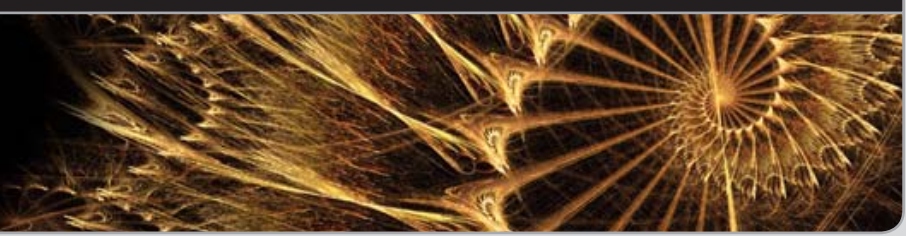
Brisbane, QLD

Jenny.Wilson@griffith.edu.au



Other opportunities

The two teams are also planning a researcher exchange. It is proposed that a member of ANSTO's Counter Terrorism Research project, Elizabeth Keegan, will visit the ITU later in 2008. She leads research on the provenance determination of uranium ore concentrates. Undertaking research at ITU will give Ms Keegan access to state-of-the-art instrumentation and a larger sample set than available at ANSTO. The work program is envisaged to take about ten months, of which five months will be at the ITU. ITU scientists are world leaders in nuclear forensic research, and nuclear trafficking is a global challenge that requires knowledge transfer between countries.





Forum for European-Australian Science and Technology cooperation

Australian-German research collaboration