

# Centre for Geoanalytical Mass Spectrometry (CGMS)

## 2017 ANNUAL REPORT

Date - 19 April 2018

### Centre for GEOANALYTICAL MASS SPECTROMETRY



World-class analytical equipment enabling researchers, institutions, government, industry partners and community clients to expand research across traditional boundaries.

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# Centre for Geoanalytical Mass Spectrometry

## Message from the Director of the Centre

The Centre for Geoanalytical Mass Spectrometry (CGMS) is a fully integrated research facility in the School of Earth and Environmental Sciences that is dedicated to the analysis of stable and radiogenic isotope ratios and trace element abundances in natural and man-made materials. The CGMS comprises the Radiogenic Isotope Facility (RIF), the Stable Isotope Geochemistry Laboratory (SIGL), and the Environmental Geochemistry Laboratory (EGL).

The CGMS has implemented two new instruments in 2017 funded through the 2016 UQ MRFF and MEI schemes and completed a major refurbishment of RIF's HEPA-filtered ultra-clean laboratory complex. It has entered a partnership with Griffith and QUT with the creation of the Brisbane Geochronology Alliance that aims to make Brisbane a global hub for isotope geochemistry and geochronology.

The new laser-ablation system coupled with both the quadrupole and multi-collector ICP-MS machines will open a whole new dimension for in situ, non-destructive elemental and isotope analysis and imaging of various materials. The CGMS will routinely date events and processes, such as coral mortality and reef decline, at  $\pm 1$ -2yr precisions, unravelling the past history of the Great Barrier Reef prior to the "long-term monitoring" program taking place since the 1980's. This enhanced capability will allow many previously untenable issues in marine and terrestrial conservation and management to be tested and hopefully resolved, with fundamental implications for the protection of our environment. In addition, the commissioning of the next-generation dual inlet isotope ratio mass spectrometer (DI-IRMS) and the multi-collector ICP-MS will enable routine high-precision analysis of traditional and non-traditional stable isotopes, which have seen widespread applications in resource geology, paleoenvironmental studies, environmental toxicology, pollution monitoring and biomedical research.

The Centre facilities are utilised by numerous research groups and individuals across five UQ faculties (EAIT, HABS, HASS, Medicine and Science), in addition to an extensive national and international network of collaborators and clients. The CGMS supports high calibre and ground breaking multidisciplinary research in the earth, environmental, archaeological, biological, chemical, microbial, medical and material sciences. It provides expert training to UQ researchers and postgraduate students in cutting-edge mass spectrometric technologies, and supports and initiates the development of new techniques and applications for isotopic and trace element analysis of natural and synthetic materials.

Professor Sue Golding

## Centre Membership in 2017

Academic, General and Research Staff, and conjoint, adjunct or honorary members specifically appointed to or affiliated with this centre.

### Radiogenic Isotope Facility (RIF)

Title	First Name	Last Name	School/Centre/Institute
PROF	JIAN-XIN	ZHAO	SEES
DR	YUE-XING	FENG	SEES
DR	AI DUC	NGUYEN	SEES
DR	FAYE	LIU	SEES (casual)
DR	TARA	CLARK	SEES (casual)
DR	NICOLE	LEONARD	SEES (casual)

### Environmental Geochemistry Laboratory (EGL)

Title	First Name	Last Name	School/Centre/Institute
A/PROF	MASSIMO	GASPARON	SEES
MS	MARIETJIE	MOSTERT	SEES

### Stable Isotope Geochemistry Laboratory (SIGL)

Title	First Name	Last Name	School/Centre/Institute
PROF	SUE	GOLDING	SEES
MS	KIM	BAUBLYS	SEES
DR	WEI	ZHOU	SEES

### Honorary Staff

Title	First Name	Last Name	School/Centre/Institute
DR	TONGUC	UYSAL	HONORARY - CSIRO
A/PROF	XUAN-CE	WANG	HONORARY - CURTIN
A/PROF	SANDER	SCHEFFER	HONORARY - SCU
PROF	KEFU	YU	HONORARY – GUANGXI UNIV, CHINA
A/PROF	WENFENG	DENG	HONORARY – CHINESE ACADEMY OF SCIENCES
PROF	MIKE	GAGAN	HONORARY – ANU

## National and International Visitors

Title	First Name	Last Name	Appointment	Place and Name of Institution	Reason for Visit	Duration	Dates
Prof	Gang-jian	Wei	Visiting scholar	Guangzhou-China, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences (CAS)	collaboration	2 months	July-Sept 2017
Prof	Sheng	Liu	Visiting scholar	Guangzhou-China, South China Sea Institute of Oceanology, CAS	collaboration	6 months	15/9/16-14/3/17
Prof	Yali	Sun	Visiting scholar	Beijing-China, Institute of Tibetan Plateau Research, CAS	collaboration	3 months	April-July 2017
A/Prof	Tian-ran	Chen	Visiting scholar	Guangzhou-China, South China Sea Institute of Oceanology, CAS	collaboration	2 months	Aug-Sep 2017
Prof	Li-feng	Zhong	Visiting scholar	Guangzhou-China, Sun Yat-Sen University	collaboration	3 months	Nov 17-Jan 18
A/Prof	Jia-xi	Zhou	Visiting scholar	Guiyang-China, Institute of Geochemistry, CAS	collaboration	12 months	Dec 16-Dec 17
Dr	Xun	Wei	Visiting scholar (postdoc)	Qingdao-China, Institute of Oceanology, CAS	collaboration	3 months	Dec 16-Mar 17
Dr	Tao	Wu	Visiting scholar (postdoc)	Hangzhou-China, Zhejiang Univ	collaboration	24 months	Jan17-Jan 19
Dr	Ting	Cheng	Visiting scholar (postdoc)	Beijing-China, Beijing SHRIMP Centre, Institute of Geology, Chinese Academy of Geological Sciences (CAGS)	collaboration	12 months	Mar 17-Mar 18
Dr	Nina	Ma	Visiting scholar	Beijing-China, Institute of Mineral Resources, Chinese Academy of Geological Sciences (CAGS)	collaboration	3 months	Oct - Dec 17
Dr	Xinghua	Ma	Visiting scholar	Beijing-China, Institute of Mineral Resources, Chinese Academy of Geological Sciences (CAGS)	collaboration	12 months	Oct 17- Oct 18
Dr	Dona	Liu	Visiting scholar	Taiyuan-China, Taiyuan University of Technology	collaboration	6 months	June - Dec 17
Dr	Hegen	Oyang	Visiting scholar	Guiyang, Institute of Geochemistry, CAS	collaboration	24 months	Nov 17-Nov 19
Dr	Anping	Hu	Visiting scholar	Hangzhou - China, PetroChina Hangzhou Institute of Geology	collaboration	3 months	Nov 17-Feb 18

<b>Title</b>	<b>First Name</b>	<b>Last Name</b>	<b>Appointment</b>	<b>Place and Name of Institution</b>	<b>Reason for Visit</b>	<b>Duration</b>	<b>Dates</b>
Dr	Fei	Li	Visiting scholar	Chengdu - China, Northwest University of Petroleum	collaboration	12 months	Nov 17- Nov 18
Mr	Jian	Gao	OT student	Wuhan-China, China Univ Geoscience	Collaborative research/training	12 months	Sept 16- Sept 17
Mr	Shuang	Yan	OT student	Guangzhou-China, Guangzhou Institute of Geochemistry, CAS	Collaborative research/training	15 months	Nov 16- Jan 18
Miss	Fenglin	Lyu	OT student	Beijing-China, Institute of Mineral Resources, Chinese Academy of Geological Sciences (CAGS)	Collaborative research/training	12 months	Mar 17- Mar 18
Miss	Linlin	Li	OT student	Beijing-China, Beijing SHRIMP Centre, Institute of Geology, Chinese Academy of Geological Sciences (CAGS)	Collaborative research/training	12 months	Oct 17- Oct 18
Dr	Santanu	Ghosh	Visiting scholar (postdoc)	Dhanbad-India, Indian Institute of Technology, Indian School of Mines	Collaborative research	2 months	May 17- June 17
Dr	Kay	Nguo	Visiting scholar (postdoc)	Department of Nutrition and Dietetics, Monash University	Training	3 weeks	2017

## Our Students – Research Degrees awarded and in progress in 2017

Awarded in 2017						
Name of Student	Topic	PhD / MPhil	1 <sup>st</sup> Year	Name of University, School	Principal or Joint Advisor	Associate Advisors
Dr Chen Cai	Fundamental and applied aspects of nitrate-, Fe(III)- and Mn(IV)-dependent anaerobic oxidation of methane	PhD	2013	UQ/Advanced Water Management Centre	Zhiguo Yuan	Hu Shi
Dr Hannah Markham	Long term ecological dynamics of reef systems of the Wet Tropics Heritage Region, the Great Barrier Reef: a combined geochemical, geochronological and palaeoecological approach	PhD	2012	UQ/SBS	John Pandolfi	Jian-xin Zhao
Dr Nicole Leonard	Holocene sea level and climate variability on the Great Barrier Reef, Australia	PhD	2013	UQ/SEES	Jian-xin Zhao	Kevin Welsh
Dr Jenine McCutcheon	Microbial carbonation in natural and engineered environments	PhD	2013	UQ/SEES	Gordon Southam	Gregory Webb, Sasha Wilson
Dr Hevelyn Monteiro	Paleoenvironmental evolution of continental landscapes through combined high-resolution geochronology and $\delta^{18}\text{O}$ ion microprobe analysis of goethite	PhD	2013	UQ/SEES	Paulo Vasconcelos	Gordon Southam
Dr Maija Raudsepp	Coal mine microbial communities and biogenic methane cycling	PhD	2012	UQ/SEES	Gordon Southam	Gene Tyson
Dr Roberto Garcia Fragoso	Natural attenuation of arsenic in sulphide tailings with alkaline gangue under extreme wet and dry conditions	PhD	2012	UQ/SMI	Mansour Edraki	David Mulligan, Thomas Baumgartl

Commencing in 2017						
Name of Student	Topic	PhD / MPhil	FT / PT	Name of University, Institution and School	Principal or Joint Advisor	Associate Advisors
Ruadhan Magee	Investigating the evolution of an active volcano: petrology and geochemistry of historic eruptive products at Mount Etna (Sicily, Italy)	PhD	FT	UQ/SEES	Teresa Ubide	Jian-xin Zhao
Joan Macaladad	Application of compound specific stable isotopes to subtropical coastal environment	PhD	FT	UQ/SEES	Kevin Welsh	Harald Hofmann
Nikola van de Wetering	Isotope chemistry and chemo-stratigraphy of the Moatize Basin, Mozambique	MPhil	FT	UQ/SEES	Joan Esterle	Sue Golding

<b>Continuing in 2017</b>							
<b>Name of Student</b>	<b>Topic</b>	<b>PhD / MPhil</b>	<b>FT / PT</b>	<b>1<sup>st</sup> Year</b>	<b>Name of University, School</b>	<b>Principal or Joint Advisor</b>	<b>Associate Advisors</b>
Lizanne Obersky	Aerobic processes in landfill cells	PhD	FT	2014	UQ/Civil Engineering	William Clarke	Sihuang Xie, Sue Golding
Owen Coffee	Stable isotope and gut content analysis to ascertain diet composition and common foraging sites of endangered Loggerhead and Green turtles on the South-east coast of Queensland, Australia	PhD	FT	2015	UQ/SBS	David Booth	Janet Lanyon
Dan Huston	Taxonomy and systematics of digenetic trematodes	PhD	FT	2015	UQ/SBS	Thomas Cribb	Scott Cutmore
Tries Razak	The effect of temperature variability and life-history strategy in coral response to long-term increase in sea surface temperature	PhD	FT	2012	UQ/SBS	Pete Mumby	Jian-xin Zhao George Roff
Gisely Barcelos	Immobilization of lanthanum, cerium, europium and holmium by co-precipitation with iron and aluminium (hydr)oxides in aqueous solutions	PhD	FT	2015	UQ/SEES, University of Viçosa (Brazil)	Massimo Gasparon, Jaime de Mello	
Kim Baublys	Hydrogeological and microbial controls on the isotope and molecular composition of coal seam gases and production waters of the Walloon Subgroup, Surat Basin, Queensland, Australia	PhD	PT	2013	UQ/SEES	Sue Golding	Harald Hofmann, Sue Vink
Heike Bostelmann	Bioleaching of copper sulphides	PhD	FT	2015	UQ/SEES	Gordon Southam	Paulo Vasconcelos
Anderson Chagas	Preservation of geochemical signatures in lacustrine microbialites and sediments	PhD	FT	2014	UQ/SEES	Gregory Webb	Gordon Southam, Robert Byrne
Tracey Crossingham	Hotspot volcanism down under: a product of mantle plumes or the unique structure and motion of the Australian plate?	PhD	FT	2013	UQ/SEES	Paulo Vasconcelos	Teresa Ubide, Guil Mallmann
Michele Elmes	The potential of the Mineral Liberation Analyser for the characterisation of	PhD	PT	2014	UQ/SEES	Massimo Gasparon	Virginia Ciminelli



<b>Continuing in 2017</b>							
<b>Name of Student</b>	<b>Topic</b>	<b>PhD / MPhil</b>	<b>FT / PT</b>	<b>1<sup>st</sup> Year</b>	<b>Name of University, School</b>	<b>Principal or Joint Advisor</b>	<b>Associate Advisors</b>
	airborne particulate matter						
Kyle Ferguson	Understanding physical and chemical diagenetic processes that occur during fossilisation of biomineralised vertebrate remains	PhD	FT	2014	UQ/SEES	Gilbert Price	Yuxing Feng
Anicia Henne	Bioleaching of copper	PhD	FT	2016	UQ/SEES	Gordon Southam	Paulo Vasconcelos
Astrid Hentschel	Integrating coal petrology, geochemistry and geochronology to understand spatial variation in the Walloon Subgroup	PhD	FT	2014	UQ/SEES	Joan Esterle	Sue Golding
Alan Levett	Development of ferruginous duricrusts (canga) in tropical iron ore systems	PhD	FT	2016	UQ/SEES	Gordon Southam	Paulo Vasconcelos
Narottam Saha	Tracking inshore water quality using coral-based trace elements geochemistry from the Great Barrier Reef	PhD	FT	2014	UQ/SEES	Jian-xin Zhao	Gregory Webb
Marcos Salas-Saavedra	Holocene reef development and water quality reconstruction, Heron Reef, Great Barrier Reef	PhD	FT	2014	UQ/SEES	Jian-xin Zhao	Gregory Webb
Alex Wheeler	Palynology of the Galilee Basin	PhD	FT	2016	UQ/SEES	Joan Esterle	Patrick Moss
Llyam White	The relative roles of tectonism, metamorphism and hypogene processes in the enrichment of banded iron-formations	PhD	FT	2015	UQ/SEES	Paulo Vasconcelos	
Maria Cristina Vegafria	Geochemical pathways of contaminants through weathering and reprocessing of uranium tailings	PhD	FT	2014	UQ/SMI	Mansour Edraki	
Nathan Siddle	Structural and stratigraphic architecture of the Georgina Basin, central Australia	MPhil	FT	2016	UQ/SEES	Charles Verdel	
Shaun Adams	Using a suite of isotopes to map variability throughout northern Australian and aid in provenancing human remains	PhD	FT	2014	Griffith University, Environmental Futures Research Institute	Michael Westaway	Rainer Grun

## Research Grants and Contracts in 2017

### Selected Research Grants and Contracts

Administering School/Division	Project Title	Granting Scheme	Investigator String	Fund Years	Approved Funding
Australian Institute for Bioengineering and Nanotechnology	NHMRC ECF (Peter Doherty - Aust. Biomedical): Bifunctionalised imaging agents for diagnosis and treatment of cardiovascular and inflammatory diseases	NHMRC Training (Postdoctoral) Fellowship	*TA, Hang T	2013 - 2016	412,882
Australian Institute for Bioengineering and Nanotechnology	Novel nanomaterial solutions based on metal and metal oxide for advanced diagnosis of cardiovascular diseases	NHMRC Project Grant	*TA, Hang T & Wang, X.	2018 - 2020	573,015
Biological Sciences	Using stable isotope analysis to determine foraging groups and the influence of foraging group on reproductive output of loggerhead turtles	Sea World Research and Rescue Foundation Inc	*BOOTH, David T	2015-2017	61,061
Centre for Mined Land Rehabilitation	Quantification of the impact of tailings aging on accuracy of tailings storage facility (TSF) water and chemical balance modelling	Klohn Crippen Berger Ltd	*EDRAKI, Mansour & *BAUMGARTL, Thomas	2015-2016	N/A
Chemical Engineering	Desilication product characterisation and chemical thermodynamic solubility model.	Alumina Quality Workshop (Inc)	*VAUGHAN, James W; *PENG, Hong; SANTINI, Talitha & *GILLESPIE, Alistair R	2017 - 2019	118,800
Chemistry and Molecular Biosciences	Proteins and glycans in host-pathogen interactions: targets for novel drugs and vaccines (NHMRC Program Grant administered by the University of Adelaide)	University of Adelaide	*WALKER, Mark J; Paton, J.; Jennings, M.; von Itzstein, M. & *KOBE, Bostjan	2015 - 2019	3,320,587
Earth and Environmental Sciences	Biogeochemistry of ferruginous duricrusts	ARC Linkage Projects	*SOUTHAM, Gordon; *VASCONCELOS, Paulo M d; TYSON, Gene W; Ireland, T. & Mello, L.	2015 - 2017	890,000
Earth and Environmental Sciences	Bioleaching of copper in tropical systems	ARC Linkage Projects	*SOUTHAM, Gordon; *VASCONCELOS, Paulo M d & Mello, L.	2015 - 2018	675,000

Earth and Environmental Sciences	Centre for Geoanalytical Mass Spectrometry (CGMS) - Achieving excellence in isotope geochemistry and geochronology	UQ Research Facilities Infrastructure Grants	*GOLDING, Sue; *VASCONCELOS, Paulo M d; ZHAO, Jian; *FENG, Yuexing; *WEBB, Gregory E; *SOUTHAM, Gordon; *ESTERLE, Joan S & others	2017 - 2018	555,333
Earth and Environmental Sciences	Climate and environmental history of SE Queensland dunefields	ARC Discovery Projects	*SHULMEISTER, James P; Hesp, P.; Miot da Silva, G.; *WELSH, Kevin J; *SANTINI, Talitha; *LARSEN, Joshua; Gontz, A. & Rittenour, T.	2015-2017	364,900
Earth and Environmental Sciences	Controls on Fluorine and Phosphorus Distribution in Bowen Basin Coals	Australian Coal Research Limited	*ESTERLE, Joan S & *RODRIGUES, Sandra M	2017-2019	155,155
Earth and Environmental Sciences	Development of an "integrated isotopic dating toolbox" for application in mineral and hydrocarbon exploration, and studies of palaeo-earthquakes and Quaternary human-environment interaction	Chinese Academy of Sciences	*ZHAO, Jian-xin & Liu, D.	2015 - 2018	256,000
Earth and Environmental Sciences	Geochronological and geochemical constraints on the sedimentary process and tectonic evolution of the South China Sea	Institute of Oceanology, Chinese Academy of Sciences	*ZHAO, Jian-xin	2017 - 2018	50,000
Earth and Environmental Sciences	Interaction of CO2 saturated groundwater with Mollayember Formation lithologies	Australian National Low Emissions Coal Research and Development	*GOLDING, Sue; *PEARCE, Julie K & *DAWSON, Grant K W	2017-2018	194,504
Earth and Environmental Sciences	Investigation of late Quaternary paleo-seismicity of major active fault systems in Turkey with radiometric dating and isotope studies	Hacettepe University	*ZHAO, Jian-xin & Dirik, K.	2016 - 2018	54,900
Earth and Environmental Sciences	Isotopic dating and geochemical characterization of calcite and quartz veins in the Mid-Yangtze Plate, South China for paleofluid reconstructions	University of Geosciences, Wuhan	*ZHAO, Jian-xin & He, S.	2017	30,000

Earth and Environmental Sciences	Isotopic dating of reef-shoal carbonate reservoirs within Qixia and Maokou formations in Sichuan Basin (China) and a comparative study to the Cenozoic analogue in Australia	UniQuest Pty Ltd	*ZHAO, Jian-xin	2016-2018	40,972
Earth and Environmental Sciences	Mobilisation and fate of heavy metals released from clays and other reactive phases by the GHG stream	Australian National Low Emissions Coal Research and Development	*GOLDING, Sue; *PEARCE, Julie K & *DAWSON, Grant K W	2015 - 2018	1,003,047
Earth and Environmental Sciences	Raman Spectroscopy - detecting SOX and NOX in precipice sandstone	Australian National Low Emissions Coal Research and Development	*PEARCE, Julie K; *GOLDING, Sue & Morgan, Q.	2015-2017	977,347
Earth and Environmental Sciences	Rare earth elements distribution in in synthetic Fe-(hydr)oxides	Fundacao Arthur Bernardes (FUNARBE)	*GASPARON, Massimo & Mello, J.	2016-2017	12,960
Earth and Environmental Sciences	Reevaluation of the thermal maturity of McArthur Basin source rocks	Innovation Connections	*GOLDING, Sue & *RODRIGUES, Sandra M	2016-2017	109,926
Earth and Environmental Sciences	Sr isotope tracing of the groundwater recharge in the Badain Jaran Desert, North China	Hohai University	*ZHAO, Jian-xin & Rao, W.	2016-2017	10,500
Earth and Environmental Sciences	Sr-Nd-Pb-Hf isotopes of Caroline plateau basalts: Implications for intraplate mantle dynamics	Institute of Oceanology, Chinese Academy of Sciences	*ZHAO, Jian-xin & Zhang, G.	2016-2017	44,530
Earth and Environmental Sciences	Sr-Nd-Pb-Hf isotopic research on lavas from the Mid-Atlantic Ridge (33°-35°N) to constrain their geochemical variability	First Institute of Oceanography, State Oceanic Administration	*ZHAO, Jian-xin	2017-2018	28,400
Earth and Environmental Sciences	Study of marine transgression, sources, and mineralization ages in salt basins in the southern branch of Neo-Tethyan realm	Institute of Mineral Resources, Chinese Academy of Geological Sciences	*ZHAO, Jian-xin & Liu, C.	2015 - 2016	56,690
Earth and Environmental Sciences	The development of geochemical and geochronological methods and analytical protocols and their application to the study of ancient microbial carbonate reservoirs	PetroChina Hangzhou Research Institute of Geology	*ZHAO, Jian-xin & Hu, A.	2017 - 2018	294,253

Earth and Environmental Sciences	The origins and ore-forming ages of typical Pb-Zn-( Cu) mineralization in the Sichuan-Yunnan-Guizhou Pb-Zn metallogenic province, southwest China	Institute of Geochemistry, Chinese Academy of Sciences	*ZHAO, Jian-xin; Zhou, J. & *WANG, Xuan-Ce	2016 - 2020	70,000
Earth and Environmental Sciences	U-series dating of coral reefs in the high-latitude South China Sea for palaeo-climate, palaeo-environmental and palaeo-ecological reconstructions	Chinese Academy of Sciences	*ZHAO, Jian-xin & Wei, G.	2015 - 2018	120,000
Earth and Environmental Sciences	U-series dating of coral reefs in the northern South China Sea: past climate and environment study	Institute of Oceanology, Chinese Academy of Sciences	*ZHAO, Jian-xin & Chen, T.	2016-2018	54,000
Earth and Environmental Sciences	U-series dating of coral reefs in the South China Sea for palaeo-environmental reconstructions	Institute of Oceanology, Chinese Academy of Sciences	*ZHAO, Jian-xin & Yu, K.	2016-2018	36,000
Earth and Environmental Sciences	U-Th dating and geochemical characterization of dead coral rubble: Understanding the causes of coral mortality and ecological changes in the South China Sea	Chinese Academy of Sciences	ZHAO, Jian-xin & LIU, Sheng	2017-2019	48,000
Earth and Environmental Sciences	Vale-UQ Coal Geosciences Programs	Vale Exploration Pty Ltd	*ESTERLE, Joan S.	2015-2020	2,625,000
Earth and Environmental Sciences	Volcanic megacrystals as recorders of the triggers of explosive eruptions	UQ Early Career Researcher	*UBIDE, Teresa	2017-2018	40,000
Office of the Research Dean	Abnormal lung iron homeostasis in cystic fibrosis (NHMRC Project Grant administered by QIMR)	Queensland Institute of Medical Research	WAINWRIGHT, Claire E; Reid, D.; ANDERSON, Gregory J; Lamont, I.; BELL, Scott C & Frazer, D.	2015-2017	N/A

## Major Partners and Linkages in 2017

Person	Company/Institute/Department	Linkage or Activity
Dr Aaron O'Dea	Smithsonian Tropical Research Institute	Funding, collaborative partners, coauthors
Dr Katie Cramer & Richard Norris	Scripps Institution of Oceanography	Funding, collaborative partners, coauthors
Dr Adam Brumm	Griffith University	Funding, collaborative partners, coauthors
Prof Rainer Grun	Griffith University	Funding, collaborative partners, coauthors
A/Prof Maxime Aubert	Griffith University	Funding, collaborative partners, coauthors
Dr Michael Westaway	Griffith University	Funding, collaborative partners, coauthors
Dr Julien Louys	Griffith University	Funding, collaborative partners, coauthors
Dr Kira Westaway	Macquarie University	Funding, collaborative partners, coauthors
Dr Helen McGregor	University of Wollongong	Funding, collaborative partners, coauthors
Dr Quan Hua	ANSTO	Funding, collaborative partners, coauthors
Prof Mike Gagan	ANU	Funding, collaborative partners
Dr Stuart Bedford	ANU	Funding, collaborative partners
Prof Lloyd Weeks	UNE	Funding, collaborative partners
Mr Tony Allen	CSIRO Sydney	Funding, collaborative partners
Drs Tonguc Uysal & Emanuelle Frery	CSIRO Perth	Funding, collaborative partners, coauthors
Drs Yongjun Lu and Michael Wingate	Geological Survey of Western Australia	Funding, collaborative partners, coauthors
A/Prof Xuan-ce Wang	Curtin University	Funding, collaborative partners, coauthors
Prof Malcolm McCulloch	UWA	Funding, collaborative partners
Dr Sander Scheffers	SCU	Funding, collaborative partners
Dr Renaud Joannes-Boyau	SCU	Funding, collaborative partners
Prof Anja Scheffers	SCU	Funding, collaborative partners
Prof Jacky Croke	SCU	Funding, collaborative partners
Prof Darren Curnoe	University of New South Wales	Funding, collaborative partners
Dr Emma Ryan	James Cook University	Funding, collaborative partners, coauthors
Dr Steve Lewis	James Cook University	Funding, collaborative partners, coauthors
Prof Scott Smithers	James Cook University	Funding, collaborative partners, coauthors
Dr Anne-marie Bacon	Dynamique de l'évolution humaine, France	Funding, collaborative partners, coauthors
Dr James Terry	U Arab Emirates	Funding, collaborative partners, coauthors
Dr Laura Shackelford	University of Illinois at Urbana-Champaign	Funding, collaborative partners, coauthors
Dr Fabrice Demeter	Museum national d'Histoire naturelle, France	Funding, collaborative partners, coauthors
Dr Belinda Dechnik	Univ Sydney	Funding, collaborative partners, coauthors
A/Prof Jody Webster	Univ Sydney	Funding, collaborative partners, coauthors
A/Prof Silvia Frisia	Univ Newcastle	Funding, collaborative partners, coauthors

<b>Person</b>	<b>Company/Institute/Department</b>	<b>Linkage or Activity</b>
Dr Andrea Borsato	Univ Newcastle	Funding, collaborative partners, coauthors
Prof Jianwei Li	China Univ Geoscience Wuhan	Funding, collaborative partners
Prof Shen He	China Univ Geoscience Wuhan	Funding, collaborative partners, coauthors
A/Prof Entao Liu	China Univ Geoscience Wuhan	Funding, collaborative partners, coauthors
Dr Xun Wei	First Institute of Oceanology	Funding, collaborative partners, coauthors
Prof Wei Wang	Guangxi Museum of Nationalities	Funding, collaborative partners
Prof Kefu Yu	Guangxi University	Funding, collaborative partners, coauthors
Prof Gangjian Wei	Guangzhou Institute of Geochemistry, Chinese Academy of Sciences (CAS)	Funding, collaborative partners, coauthors
A/Prof Wenfeng Deng	Guangzhou Institute of Geochemistry, Chinese Academy of Sciences (CAS)	Funding, collaborative partners, coauthors
A/Prof Jia-xi Zhou	Institute of Geochemistry, CAS	Funding, collaborative partners, coauthors
Prof Dunyi Liu	Institute of Geology, Chinese Academy of Geological Sciences (CAGS)	Funding, collaborative partners
Prof Yuruo Shi	Institute of Geology, Chinese Academy of Geological Sciences (CAGS)	Funding, collaborative partners
Dr Nina Ma	Institute of Mineral Resources, Chinese Academy of Geological Sciences (CAGS)	Funding, collaborative partners
Prof Chenglin Liu	Institute of Mineral Resources, Chinese Academy of Geological Sciences (CAGS)	Funding, collaborative partners, coauthors
Dr Lijian Shen	Institute of Mineral Resources, Chinese Academy of Geological Sciences (CAGS)	Funding, collaborative partners, coauthors
Prof Guanjun Shen	Nanjing Normal Univ	Funding, collaborative partners, coauthors
Prof Anjiang Shen	PetroChina Hangzhou Institute of Geology	Funding, collaborative partners
Dr Anping Hu	PetroChina Hangzhou Institute of Geology	Funding, collaborative partners
Dr Wenqing Pan	PetroChina Tarim Oilfield	Funding, collaborative partners
Prof Houyun Zhou	South China Normal Univ	Funding, collaborative partners, coauthors
Prof Sheng Liu	South China Sea Institute of Oceanology, CAS	Funding, collaborative partners
Prof Hui Huang	South China Sea Institute of Oceanology, CAS	Funding, collaborative partners
A/Prof Tian-ran Chen	South China Sea Institute of Oceanology, CAS	Funding, collaborative partners, coauthors
Dr Shu Li	South China Sea Institute of Oceanology, CAS	Funding, collaborative partners, coauthors
A/Prof Hongqiang Yang	South China Sea Institute of Oceanology, CAS	Funding, collaborative partners
Dr Yunfeng Zhang	Southwest University of Petroleum	Funding, collaborative partners
Prof Bin Xia	Sun Yat-sen University	Funding, collaborative partners
A/Prof Lifeng Zhong	Sun Yat-sen University	Funding, collaborative partners, coauthors
A/Prof Weiliang Liu	Sun Yat-sen University	Funding, collaborative partners
A/Prof Qiangtai Huang	Sun Yat-sen University	Funding, collaborative partners
Prof Shu-cheng Tan	Yunnan University	Funding, collaborative partners, coauthors

## Selected Research Publications from 2017

### Journal (peer reviewed)

- Brumm, A., Langley, M.C., Moore, M.W., Hakim, B., Ramli, M., Sumantri, I., Burhan, B., Saiful, A.M., Siagian, L., Suryatman, Sardi, R., Jusdi, A., Abdullah, Mubarak, A.P., Hasliana, Hasrianti, Oktaviana, A.A., Adhityatama, S., van den Bergh, G.D., Aubert, M., Zhao, J.X., Huntley, J., Li, B., Roberts, R.G., Saptomo, E.W., Perston, Y., Grun, R., 2017. Early human symbolic behavior in the Late Pleistocene of Wallacea. *Proceedings of the National Academy of Sciences of the United States of America* 114, 4105-4110.
- Chen, T., Zheng, H., Hamilton, S., Rodrigues, S., Golding, S.D., Rudolph, V., 2017. Characterisation of bioavailability of Surat Basin Walloon coals for biogenic methane production using environmental microbial consortia. *International Journal of Coal Geology* 179, 92-112.
- Clark, T.R., Roff, G., Zhao, J.X., Feng, Y.X., Done, T.J., McCook, L.J., Pandolfi, J.M., 2017. U-Th dating reveals regional scale decline of branching *Acropora* corals on the Great Barrier Reef over the past century. *Proceedings of the National Academy of Sciences of the United States of America* 114, 10350-10355.
- Cramer, K.L., O'Dea, A., Clark, T.R., Zhao, J.X., Norris, R.D., 2017. Prehistorical and historical declines in Caribbean coral reef accretion rates driven by loss of parrotfish. *Nat. Commun.* 8, 14160; DOI: 14110.11038/ncomms14160.
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- Deng, W.F., Chen, X.F., Wei, G.J., Zeng, T., Zhao, J.X., 2017. Decoupling of coral skeletal  $\delta^{13}\text{C}$  and solar irradiance over the past millennium caused by the oceanic Suess effect. *Paleoceanography* 32, 161-171.
- Deng, W.F., Liu, X., Chen, X.F., Wei, G.J., Zeng, T., Xie, L.H., Zhao, J.X., 2017. A comparison of the climates of the Medieval Climate Anomaly, Little Ice Age, and Current Warm Period reconstructed using coral records from the northern South China Sea. *J. Geophys. Res.-Oceans* 122, 264-275.
- Djoko, K.Y., Phan, M.-D., Peters, K.M., Walker, M.J., Schembri, M.A., McEwan, A.G., 2017. Interplay between tolerance mechanisms to copper and acid stress in *Escherichia coli*. *Proceedings of the National Academy of Sciences* 114, 6818-6823.
- Edraki, M., Baumgartl, T., Mulligan, D., Fegan, W., Munawar, A., 2017. Geochemical characteristics of rehabilitated tailings and associated seepages at Kidston gold mine, Queensland, Australia. *International Journal of Mining, Reclamation and Environment*, 1-15.
- Elmes, M., Gasparon, M., 2017. Sampling and single particle analysis for the chemical characterisation of fine atmospheric particulates: A review. *Journal of Environmental Management* 202, 137-150.
- Gao, J., He, S., Zhao, J.X., Yi, J.Z., 2017. Geothermometry and geobarometry of overpressured lower Paleozoic gas shales in the Jiaoshiba field, Central China: Insight from fluid inclusions in fracture cements. *Marine and Petroleum Geology* 83, 124-139.
- Gao, J.F., Xing, H.L., Tian, Z.W., Pearce, J.K., Sedek, M., Golding, S.D. and Rudolph, V., 2017. Reactive transport in porous media for CO<sub>2</sub> sequestration: Pore scale modeling using the lattice Boltzmann method. *Computers & Geosciences*, 98:9-20.
- Gardiner, N., Hickman, A.H., Kirkland, C.I., Lu, Y.J., Johnson, T., Zhao, J.X., 2017. Processes of Crust Formation in the Early Earth Imaged through Hf isotopes from the East Pilbara Terrane. *Precambrian Research* 297, 56-76.
- Jiang, W., Yu, K.F., Song, Y.X., Zhao, J.X., Feng, Y.X., Wang, Y.H., Xu, S.-D., 2017. Coral trace metal of natural and anthropogenic influences in the northern South China Sea. *Science of the Total Environment* 607-608, 195-203.
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## Contact Details

### Professor Suzanne D. Golding

#### Deputy Head, School of Earth and Environmental Sciences

Director, Centre for Geoanalytical Mass Spectrometry (CGMS)

The University of Queensland, QLD 4072, Australia

Email: [s.golding1@uq.edu.au](mailto:s.golding1@uq.edu.au) | Ph: 07 3365 1159 | Fax: 07 3365 1277

School website:

<http://www.sees.uq.edu.au/>

CGMS website:

<https://sees.uq.edu.au/centre-geoanalytical-mass-spectrometry-0>