SCHOOL OF CHEMISTRY
ANNUAL REPORT 2020

ANNUAL REPORT

UNSW SYDNEY

2020 School of Chemistry Annual Report,
The University of New South Wales

UNSW Sydney
NSW 2052
Australia

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01 HEAD OF SCHOOL REPORT

THE COVID YEAR. THAT PROBABLY SAYS ENOUGH FOR WHAT 2020 WAS.

The first couple of months of 2020 started as any other year. I was on sabbatical in France for 3 months and Professor Palli Thordarson was acting-Head of School.

It was like watching cyclonic storm clouds on the horizon – in China, then Italy, and then moving through France towards us. We retreated early back to Australia and were on the first flight into the country where passengers had to self-isolate at home for 2 weeks (nobody in border security knew what to do then!). I have had 10 close encounters with border closures since then thanks to family in Queensland and Victoria. I got caught behind closed borders, or just escaped closures (by 20 minutes in one case), or having to self-isolate and get tested once home.

Back in the School, Palli managed the early impact of COVID with compassion and assurance and deserves all our thanks! The School's teaching portfolio moved completely to on-line within one week. If someone had said, in 2019, that the whole of UNSW could move to on-line teaching in one year, let alone one week, I would have said they were crazy. "Necessity" is truly the mother of invention!

Term 2 teaching was conducted completely on-line in a very uncertain budget environment. This meant that academic staff conducted all teaching and all casual academic support was suspended. Enormous thanks to everyone in the School because all academics and lab technical staff were called into the fray, to prepare and teach the on-line laboratory material in a very short period of time. Lectures and tutorials remained on-line in Term 3. Face-to-face labs returned, albeit half-populated (students did lab one week in person, one week on-line), socially distanced and with everyone wearing face masks. I think everyone was pleased to have the return of some campus experience.

Research in the School continued unabated through 2020. Many researchers worked from home doing analysis and writing. The labs stayed open, with strict COVID-safe plans in place. Indeed, the School formulated COVID-safe plans ahead of broader university plans, using our "Working after Hours" safety protocols as a template to ensure that the reduced lab occupancy did not compromise our usual high safety standards. I commend all researchers, especially the Honours students, who turned in a set of outstanding Honours theses, with a standard of scientific research as high as any other year!

The very high standard of research performance is described in detail in the Director of Research report. But I do want to congratulate staff who won external research fellowships during 2020. Congratulations to Scientia Professors Justin Gooding and Martina Stenzel for being awarded eminent NHMRC and ARC Fellowships, Associate Professors Alex Donald and Neeraj Sharma for ARC Future Fellowships and Drs Anna Wang and DJ Kim for winning ARC DECRA Fellowships. At the beginning of 2021, the School will have a Laureate Fellow, NHMRC Senior Research Fellow, 6 x Future Fellows and 7 x DECRA Fellows, which is an outstanding fellowship record by any standard. 2020 also saw a record number of publications, a record number of outputs in Nature Index journals, three Science papers, and the highest ever research income, riding on the back of significant industry investment in research done in the School. The School hosted ~170 HDR students, and ~50 Honours students, both of which are probably the highest ever in the School.

The reduction in international student numbers had a significant effect on the UNSW budget (and that of all other Australian universities). This flowed through the whole organization, and the School of Chemistry was not spared. The budget was cut significantly through the year, leaving the School budget the smallest since I took over as Head 6 years ago, despite 50% larger number of staff, HDR students and space to manage. UNSW suffered almost 500 redundancies. This time, the School was partly spared because of the success by our staff at securing external research Fellowships as described above. It's a temporary reprieve, however. These fellowships do not last forever and unless university budgets return, at least partially, to a pre-COVID state, then the School has some lean budget years ahead. The School executive is working hard to position the School to not just survive, but to continue to thrive.

Despite the lean budget forecast, I remain optimistic. The School has an outstanding cohort of academic, technical and administrative staff. The large group of early career staff are starting to find their wings and some are already soaring. It is one of the most rewarding parts of my job to watch new colleagues succeed.

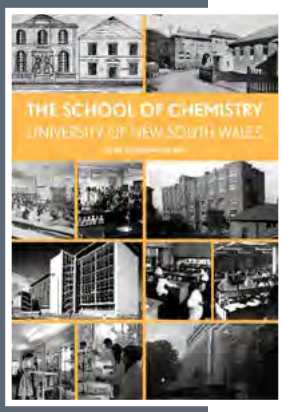
2020 saw the retirement, resignation, and moving on to new opportunities, for a number of staff. We said goodbye to Dr. Gavin Edwards, Associate Professor Shelli McAlpine, Drs Rob Chapman and Kim Lapere from academic staff and Ian Aldred, Michael Gandy, Giulia Oss and Ken McGuffin from technical/admin staff. I particularly want to call out Ian, Gavin and Ken for their extraordinary long and outstanding service to the School and to UNSW.

In closing, I thank the entire School for patience and resilience during what I hope will be our most problematic year for a long time. I particularly want to thank our School Manager, Dr. Toby Jackson and Palli Thordarson for outstanding leadership during the year.

PROFESSOR SCOTT HENDERSON KABLE

THE COMPLETE HISTORY: CHEMISTRY UNSW

Retired Professor Peter Southwell-Keely, an alumnus of the School and former academic staff member, took on the enormous task of researching and writing the complete history of the School of Chemistry and in 2020 published a unique and historically accurate tome.



PSK as he is fondly known, compiled the information from his many contacts still at the School of Chemistry along with UNSW archivists and librarians, many visits to the State Library of NSW and the Sydney Mechanics School of Arts.

The book was officially launched on 19th June 2020 and was streamed live via Microsoft Teams due to Covid. The event was hosted by Alyce Taylor, Faculty of Science Community & Engagement Officer (Strategy) and attended by current and past Heads of School together with Mr Ken McGuffin (Postgraduate Administrative Officer) who was an invaluable source of information for PSK.

Professor Scott Kable (current Head of School), Alyce Taylor (Faculty of Science representative and MC), Professor Barbara Messerle (Head of School 2007 – 2014), Mr Ken McGuffin (unofficial School historian and Post Graduate administrator 2004 – 2020), Peter Southwell-Keely (book author), Emeritus Professor David St Clair Black (Head of School 1988 – 1990)

02

STAFF

"WHICH IS BETTER, SOAP OR HAND SANITIZER?"

PROFESSOR PALL THORDARSON – A YEAR IN THE MEDIA

2020 and COVID brought many things to many people, but for Professor Pall Thordarson it brought media attention from around the world including his native Iceland.

While it was accepted that hygiene protocols during the pandemic were pivotal in stopping the spread of the virus, the debate arose around the question "Which is better, soap or hand sanitizer?"

Palli's media blitz leaves no question as to the answer: soap is the preferred combatant but if it not available alcohol-based sanitiser is the next best alternative.

Newspaper articles:

- New York Times: Why soap works
- Le Monde: Comment le savon permet de détruire le coronavirus
- The Guardian, UK: The science of soap - here's how it kills the coronavirus

  theguardian.com/commentisfree/2020/mar/12/science-soap-kills-coronavirus-alcohol-based-disinfectants
- The Times of India: Why soap is better to beat the coronavirus

  timesofindia.indiatimes.com/india/why-soap-is-the-best-bet-to-beat-corona/articleshow/74589860.cms

Palli also appeared on the following:

Television:

- ABC 24 News
- SBS News
- eFM, South Korea
- BBC World News
- ABC Adelaide
- RTE (Ireland)
- 2SER
- Triple UFM (Shoalhaven)

Radio:

- ABC Sydney
- RUV (Icelandic National Radio)

SCHOOL COMMITTEES

Dr Toby Jackson, Prof Scott Kable, Scientia Prof Justin Gooding, Scientia Prof Martina Stenzel, Prof Pall Thordarson, Associate Prof Jason Harper

School Executive Committee

Prof Scott Kable (Chair)

Scientia Prof Justin Gooding

Scientia Prof Martina Stenzel

Prof Pall Thordarson

Prof Tim Schmidt

A/Prof Jason Harper

Dr Toby Jackson

COMMITTEE CHAIR

PROFESSOR TIM SCHMIDT

Research Committee

Prof Tim Schmidt (Chair)

Prof Scott Kable

Scientia Prof Justin Gooding

Prof Les Field

Prof Fraser Stoddart

Prof Richard Tilley

Prof Chuan Zhao

A/Prof Suzanne Neville

Dr Martina Lessio

Dr Nicole Rijs

Dr Josh Peterson

COMMITTEE CHAIR

ASSOCIATE PROFESSOR JASON HARPER

Teaching Committee

A/Prof Jason Harper (Chair)

Dr Gavin Edwards (Deputy Chair)

Prof Scott Kable

A/Prof Luke Hunter

A/Prof Kris Kilian

A/Prof Neeraj Sharma

A/Prof John Stride

Dr Ron Haines

Dr Shannan Maisey

Dr Scott Sulway

Dr Siobhan Wills

Dr Nancy Talavera

Mr Michael Gandy

COMMITTEE CHAIR

ASSOCIATE PROFESSOR ALEX DONALD

Postgraduate Committee

A/Prof Alex Donald (Chair)

Prof Scott Kable

Prof Naresh Kumar

Prof Pall Thordarson

Prof Richard Tilley

A/Prof Jon Beves

Dr Gavin Edwards

Dr Junming Ho

Dr KM Mohibul Kabir

Dr Chris Medcraft

Dr Vinh Nguyen

Ms Sheree Munro

COMMITTEE CHAIR

DR LAURA MCKEMMISH

Outreach Committee

Dr Laura McKemmish (Chair)

Prof Scott Kable

Prof Pall Thordison

A/Prof Graham Ball

Dr Scott Sulway

Dr DJ Kim

Dr Kim Lapere

Dr Nancy Talavera

Vanessa Gotting

COMMITTEE CHAIR
DR JOSH PETERSON

School HS Consultation Committee

Dr Josh Peterson (Chair)
Prof Scott Kable
A/Prof Luke Hunter
Dr Toby Jackson
Dr Robert Chapman
Dr Martin Peeks
Dr Giulia Oss
Dr Ruth Thomas
Dr Claire Sullivan
Mr Svetislav Videnovic
Mr David Jacina
Dr Ahmed Ahmed
Theresa Khawati
(Faculty representative)
Tim Fang
(Student representative)
Samantha Miles
(Student representative)
Yangfang Wu
(Student representative)

COMMITTEE CHAIR
DR RUTH THOMAS

Chemistry Equity, Diversity and Inclusion Committee

Dr Ruth Thomas (Chair)
Prof Scott Kable
Scientia Prof Justin Gooding
Scientia Prof Martina Stenzel
Prof Pall Thordarson
A/Prof John Stride
A/Prof Kris Kilian
A/Prof Neeraj Sharma
Dr Shannan Maisey
Dr Laura McKemmish
Dr Martina Lessio
Dr Anna Wang
Dr Toby Jackson
Anne Ayres
Vanessa Gotting
Lori Jacobs
(student representative)
Parisa Moazzam
(student representative)
Andrew Addie
(student representative)

ACADEMIC STAFF

ASSOCIATE PROFESSOR
GRAHAM EDWIN BALL

BSc (Hons), PhD, University of Sheffield, UK

Professional Activities:

- RACI Member

Research:

- Chemical and biological applications of NMR spectroscopy.
- Characterisation of chemical reactive intermediates, especially organometallics.
- Elucidation structures of inorganic molecules (e.g., metal hydrides) using NMR spectroscopy
- Investigations of drug-DNA interactions.
- Chemical transformations of CO2
- Applications of computational chemistry

PhD Students:

- Jane Jung
- Christopher Pracey
- James Watson

Honours Students:

- Dejan Mizdrak

ASSOCIATE PROFESSOR
JONATHON BEVES

BSc (Hons I), MSc, The University of Sydney, PhD, The University of Basel

Professional Activities:

- Member, Royal Australian Chemical Institute
- Member, Royal Society of Chemistry
- Member, School of Chemistry Research Committee.

Research:

- Supramolecular chemistry
- Coordination chemistry

PhD Students:

- Ray DiNardi
- Lucy Fillbrook
- Varsha Gopalakrishnan
- Fayaz Ali Larik (co-supervisor)
- Lewis Pointing
- Laura Wimberger

Honours Students:

- Zoe De Vries

DR ROBERT CHAPMAN

BEng (Ind. Chem Hons 1), UNSW, PhD, The University of Sydney

Professional Activities:

- Committee member – RACI Polymer NSW

Research:

- High throughput polymerisation reactions
- Protection of enzymes and antibodies with polymers
- Folding of single chain polymer nanoparticles

PhD Students:

- Shegufta Farazi
- Henry Foster
- Zifei Han
- Zihao (Alvin) Li

Honours Students:

- Matthew Humphreys

DR XIANJUE CHEN

PhD, UWA

Professional Activities:

- Chartered Member, Royal Australian Chemical Institute (MRACI CChem)
- Member, Australian Carbon Society

Research:

- Developing novel graphene-based electrode materials

Honours Students:

- Charles Guo

ASSOCIATE PROFESSOR
W. ALEXANDER DONALD

BSc Seattle University, PhD University of California, Berkeley

Professional Activities:

- Treasurer, Australian and New Zealand Society for Mass Spectrometry
- Chair, RACI NSW Analytical & Environmental Chemistry Division
- Associate Editor (Handling Editor), Journal of Enzyme Inhibition and Medicinal Chemistry
- Editorial Board, Expert Opinion on Therapeutic Patents
- Editorial Board, Journal of Enzyme Inhibition and Medicinal Chemistry
- Editorial Board, International Journal of Molecular Sciences (Biochemistry)

Research:

- Fundamental and applied mass spectrometry, including ionization and ion fragmentation
- Single cell chemical analysis by mass spectrometry
- Rapid, direct and portable ambient pressure methods for forming, focusing, separating and detecting ions

Postdoctoral Fellows:

- Dr Morphy Dumlao
- Dr Giang Nguyen

PhD Students:

- Ezaz Ahmed
- Merryn Baker
- Susannah Brown
- Hyun Eui (Peter) Lee
- Xiaojing Huang
- Renee Kwon
- Alireza Mashouf
- Chi Phuong
- Mohammad Tajiki
- Diana Zhang

MSc

- Fon Kankaew

MPhil

- Qinwen Liu

Honours Students:

- Sherrie Liu
- Olivia Rusli

DR GAVIN LESLIE EDWARDS

BSc (Hons), PhD (Monash)

Professional Activities:

- Associate Dean – Academic Programs
- Deputy Director of Teaching, School of Chemistry

DR ALBERT FAHRENBACH

BSc (Hons) Indiana University, PhD Northwestern University

Professional Activities:

- President of the UNSW Chemical Society
- Member of the Australian Centre for Astrobiology
- Member of RACI
- Workshop: PCE3, the Prebiotic Chemistry and Early Earth Environments Consortium. NASA Astrobiology Program, discussion leader.

Research:

- Prebiotic Chemistry with a Focus on RNA
- Engineering Radiolytically Driven Reaction Networks
- Investigating RNA-Peptide Noncovalent Chemistry
- Understanding the Thermodynamics of Nonenzymatic RNA Replication
- Nonenzymatic Template-Directed Peptide Synthesis

PhD Students:

- Luke Marshall (MPhil)
- Luke Steller

Honours Students:

- Renee Lim
- Ella Stack
- Quoc Phuong Tran

PROFESSOR
LESLIE DAVID FIELD

B.Sc (Hons), Ph.D, D.Sc University of Sydney

Professional Activities:

- Fellow of the Australian Academy of Science
- Fellow of the Royal Australian Chemical Institute
- Fellow of the Royal Society for Chemistry
- Fellow of the Royal Society of NSW
- Member of the American Chemical Society

Research:

- Organometallic chemistry of coordinated dinitrogen
- Nitrogen fixation.
- C-H Bond activation and functionalisation
- Organometallic chemistry of carbon dioxide
- Applications of NMR spectroscopy in organic & organometallic chemistry
- Transition metal catalysis in organic synthesis
- Transition metal acetylides, organometallic polymers and new materials

Postdoctoral Fellows:

- Dr Hsiu Lin Li

PhD Students:

- Silviu Dobrota
- Surabhi Naik
- James Watson

Honours Students:

- Stephen Cameron
- Chung Hei (Joshua) Tse

DR VINICIUS ROMERO GONCALES

BSc, PhD, University of Sao Paulo, Brazil

Research:

- Wearable Sensors

SCIENTIA PROFESSOR
J. JUSTIN GOODING

B.Sc. (Hons) UniMelb, D. Phil (Oxon)

Professional Activities:

- Founding Co-Director of the Australian Centre for NanoMedicine
- Inaugural Editor-in-Chief, *ACS Sensors*
- Founding co-Director, New South Wales Smart Sensing Network (NSSN)
- Handling editor for *Journal of Chemical and Biological Interfaces.* Member of the editorial board of the journals Electrochemistry Communications, Electroanalysis, Sensors, Nanobiotechnology, Sensors and Actuators B, Sensor Letters, Journal of Nanoeducation, Analyst, Chemical Sciences, Biosensors
- Referee for the journals Nature Materials, Nature Nanotechnology,Nature, Science, Nature Communications Journal of the American Chemical Society, Analytical Chemistry, Langmuir, Journal of Physical Chemistry B., Electroanalysis, Electrochemistry Communications, Biosensors Bioelectronics, Nucleic Acids Research, The Analyst, Chemical Communications.

Research:

- Modified surfaces for controlling surface interactions with cells for biomaterials applications (with Dr Katharina Gaus, Medicine UNSW).
- Nanoparticle based biosensors labelling and detection in for medical diagnostics (with Professor Richard Tilley, Chemistry, UNSW).
- Detection of microRNA (with Professor Maria Kavallaris, Australian Centre for NanoMedicine).
- The immobilisation of homogeneous catalyst on surfaces (led by Professor Barbara Messerle, Sydney University).
- Nanoparticle architectures for electrocatalysis (with Professor Richard Tilley, Chemistry, UNSW).

Postdoctoral Fellows:

- Dr Padmavarthy Bakthavathsalam
- Dr Tania Benedettiv
- Dr Eric Du
- Dr Vinicius Goncales
- Dr Vinoth Rajendran
- Dr Iman Roohaniesfahani
- Dr James Webb
- Dr Yanfang Wu
- Dr Ying Yang
- Dr Long Zhang

PhD Students:

- Saifal Alam
- Fida'A Alshawawreh
- Yosef Armin
- Danielle Bennett
- Simone Bonaccorsi
- Dongfei (Phoebe) Chen
- Xueqian Chen
- Kim Duong
- Sanjun Fan
- Shreedhar Gautum
- Daniel Hagness
- Sharmin Hoque
- Nilou Jamshidi
- Mohaddeseh Kahram
- Jiaxin (Lily) Lian
- Milad Mehidpour
- Parisa Moazzem
- Duyen Nguyen
- Peter O'Mara
- Matthew Sims
- Panthipa Suwannakot
- Wenxian Tang
- Peilin Tian
- Kristine Tolentino
- Cong Vu
- Johanna Wordsworth

Honours Students:

- Jacinta Houng
- Sam Somerville

DR RONALD STANLEY HAINES

B.Sc. in Pure and Applied Chemistry, Ph.D. UNSW

Professional Activities:

- First Year Chemistry Laboratory Coordinator
- School of Chemistry IT Coordinator
- Member, School of Chemistry Teaching Committee

Research:

- Chemical kinetics - the influence on reaction mechanisms of ionic liquids as solvents.
- Chemical education - assessment and instruction in undergraduate Chemistry laboratories.

PhD Students:

- Alyssa Gilbert
- Andrew Hsieh
- Kenny Liu

DR CHRISTOPHER HANSEN (DECRA FELLOW)

B.NanotechAdv (Hons), PhD, University of Wollongong

Professional Activities:

- Conference Convenor - Royal Australian Chemical Institute Physical Chemistry Division

Research:

- Chemical Reaction Dynamics
- Atmospheric Chemistry
- Interstellar and extra-terrestrial photochemistry

ASSOCIATE PROFESSOR
JASON BRIAN HARPER

B.Sc., University of Adelaide, B.Sc. (Hons), Ph.D. Australian National University

Professional Activities:

- Director of Teaching, School of Chemistry
- Titular, Division III (Organic), International Union of Pure and Applied Chemistry
- Member, IUPAC Subcommittee on Structural and Mechanistic Organic Chemistry
- International Advisory Board, *ChemPlusChem*
- Guest editor RSC journals *(Physical Chemistry Chemical Physics and Organic and Biomolecular Chemistry)* web-based thematic issue (NonTraditional Solvent Effects in Organic Reactions)
- Reviewer for national funding bodies and promotion applications: Australia, Canada, Pakistan, Romania
- Ph.D. Examiner: Australia, Pakistan
- International Advisory Board, 31st International Symposium on the Chemistry of Natural Products & 11th International Congress on Biodiversity
- Organising Committee, Satellite Meeting, 9th Australasian Symposium on Ionic Liquids
- President and Treasurer, Southern Highlands Conference on Heterocyclic Chemistry
- Fellow, Royal Australian Chemical Institute
- Member, American Chemical Society (ACS)
- Member, Royal Society of Chemistry
- Director, Systems Chemistry Australia

Research:

- Application of physical organic chemistry to understanding organic processes, including:
- The development of an understanding of ionic liquids as novel reaction media, and their application.
- The examination of the chemical and physical properties of *N*-heterocyclic carbenes
- The investigation of novel NMR spectroscopic methods for monitoring reaction kinetics

PhD Students:

- Benjamin Smit-Colbran
- Alicia Evans
- Kenny Liu
- Daniel Morris
- Karin Schaffarczyk McHale
- Matthew Taylor

Honours Students:

- Maxwell Coney
- Andrew Hsieh

DR JUNMING HO

BSc, UWA, BSc (Hons), PhD ANU

Professional Activities:

- Editor, Chemical Data Collections (Elsevier)
- ARC grants assessor
- Organiser of 2020 ACT/NSW Computational Chemistry Retreat (Southern highlands)

Research:

- Computational chemistry
- Physical organic chemistry
- Biomolecular simulations

PhD Students:

- Junbo Chen
- Gabriella Marcolin
- Dan Mikic
- Isolde Sandler

Honours Students:

- Shaleen Sharma
- Mackenzie Taylor

ASSOCIATE PROFESSOR
LUKE HUNTER

BSc (Advanced) (Hons), PhD, The University of Sydney,
Graduate Certificate in University Learning and Teaching, UNSW

Professional Activities:

- Referee for discipline journals
- Examiner for national and international PhD theses

Research:

- Design and synthesis of DNA-targeted anticancer drugs
- Activating the hypoxia response to treat stroke
- Controlling the conformations of bioactive molecules and peptides through stereoselective fluorination
- Flow-based methods for synthesising aryl-SF5 compounds
- Synthesis of feedstock molecules for isotopic enrichment of silicon for quantum computing applications

Postdoctoral Fellows:

- Dr Caspar de Bruin-Dickason

PhD Students:

- Mohiminul Adib
- Grace Constable
- Samantha Miles
- Nicole Richardson
- Patrick Ryan
- Glen Surjadinata
- Daniel Weissberger

Honours Students:

- Krishayant Dhar
- Adrian Guo
- Yuki Suzuki

DR K.M. MOHIBUL KABIR

BSc (Hons), MSc, Electrical & Electronic Engineering, Islamic University of Technology, Bangladesh, PhD Applied Chemistry, RMIT

Professional Activities:

- Member – School of Chemistry Postgraduate Research Committee
- Panel member - postgraduate students' annual progress reviews
- Panel member - Honours thesis and viva

Research:

- Development of high-resolution ion mobility spectrometry for chemical separation
- Microscale sensor development for volatile biomarker detection
- Mentoring research students working in different projects including (i) ion mobility spectrometer and (ii) ion focussing instrument, and (iii) volatile organic compound analysis for disease diagnosis and forensic applications.

PROFESSOR SCOTT HENDERSON KABLE

B.Sc. (Hons), (Griffith), Grad. Dip. Business Admin. (QUT) PhD (Griffith)

Professional Activities:

- Fellow, RACI
- Fellow RSNSW

Research:

- Atmospheric chemistry and modelling
- Photochemical reaction dynamics
- Spectroscopy of free radicals

Postdoctoral Fellows:

- Dr Klaas Nauta

PhD Students:

- Jyoti Campbell
- Lorrie Jacob (MSc)
- Maria Perez-Pena
- Blair Welsh

ASSOCIATE PROFESSOR
KRIS KILIAN

BS, MS University of Washington, PhD UNSW

Professional Activities:

- Theme organiser, 11th International Nanomedicine Conference
- NATA Technical Assessor
- BIOTech Futures Challenge, Team Mentor, 2020/2021
- ARC Future Fellowship Workshop, Presenter and Mentor, 2020
- Associate Editor, Journal of Biomedical Materials Research Part A, 2020-present
- Guest Editor, ACS Biomaterials Science & Engineering, 2020/2021
- Guest Editor, Acta Biomaterialia, 2020/2021

Research:

- Biomaterials design
- Hydrogel chemistry
- Mechanochemistry and mechanobiology
- Cell, tissue and organoid engineering
- Model tumour microenvironments

Postdoctoral Fellows:

- Dr Sara Romanazzo

PhD Students:

- Jake Ireland (Chem)
- Honda Jayathilaka (Chem)
- Ashley Nguyen (Chem)
- Md Shariful Islam (MSE)
- Shariful Islam (MSE)
- Gagan Jahlandra (MSE)
- Thomas Molley (MSE)
- Stephanie Nemec (MSE)
- Pallavi Srivistava (SOMS)

Honours Students:

- Derya Kaba (Chem)
- Mark Richardson (Nano)

DR DONG JUN KIM

BSc - Materials Science & Engineering, Yonsei University, South Korea, PhD - Materials Science and Engineering, Korea Advanced Institute of Science and Technology, South Korea

Research Activities:

- Energy storages
- Rechargeable batteries
- Artificial molecular machines

Postdoctoral Fellows:

- Dr Ji Eun Wang

Honours Students:

- Christopher Lee

PROFESSOR
NARESH KUMAR

BSc (Hons 1), MSc, Punjab Agricultural University, India
PhD University of Wollongong, Australia

Professional Activities:

- Postgraduate Coordinator: completions
- Member, Royal Australian Chemical Institute (RACI)
- Member, American Chemical Society
- Member International Society of Heterocyclic Chemistry
- Chair, RACI (NSW) Natural Products Chemistry Group
- Member RACI Bioactive Discovery and Development Group
- Assessor for ARC Discovery, DECRA, and Linkage projects
- Assessor for ARC Laureate Fellowship applications
- Research project evaluation for Auckland Medical Research Fund, and Cancer Society of New Zealand
- Reviewer for Academic Research Fund applications, Nanyang Technological University, Singapore
- PhD thesis examiner for national and international universities
- Referee for Tetrahedron Letters, Tetrahedron, Organic and Biomolecular Chemistry, Bioorganic Chemistry, Bioorganic and Medicinal Chemistry Letters, European Journal of Medicinal Chemistry, Journal of Organic Chemistry, ACS Omega, Journal of Medicinal Chemistry, Biofouling, Langmuir, Biomaterials, and Acta Biomaterialia

Research:

- Design and synthesis of novel antimicrobial agents including quorum-sensing inhibitors and antimicrobial peptide mimics
- Development of synthetic methodologies for the preparation of biologically important natural products and their analogues
- Heterocyclic chemistry
- Novel antimicrobial biomaterials

Postdoctoral Fellows:

- Dr Vina Aldilla
- Dr Renxun Chen
- Dr Neil Mallo
- Dr Daniel Wenholz

PhD Students:

- Ghayah Bahatheg
- Katrina Brownie
- Sudip Chakraborty
- Xiaoming Fu
- Satyanaryana Gadde
- John Jones (MPhil)
- Sun Jun
- Eloise O'Brien (MIR)
- Robert Rourke
- Shekh Sabir
- Sandy Yang
- Tsz Tin Yu

Honours Students:

- Phuoc Linh Dan Nguyen
- Dittu Suresh

DR KIM LAPERE

BSc (Honours), PhD, UWA,
GCert (University Learning & Teaching) UNSW

Professional Activities:

- School of Chemistry Teaching Fellow Coordinator
- School of Chemistry Outreach Committee
- School of Chemistry Website Coordinator

DR MARTINA LESSIO

B.Sc, M.Sc Universitá degli Studi di Torino (Italy), M.A, Ph.D Princeton University

Professional Activities:

- RACI member

Research:

- Computational chemistry and materials science for sustainability applications
- Computational homogeneous and heterogeneous catalysis
- Simulation of porous materials for water remediation applications
- Computational surface science for art conservation

PhD Students:

- Claudia Cox

Honours Students:

- Ethan Abergas

DR SHANNAN MAISEY

BSc (Hons), BCom, PhD, UWA, Grad Certificate – University Learning and Teaching, UNSW

Professional Activities:

- Secretary/Treasurer NSW RACI Chemical Education group
- Committee member - National RACI Chemical Education group

Research:

- Developing science identity in pre-honours science students
- Student perception of digital assessment
- Developing metacognition in novice science students

ASSOCIATE PROFESSOR
SHELLI RENEE McALPINE

BSc University of Illinois, PhD UCLA

Research:

- Investigating the mechanism of action of Heat shock protein 90 inhibitors as chemotherapeutics
- Designing small molecules that target Heat shock protein 70 and Heat shock protein 27

DR LAURA McKEMMISH

BSc (Adv, Hons), The University of Sydney, PhD ANU

Professional Activities:

- Secretary of RACI PhysChem division (organised fortnightly webinars - July-Dec 2020)
- Coordinator, Faculty SciX program
- Chair - School of Chemistry Outreach and Marketing Committee

Research:

- High-throughput computational infrared spectroscopy for astrochemistry
- Mixed ramp-Gaussian basis sets

PhD Students:

- Anne-Maree Syme
- Juan Camilo Trujilo Zapata

Honours Students:

- Jasmin Borsovszky
- Panayioti Kapodistrias

DR CHRISTOPHER MEDCRAFT
(DECRA FELLOW)
BSc (Hons), PhD, Monash

Professional Activities:

- Member, Royal Australian Chemical Institute (MRACI)
- Member, Royal Society of Chemistry (AMRSC)

Research:

- Examining the molecular level origins of secondary organic aerosol formation

PROFESSOR AND DEAN OF GRADUATE RESEARCH
JONATHAN CHARLES MORRIS
BSc (Hons) UWA, PhD ANU

Professional Activities:

- Dean of Graduate Research
- Fellow, Royal Australian Chemical Institute
- Member, American Chemical Society.
- Referee for ACS, RSC, Wiley and Elsevier Journals.

Research:

- Total synthesis of biologically active natural products
- Design of inhibitors of kinases that regulate alternative splicing [with Emenda]
- Applications of the Diels-Alder reaction to the synthesis of biologically active molecules
- Design of phosphatase activators (with Dr Matt Dun and Dr Nikki Verrills, University of Newcastle)
- Medicinal chemistry

Postdoctoral Fellows:

- Dr Tom Hawtrey

PhD Students:

- Iliya Dragutinovic
- Jack Duncan
- Tess Mutton
- David Neale
- Matthew Peterson
- Quantao Sun

Honours Students:

- Toby Mac

ASSOCIATE PROFESSOR SUZANNE NEVILLE

BSc (Hons), PhD, The University of Sydney

Professional Activities:

- Member, RACI NSW Branch Council
- Member, Australian Synchrotron PAC Council
- Conference Organiser, Crystal – 33
- Council member, Society of Crystallography Australia and New Zealand (SCANZ)

Research:

- Molecular sensing in porous materials
- Molecule-based switches
- Pyrite decomposition for battery materials

Postdoctoral Fellows:

- Dr Christopher Didier
- Dr Lida Ezzedinloo

PhD Students:

- Manan Ahmed
- Ashley Brennan
- Monica Hibberd (MSc)
- Hamish McDougall (MSc)
- Luonan Xu

Honours Students:

- Lisa Hua
- Xandria Ong

DR VINH NGUYEN (FUTURE FELLOW)

B.Eng (1st class Hons) UNSW, Ph.D ANU

Professional Activities:

- MRACI member of RACI

Research:

- Synthetic methodology
- Organocatalysis

PhD Students:

- An Huy Dinh
- Son Hoai Doan
- Emily Jacobs
- Domenic Pace
- Tuong Anh To
- Nhan Nu Hong Ton (MSc)
- Eloise O'Brien (MPhil)

Honours Students:

- Philip Lentz

DR MARTIN PEEKS
(SCIENTIA FELLOW)

MChem, St Andrews, DPhil, Oxford

Professional Activities:

- RACI RSC member
- ARC referee

Research:

- Functional organic molecules and physical-organic chemistry

PhD Students:

- David Bradley

Honours Students:

- Stephen Bortolussi
- Dexter Gordon
- Bethany Hillier

DR NICOLE RIJS
(ARC DECRA FELLOW)

BSc (Hons), PhD, University of Melbourne

Professional Activities:

- DAAD Research Ambassador

Research:

- Gas Phase Ion Chemistry
- Mass Spectrometry
- Electrospray mechanisms
- Ion-Mobility
- DFT
- Supramolecular
- Modelling gas phase structure and reactivity

Postdoctoral Fellows:

- Dr Lida Ezzedinloo
- Dr Olivia Rusli

PhD Student:

- Oscar Lloyd Williams (PhD)
- Meng Yuan Zhang (MPhil)

DR IMAN ROOHANI

BSc, MSc (Materials Engineering) Isfahan University of Technolgy, PhD (Biomedical Engineering) The University of Sydney

Research:

- Development of Bone-ink for bioprinting and in-situ printing of bone mimicked constructs.
- Effect of surface curvature on differentiation of bone marrow derived stem cells
- Identification of the role of microporosity on osteoinduction of synthetic bone grafts
- Fabrication and characterisation of biomimetic nanoparticles for treatment of bone metastasis
- Osteogenic and angiogenic behaviour of Lithium doped calcium phosphate nanoparticles
- A new technique for integration of bone forming growth factor with 3D printed synthetic grafts
- A modular design strategy to enable bone scaffolds to withstand complex in-vivo loadings and regulate mechanotransduction

PROFESSOR TIMOTHY SCHMIDT

BSc (Hons) The University of Sydney, PhD Cambridge

Professional Activities:

- Editorial Board, SPIE Journal of Photonics for Energy
- Review Editor, Astrochemistry, Frontiers in Astronomy and Space Sciences

Research:

- Exciton Science
- Astrochemistry
- Radical Spectroscopy
- Electronic Structure Theory

Postdoctoral Fellows:

- Dr Thilini Ishwara
- Dr Shyamal K.K. Prasad

PhD Students:

- Cameron Bruno Dover
- Elham Morteza Gholizaadeh
- Parisa Hosseinabadi
- Zachary Levey
- Rosina Pelosi

Honours Students:

- Jasmin Borsovszky

ASSOCIATE PROFESSOR
NEERAJ SHARMA

B Advanced Science (Hons 1), PhD The University of Sydney

Professional Activities:

- Member of National Committee for Crystallography (NCCr), Australian Academy of Sciences
- Advanced Diffraction & Scattering (ADS) Beamline Advisory Panel (BAP), Australian Synchrotron
- Director & Founder, Australian Battery Society

Research:

- Fundamental research and materials discovery for the next generation of batteries including sodium- and potassium-ion batteries and lithium-sulfur batteries
- Recycling and sustainably producing batteries
- Scaffolding layered electrode materials
- Tuning negative thermal expansion to produce zero thermal expansion materials
- Using and understanding electrochemically-activated solid state synthesis
- In situ studies of materials and processes
- Structural investigations using neutron and X-ray scattering

Postdoctoral Fellows:

- Dr Henrik Andersen

PhD Students:

- Emily Cheung
- Lisa Djuandhi
- Michael Fenech
- Conrad Gillard
- Jennifer Stansby
- Matthew Teusner
- Jimmy Wu

Honours Students:

- Ivan Johan

SCIENTIA PROFESSOR
MARTINA HEIDE STENZEL

MSc, University of Bayreuth, Germany
PhD University of Stuttgart, Germany

Professional Activities:

- Co-Director Centre for Advanced Macromolecular Design (CAMD)
- Co-Director of the ARC Training Centre for Chemical Industries
- Fellow of the Australian Academy of Science
- Fellow of the Royal Australian Chemical Institute (RACI) and past chair of the RACI polymer division
- Scientific editor of the RSC journal Materials Horizon
- Member of the editorial board of the journals Macromolecular Bioscience, Macromolecular Rapid Communications, Biomacromolecules, Polymer Chemistry, Journal of Materials Chemistry B and Acta Biomaterialia, ACS Biomaterials Science and Engineering
- Chair of the National Chemistry Committee of the Australian Academy of Science

Research:

- New polymer materials for drug delivery
- Self-assembly of polymers into nano-objects such as cylindrical micelles, vesicles, spherical micelles and other structures
- Hollow nanoparticles for the delivery of proteins
- Nanoparticles with proteins or sugars to generate bioactive nanoparticles with high affinity for cancer cells
- Macromolecular ligands for metal complexes and their use in cancer therapy
- Polyion complex micelles for protein delivery
- Investigation into the interaction of nanoparticles with cancer cells in 2D and in 3D multicellular spheroids

Postdoctoral Fellows:

- Dr Ben Kent
- Dr Mitch Nothling

PhD Students:

- Shegufta Nasrin Farazi
- Henry Foster
- Sylvia Ganda
- Zifei Han
- Nidhi Joshi
- Yee Khine
- Yimeng Li
- Jordan Lovegrove
- Russul Mamdooh
- Daniele Melodia
- Marzieh Monfared
- Ahmed Mustafa
- Yen Hoang Vo
- Guannan Wang
- Yiping Wang
- Sandy Wong
- You Dan Xu
- Lin Zhang
- Li Zihao

Master of Industrial Research Students:

- Callan Wear

Honours Students:

- Nicki Kyriacou
- Yi Ling Liu

SIR FRASER STODDART,
NOBEL LAUREATE

BSc, PhD, University of Edinburgh, FRS, FRSE, FRSC

Professional Activities:

- Professor of Chemistry and Head of the Stoddart Mechanostereochemistry group, Northwestern University, Illinois, USA
- Head of research laboratory, Tianjin, China
- Fellow of the Royal Society of New South Wales
- Member of the European Academy of Sciences and Arts
- Member of the National Academy of Sciences, USA
- Member of the American Academy of Arts and Sciences
- Honorary Fellow of the Royal Society of Edinburgh, UK
- Honorary Fellow of the Royal Society of Chemistry, UK

Research:

- Mechanically-interlocked molecular architecture
- Dynamic covalent chemistry
- Molecular switches
- Nanomechanical systems

Honours Students:

- Christopher Lee

ASSOCIATE PROFESSOR
JOHN ARRON STRIDE

BSc (Hons.) Ph.D. (Chemistry), University of East Anglia, UK

Professional Activities:

- UNSW AINSE Delegate

Research:

- Molecular magnetism
- Nanostructured materials
- Molecular dynamics
- Photo-active devices
- Porous framework materials

Postdoctoral Fellows:

- Dr Sreenu Jennepalli
- Dr .Fatemeh Mirnajafizadeh

PhD Students:

- Jason Holland
- Md Habibur Rahaman
- Zhichen (Jeffrey) Yan

DR SCOTT ANDREW SULWAY

MChem (Hons), Ph.D, University of Manchester, P.G.C.E. Secondary Science (Chemistry), Manchester Metropolitan University

Professional Activities:

- Member of the School of Chemistry Teaching Committee

Research:

- Lanthanide coordination chemistry
- Magnetic interactions of lanthanide complexes

Honours Students:

- Jarrod RobertThomas

PROFESSOR
PALL THORDARSON

BSc. Chemistry, University of Iceland, PhD Chemistry, University of Sydney

Professional Activities:

- President-Elect and Board member Royal Australian Chemical Institute (RACI).
- Editorial board member – Commissioning Editor, the Australian Journal of Chemistry.
- Editorial board member – ChemSystemsChem (Wiley).
- Editorial board member – Cell Physical Science – Cell Press (Elsevier)
- Co-Chair, International Symposia on Macrocyclic and Supramolecular Chemistry (ISMSC) in Reykjavik, Iceland, June 2024.
- Membership of the Royal Australian Chemical Institute, The American Chemical Society, The Royal Society of New South Wales, The Icelandic Chemical Society, Society of Porphyrins and Phthalocyanines (SPP), The Australian Microscopy and Microanalysis Society and the Marie Curie Fellowship Association
- Australian Research Council (ARC) College of Expert member.

Research:

- Systems Chemistry
- Origins of life (pre-biotic chemistry)
- Self-assembled gels for biomedical applications and electroactive displays.
- RNA – peptide interactions
- Non-linear interactions in supramolecular chemistry

Postdoctoral Fellows:

- Dr Abbas Darestani Farahani
- Dr Mohanad Hussein
- Dr Sandra Nurttila
- Dr (Chin) Ken Wong

PhD Students:

- Abdur Rehman Adil
- Fayaz Ali
- Karrar Al-Latef
- Changzhuang Bai
- Chelsea Forest
- Han Han
- Luke Marshall (MPhil)
- Toby Funston (MIR – Master of Industrial Research)

Honours Students:

- Grace Maynard
- Caitlin Silva

PROFESSOR RICHARD TILLEY

MChem Oxford, PhD Cambridge

Professional Activities:

- Member of the Editorial Board – Chemistry of Materials and ChemNanoMat

Research:

- Electron Microscopy
- Nanoparticle catalysts and biomedical imaging agents

Postdoctoral Fellows:

- Dr Lucy Gloag

PhD Students:

- Ali Alinezhad Chamazketi
- Hsiang-Sheng Chen
- Hong Thien Kim Duong
- Jiaxin Lian
- Kevin Mariandry
- Munkhshur Myekhlai
- Agus Poerwoprajitno
- Zeno Rizqi Ramadhan

Honours Students:

- Leo James
- Qinyu Li

DR ANNA WANG (SCIENTIA FELLOW)

BSc (Adv, Hons) The University of Sydney, MSc & PhD Harvard University

Professional Activities

- Organiser - Astrobiology Australasia Meeting 2020
- Organiser - Australia-Japan Colloids Symposium 2020

Research:

- Digital holographic microscopy
- Building protocells
- Astrobiology and origins of life
- Membrane self-assembly
- Membrane biophysics
- Surface and colloidal science

PhD Students:

- Daniel WK Loo
- Siddharth Rawat

Honours Students:

- Lauren Anne Lowe
- Jenane Konesan

DR SIOBHAN WILLS

BSc (International), PhD, UWA

Research:

- Digital Assessment
- Students as partners in learning – course design and assessment
- Students writing mastery questions
- Student perceptions of COVID-19

PROFESSOR CHUAN ZHAO (FUTURE FELLOW)

MSc, PhD Northwest University

Professional Activities:

- Chair of Electrochemistry Division Royal Australian Chemical Institute

Research:

- Electrochemical energy conversion and storage

Postdoctoral Fellows:

- Dr Xianjue Chen
- Dr Yibing Li
- Dr Quentin Meyer
- Dr Wenhao Ren
- Dr Yuan Wang
- Dr Yong Zhao

PhD Students:

- William Adamson
- Muhammad Ibrar Ahmed
- Xin Bo
- Karin Ching
- Kamran Dastafkan
- Tim Fang
- Haocheng Guo
- Chen Jia
- Shiyang Liu
- Chengli Rong
- Zhen Shi
- Zhen Su
- Qian Sun
- Wanfeng Yang
- Tingwen Zhao

DR YILING ZHONG (DECRA FELLOW)

PhD, Soochow University, China

Research:

- Design and synthesis of multifunctional nanomaterials for bioapplications

ACADEMIC STAFF AWARDS

ASSOCIATE PROFESSOR ALEX DONALD

The Analytical Science

Named in the Power List

DR JOSEPH BROPHY

Royal Australian Chemical Institute

Churchill Fellowship

SCIENTIA PROFESSOR JUSTIN GOODING

International Society of Electrochemistry

Jaroslav Heyrovsky Prize for Molecular Electrochemistry

DR CHRISTOPHER HANSEN

Royal Society of Chemistry

Editor's Choice Award – Chemical Science

ASSOCIATE PROFESSOR JASON HARPER

The University of New South Wales

Dean of Science Education Excellence Award

ASSOCIATE PROFESSOR KRIS KILIAN

The University of New South Wales

Research Excellence Award

PROFESSOR NARESH KUMAR

Royal Society of New Zealand

Appointed panel member for the Marsden Fund, Physics, Chemistry and Biochemistry panel

SCIENTIA PROFESSOR MARTINA STENZEL

Royal Society of New South Wales

Elected as a Fellow

DR ANNA WANG

UNSW Dean of Science Staff Excellence Award

Early Career Excellence

STAFF

ADMINISTRATION

Head of School
Professor Scott Henderson Kable

Deputy Head of School
Professor Pall Thordarson

Director of Research
Professor Tim Schmidt

Director of Teaching
Associate Professor
Jason Brian Harper

Deputy Director of Teaching
Dr Gavin Leslie Edwards

Strategy / SHARP
Scientia Professor
John Justin Gooding

Post Graduate Coordinator – Student review and completion
Associate Professor William
Alexander Donald

Post Graduate Coordinator – Admissions and scholarships
Associate Professor
Suzanne Neville

Outreach and Marketing Director
Dr Laura McKemmish

HS Consultation Committee Chair
Dr Josh Peterson

HS Consultation Committee Deputy Chair
Associate Professor Luke Hunter

Honours Coordinator
Associate Professor
Neeraj Sharma

Third Year Director
Dr Junming Ho

Second Year Director
Dr Scott Sulway

First Year Director
Dr Shannan Maisey

First Year Laboratory and IT Coordinator
Dr Ronald Stanley Haines

On-line Coordinator
Dr Kim Lapere

Demonstrator Training
Dr Scott Sulway

Tutorial Coordinator
Dr Siobhan Wills

Medicinal Chemistry Program Coordinator
Associate Professor Luke Hunter

Nanotechnology Program Coordinator
Professor Chuan Zhao

ITTC Director
Scientia Professor Martina Stenzel

ITTC Coordinator
Associate Professor Jon Beves

Website Coordinator
Dr Kim Lapere

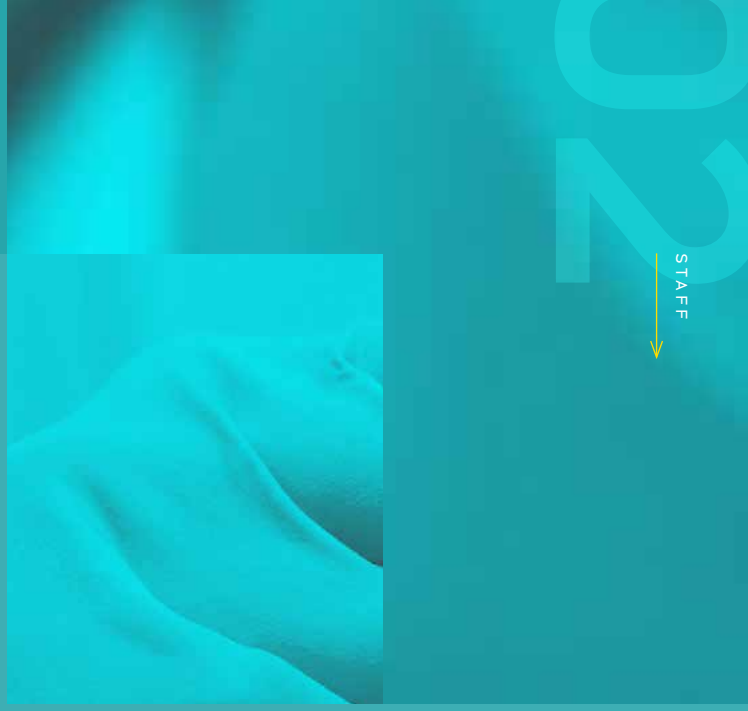
Scholarship & Prizes Coordinator
Associate Professor Jon Beves

Seminar Coordinators
Drs Albert Fahrenbach and
Nicole Rijs

Teaching Fellows Coordinator
Dr Kim Lapere

Talented Students Program Coordinator
Associate Professor
Neeraj Sharma

Chemical Society President
Dr Albert Fahrenbach



TEACHING STAFF

Nobel Laureate and Visiting Professor of Chemistry
- Sir Fraser Stoddart

Scientia Professors
- John Justin Gooding
- Martina Heide Stenzel

Professors
- Leslie D. Field
- Scott Henderson Kable
- Naresh Kumar
- Jonathan Charles Morris
- Timothy Schmidt
- Pall Thordarson
- Richard Tilley
- Chuan Zhao

Associate Professors
- Graham Edwin Ball
- Jonathon Beves
- William Alexander Donald
- Jason Brian Harper
- Luke Hunter
- Kris Kilian
- Shelli Renee McAlpine
- Suzanne Neville
- Neeraj Sharma
- John Arron Stride

Senior Lecturers
- Gavin Leslie Edwards
- Junming Ho
- Shannan Maisey
- Vinh Nguyen

Lecturers
- Albert Fahrenbach
- Vinicus Goncales
- Ronald Stanley Haines
- Dong Jun Kim
- Kim Lapere
- Laura McKemmish
- Martin Peeks
- Nicole Rijs
- Scott Sulway
- Anna Wang
- Siobhan Wills

DECRA Fellows
- Dr Robert Chapman
- Dr Xianjue Chen
- Dr Christopher Hansen
- Dr Christopher Medcraft
- Dr Yiling Zhong

NHMRC Fellows
- Dr Iman Roohani

Conjoint Associate Professor
- Ginancarlo Pascali, BSc Pisa, Ph.D. Lecce

Conjoint Lecturer
- John Doan, BSc Ph.D, USyd

FELLOWS

Emeritus Scientia Professor

- Michael Nicholas Paddon Row, BSc Lond, PhD ANU, CChem, FRSC, FRACI

Emeritus Professors

- Roger Bishop, BSc St And., PhD Camb., CChem, FRSC, FRACI
- David St. Clair Black, M.Sc. Syd., Ph.D. Camb., AMusA, CChem, FRACI, AO
- Ian Dance, M.Sc. Syd., Ph.D. Manc., CChem, FRACI, FAA
- David Brynn Hibbert, BSc PhD Lond., CChem, MRSC, FRACI
- Ronald Postle PhD Leeds

Honorary Senior Lecturer

- Dr Joseph John Brophy, BSc, PhD DSc UNSW, DipEd Monash, CChem, FRAC

Honorary Associate Professors

- Stephen Boyd Colbran, BSc (Hons), PhD, Otago
- James Hook, BSc UNSW, PhD ANU
- Roger Read, BSc PhD Syd., DIC Lond., CChem, FRACI
- Laurence Wakelin, BSc (Hons) Uni Kent, PhD Cambridge, FRSC, FRACI, FRSN

Honorary Lecturer

- Alison Magill, PhD UNSW
- Synove Scottwell, BSc, PhD Otago.

Professorial Visiting Fellows

- Amar Flood, Indiana University
- Sergei Glavatskih, KTH Royal Institute of Technology
- Margaret Harding, Board Chair of: NSW Circular, Australian National Imaging Facility
- Meredith Jordan, USYD
- Barbara Messerle, USYD
- MaryKay Orgill, University of Nevada, Las Vegas
- Mark Rutland, KTH Royal Institute of Technology

Visiting Fellows

- Henrik Andersen, Technical University of Denmark
- Tony Breton, University of Angers, France
- Philip Coghlan, Principal – i-Chem Consulting
- Liam Delvin, Consultant
- Miroslav Dvorak, Czech Technical University, Prague
- Dr Alex Falber, Algae Enterprises Ltd, Victoria, Australia
- Simon Fielder, Principal Chemist, Memjet Technology
- Liang Jiang, Pritzker School of Molecular Engineering, University of Chicago
- Adnan Mohammed, University of Kerbala, Iraq
- Sandra Nurtilla
- Silvia Flavia Rodrigues de Oliveira
- Vittoria Pischedda, Universite Claude Bernard Lyon
- Reyne Pullen, USYD
- David Sammut, Principal DCS Technical
- Lisa Stevens, LisaJStevens & Associates, Health and Safety Consultants

Adjunct Professor

- Adam Georgius

Adjunct Associate Professor

- Renate Griffith

Adjunct Senior Lecturer

- Natalie Chapman, Managing Director, gemaker
- Rumei Chang
- Christopher Garvey, Lund University, Sweden
- Amanda Hayes, NSW Smart Sensing Network
- Fabio Lisi, University of Tokyo
- Joso Raymond

Adjunct Lecturer

- Adam Martin, Macquarie University
- Alexander Soeriyadi, Co-Founder & CEO of LLEAF Pty Ltd
- Robert Utama, Lead Product Manager, Inventia Life Science

PROFESSIONAL STAFF

School Manager
- Dr Toby Jackson

Administrative Support
- Anne Ayres – Undergraduate administration
- Dr Jeffrey Black – Teaching Admin Support, PhD UNSW
- Kenneth Gerard McGuffin – Postgraduate administration (Jan – Jun), BA USYD
- Vanessa Gotting – Project Officer BA (History) UNSW
- Sheree Munro - Postgraduate administration (Jun –)

Student Services Manager
- Michael Gandy, BSc Chem, UWA

IT Specialist Technology Support Officer
- Ray Arnhold

Finance Management & Reporting Analyst
- Aftab Hossein (Jan – March)
- Lucy Sun (March -)

Laboratory Managers
- Dr Nancy Talavera – Teaching Laboratories, BSc (Hon), PhD Adel
- Dr Joshua Peterson – Research Laboratories, BSc Chem Eng Washington, PhD USYD

Technical Officers
- Dr Majid Asnavandi, PhD UNSW
- Dr Genevieve Duche, PhD UNSW
- Hitendra Gopal
- David Jacyna
- Dr Mehran Bolourian Kashi, PhD UNSW
- Dr Cameron Kelly, PhD UNSW
- Dr Clare Sullivan
- Dr Ruth Thomas, PhD UNSW
- Dr Warren Truong, PhD UNSW
- Svetislav Videnovic, BChemEng, Sarajevo

03 RESEARCH

DIRECTOR OF RESEARCH REPORT

2020 was an extremely challenging year. Although we did not shut down the laboratories as happened in other states, challenges around social distancing and equipment maintenance meant a loss of productivity compared to what we might have otherwise expected. That said, given our upwards trajectory, the effects are not yet in evidence. By all objective measures, we had an outstanding year.

Fellowships:

2020 was an extraordinary year for research fellowships. Scientia Professor Martina Stenzel was awarded an ARC Laureate Fellowship – the peak personal award from the ARC. She was awarded $3.4M to investigate how nanoparticles can enhance the efficiency of the drug administration. Scientia Professor Justin Gooding was awarded an NHMRC Fellowship along with the most NHMRC funding in the country - $3.8M to research biomarkers released from cancer cells. Associate Professors Alex Donald and Neeraj Sharma were both awarded ARC Future Fellowships. The School was particularly successful in being awarded ARC DECRA grants with Dr Anna Wang, Dr Sina Jamali and Dr Dong Jun Kim each receiving an award. All these Fellowships will commence in 2021.

Grants:

2020 saw the School awarded $11.5M apportioned funding, the highest in recorded history for the School. We were awarded four ARC Discovery Project Grants (led by Dr Albert Fahrenbach, Scientia Professor Justin Gooding, Associate Professor Kris Killian and Professor Chuan Zhao).

We were very successful in the LIEF 2020 round, with the School leading two very large grants. These were detailed in the 2019 report.

The School had notable success in less traditional schemes. Professor Pall Thordarson was awarded an Australian Research Data Commons - Platforms Programs Shared Grant. Dr Anna Wang was awarded a $1.7M 2020 Human Frontier Science Program (HFSP) collaborative Research Grant to create a synthetic cell. Associate Professor Kris Killian was awarded a $1.5M grant from the US National Cancer Institute for the treatment of malignant melanoma.

Industry Engagement:

The School's industry engagement continues to gather momentum. The ARC funded Industrial Transformational Training Centre (ITTC) for the Chemical Industries rolled out a new health and safety course in term 1 of 2020.

Associate Professor Suzanne Neville is involved in a CRC-P project awarded $2.4M to assess the production of battery-grade cobalt and supfur. This project, led by Cobalt Blue Holdings, aims to double Australia's cobalt production. Professor Pall Thordarson is involved in a $3.0M CRC-P project to make cell and gene therapy affordable with a microbioreactor.

Professor Chuan Zhao was awarded a linkage project with Kohodo Hydrogen. Professor Tim Schmidt, was awarded a grant from Innovation Connections and AusDiagnostics on enhancing PCR virus detection.

Publications:

The 2020 AROC process identified 308 research outputs (302 journal articles). The outstanding quality of these outputs is exemplified by our performance in the Nature Index. We have risen to a rank of 51 in the Asia Pacific and first in Australia. The Nature Index tracks high quality research outputs. In the period ending November 2020, UNSW published 158 articles in top chemistry journals.

UNSW Chemistry moved up from 140 to 122 in the world.

External Measures:

In the QS subject rankings, UNSW Chemistry was ranked 71 in the world and 5th in the country. In the ARWU subject rankings, UNSW Chemistry moved up from 140 to 122 in the world.

PROFESSOR TIM SCHMIDT
Director of Research

RESEARCH HIGHLIGHTS

SCIENTISTS USE NOVEL INK TO 3D-PRINT 'BONE' WITH LIVING CELLS

Scientists have worked out how to print bone-like structures using a 3D-printer and a gelatinous 'bath' containing living cells. Photo: UNSW

3D printers may one day become a permanent fixture of the operating theatre after UNSW scientists showed they could print bone-like structures containing living cells.

Scientists from UNSW Sydney have developed a ceramic-based ink that may allow surgeons in the future to 3D-print bone parts complete with living cells that could be used to repair damaged bone tissue.

...THE FACT THAT LIVING CELLS CAN BE PART OF THE 3D-PRINTED STRUCTURE, TOGETHER WITH ITS PORTABILITY, MAKE IT A BIG ADVANCE ON CURRENT STATE-OF-THE-ART TECHNOLOGY.

Using a 3D-printer that deploys a special ink made up of calcium phosphate, the scientists developed a new technique, known as ceramic omnidirectional bioprinting in cell-suspensions (COBICS), enabling them to print bone-like structures that harden in a matter of minutes when placed in water.

While the idea of 3D-printing bone-mimicking structures is not new, this is the first time such material can be created at room temperature – complete with living cells – and without harsh chemicals or radiation, says Dr Iman Roohani from UNSW's School of Chemistry.

"This is a unique technology that can produce structures that closely mimic bone tissue," he says.

"It could be used in clinical applications where there is a large demand for in situ repair of bone defects such as those caused by trauma, cancer, or where a big chunk of tissue is resected.

Associate Professor Kristopher Kilian who co-developed the breakthrough technology with Dr Roohani says the fact that living cells can be part of the 3D-printed structure, together with its portability, make it a big advance on current state-of-the-art technology.

"THE COOL THING ABOUT OUR TECHNIQUE IS YOU CAN JUST EXTRUDE IT DIRECTLY INTO A PLACE WHERE THERE ARE CELLS, LIKE A CAVITY IN A PATIENT'S BONE.

Up until now, he says, making a piece of bone-like material to repair bone tissue of a patient involves first going into a laboratory to fabricate the structures using high-temperature furnaces and toxic chemicals.

"This produces a dry material that is then brought into a clinical setting or in a laboratory, where they wash it profusely and then add living cells to it," Professor Kilian says.

"The cool thing about our technique is you can just extrude it directly into a place where there are cells, like a cavity in a patient's bone. We can go directly into the bone where there are cells, blood vessels and fat, and print a bone-like structure that already contains living cells, right in that area."

"There are currently no technologies that can do that directly."

In a research paper published recently in **Advanced Functional Materials**, the authors describe how they developed the special ink in a microgel matrix with living cells.

"The ink takes advantage of a setting mechanism through the local nanocrystallisation of its components in aqueous environments, converting the inorganic ink to mechanically interlocked bone **apatite** nanocrystals," Dr Roohani says.

"In other words, it forms a structure that is chemically similar to bone-building blocks. The ink is formulated in such a way that the conversion is quick, non-toxic in a biological environment and it only initiates when ink is exposed to the body fluids, providing an ample working time for the end-user, for example, surgeons."

Dr Sara Romanazzo prepares to 3D-print a piece of bone using the COBICS technique. PHOTO: UNSW

He says when the ink is combined with a collagenous substance containing living cells, it enables in-situ fabrication of bone-like tissues which may be suitable for bone tissue engineering applications, disease modelling, drug screening, and in-situ reconstruction of bone and osteochondral defects.

Already there has been keen interest from surgeons and medical technology manufacturers. A/Prof. Kilian thinks while it's early days, this new bone-printing process could open up a whole new way of treating and repairing bone tissue.

"This advance really paves the way for numerous opportunities that we believe could prove transformational – from using the ink to create bone in the lab for disease modelling, as a bioactive material for dental restoration, to direct bone reconstruction in a patient," says A/Prof. Kilian.

"I imagine a day where a patient needing a bone graft can walk into a clinic where the anatomical structure of their bone is imaged, translated to a 3D printer, and directly printed into the cavity with their own cells.

"This has the potential to radically change current practice, reducing patient suffering and ultimately saving lives."

"THIS HAS THE POTENTIAL TO RADICALLY CHANGE CURRENT PRACTICE, REDUCING PATIENT SUFFERING AND ULTIMATELY SAVING LIVES."

NEXT UP THE DUO WILL BE PERFORMING IN VIVO TESTS IN ANIMAL MODELS TO SEE IF THE LIVING CELLS IN THE BONE-LIKE CONSTRUCTS CONTINUE TO GROW AFTER BEING IMPLANTED IN EXISTING BONE TISSUE.

04 TEACHING

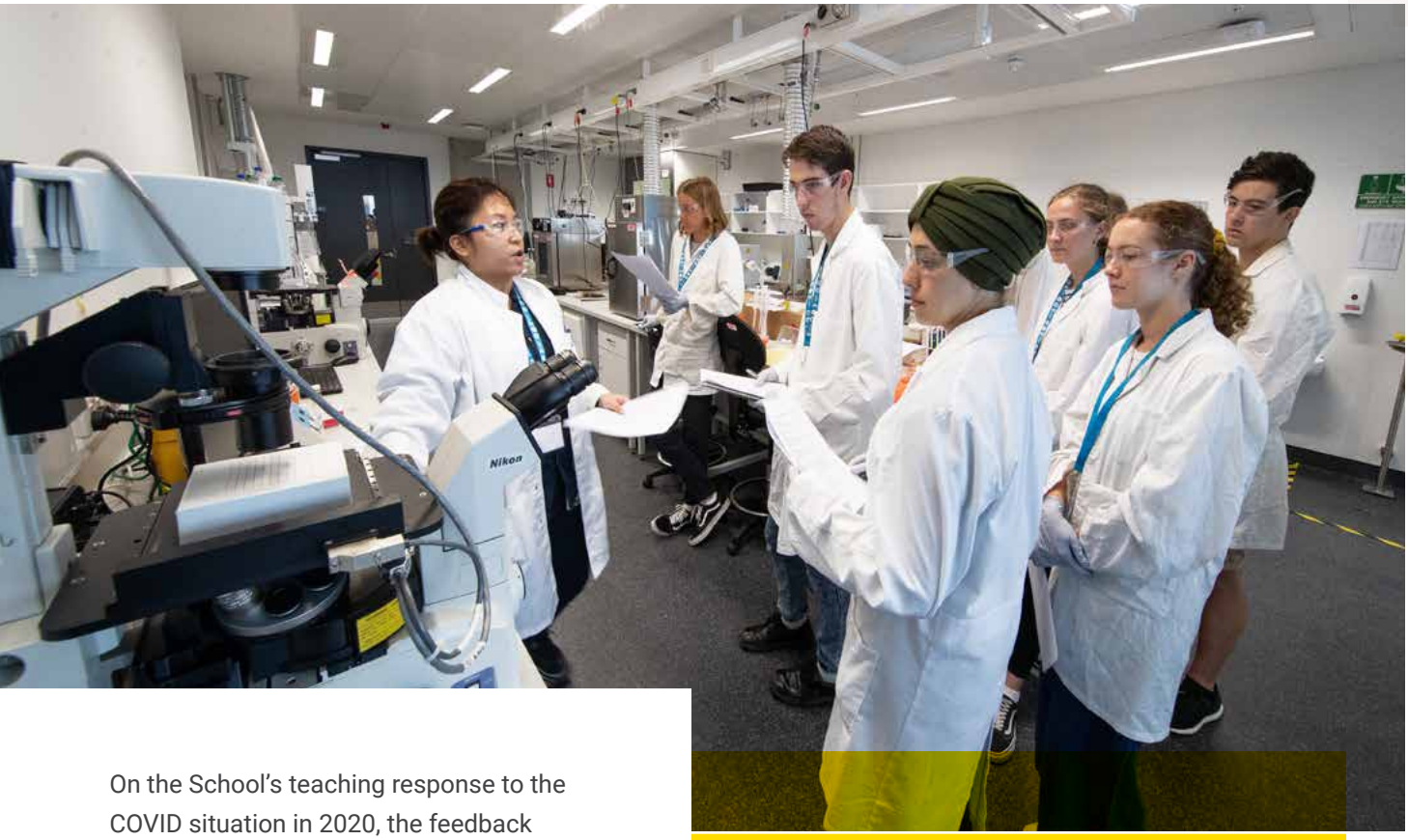
"THIS YEAR WILL BE MORE STRAIGHTFORWARD," I WAS TOLD.

DIRECTOR OF TEACHING REPORT

"This year will be more straightforward," I was told. "After the conversion to trimesters, 2020 will be an opportunity for consolidation and a chance to take a breath after 2019." That was January. The rest of the year is a matter of record.

From having to change an entire term's worth of courses from 'normal' to 'online' in a matter of days, to managing all courses in a trimester entirely by distance, to navigating the choppy waters that were the return to compulsory classes on campus, 2020 in terms of teaching in the School was an ongoing series of challenges. The latter point should be particularly highlighted, given that the School of Chemistry led the way across the university in returning to compulsory face-to-face components.

Most importantly I would like to congratulate everyone who was involved with the huge amount of work that surrounded delivering the courses from the School of Chemistry in 2020. Significantly, the entire School recognised that traditional teaching load models simply didn't apply in such a situation and everyone pitched in in order to make sure that we were able to teach all of our courses in 2020 (not a single course was cancelled as a result of the change and, consequently, we have managed to limit progression issues for students). All of these changes encompassed a tremendous amount of work and everyone involved should be congratulated – academic, professional and casual staff (the latter often our research students).



On the School's teaching response to the COVID situation in 2020, the feedback that we have received has been extremely positive, both from the University and students. On the latter, there are several positive points that should be made in regards to the student experience in 2020, a year where being a university student was particularly tough.

- Our student numbers did not drop when changing to the new model of teaching in the middle of term 1; there was not a mass exodus of students (or any exodus, in fact) as remote learning was brought in.
- General feedback from students on the response of the School of Chemistry to the COVID crisis has been extremely positive; they appreciate the efforts we have made to aid both their learning and their wellbeing; the latter was considered exceedingly important and noted multiple times.
- Running all of our courses in 2020 has been viewed very favourably within the University, but also by our students. We have actually seen increases in our student numbers since the COVID crisis hit and the fact that all of our courses were available was cited.
- The return to campus in term 3 and the way that it was managed has received plaudits from the students, who value not only the learning but the social experience. [This comment should neither undercut the efforts of staff to make the online environment work in terms 1 and 2, nor student response as a result. Interestingly, students complimented staff even when the situation was not ideal (comments of the form "online labs are not as good as the real thing BUT would be even worse without the work of <staff member>" abounded).]

Recognising our successes in managing the situation in 2020 needs to be balanced by appreciating our remaining problems. The development of online assessments has been a particular challenge, as has the issue of integrity in such assessment, which has been extremely problematic in a number of courses and there is no satisfactory answer being presented at this stage. As such, the School is continuing to push to ensure that we have flexibility in delivering assessments into the future to minimise such problems, including a return to face-to-face examinations for some courses in 2021. Further, the challenges remain, such as continuing our plan for return to campus and face-to-face laboratory classes to ensure that our chemistry students – who, after all, are studying a practical science – gain the necessary laboratory skills.

The end of 2020 also sees a changing staff profile as a result of a number of people leaving the School of Chemistry. Of our more recent appointees, Kim Lapere and Michael Gandy have left us to return to Perth; both have made notable contributions to Teaching in the School and they will be missed. At the more senior end of the spectrum, it is important to acknowledge the significant contributions to the School over an extended period of time from Associate Professor Steve Colbran, Dr. Gavin Edwards and Associate Professor Shelli McAlpine. Whilst all of them have played major roles in the School during their time at UNSW, I would like to specifically highlight the contributions of Gavin Edwards. He has been the "go to person" on teaching management and

administration in the School (and then the Faculty) for as long as I can remember, having been Deputy Director and Director of Teaching plus Associate Dean (Undergraduate Programmes). He was also instrumental in the design and establishment of the B. Med. Chem. programme and should be credited with a great deal of the programme's success as a result. On a personal note, he was the person who taught me the ropes at UNSW right from my initial appointment. Enjoy your retirement - your wisdom, counsel, and ability to put things into perspective when needed will be sorely missed.

I WILL BE BACK AND MORE AVAILABLE NEXT YEAR, SO WATCH OUT.

The end of 2020 sees the completion of my tenure as Director of Teaching in the School and hence I will finish with a few comments above and beyond what I might normally include in such a report. To my successor, John Stride, good luck, and I hope that things have been left in some semblance of order (and don't be afraid to ask if you need help – I promise I will still be around.). To everyone within the School who has put up with my bossing them about for the last five years – I promise it was done with your best interests at heart and that I tried to shield you from the worst of the detritus that was raining down on us. Finally, to my research group, who have often borne the brunt of my being busy in this role – I will be back and more available next year, so watch out.

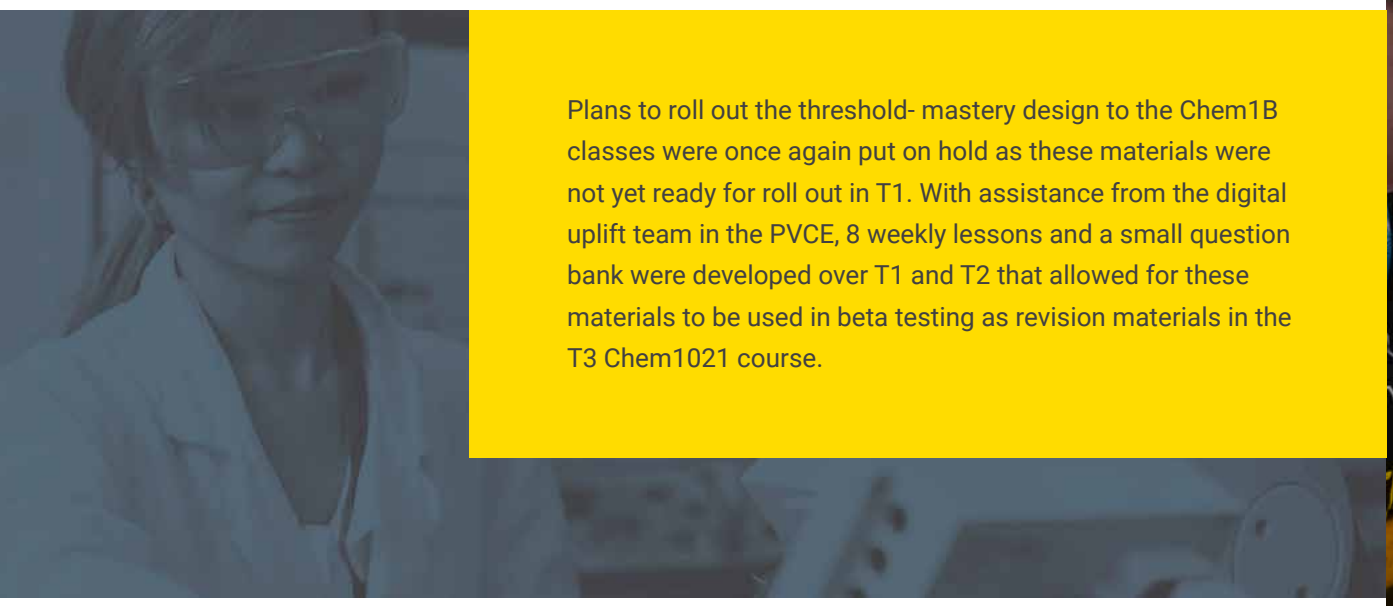
ASSOCIATE PROFESSOR JASON B. HARPER
Director of Teaching

FIRST YEAR CHEMSITRY

2020 was a tumultuous year for 1st year chemistry teaching at UNSW.

Entering the second year of the 3+ academic calendar having run our core first year courses in the term model 3 times, we had opportunity to reflect on the successes and challenges of not only the switch to the 9-week term, but also the implementation of the 'threshold-mastery' format in the Chem1A courses. As such, we started 2020 having spent considerable time reassessing the core threshold concepts and learning materials of the Chem1011,1031 and 1051 courses. The question banks for these materials were expanded considerably, with the addition of STACK style questions allowing for many thousands of variants in the bank. Feedback was revised and updated to ensure that all formative assessment in the first-year courses provided students with instantaneous digital feedback and opportunity to expand on this using online forums. Online lessons in Chem1A courses were also revised with suggestions for improvements raised by past students and implemented where possible.

I WOULD SINCERELY LIKE TO THANK MY COLLEAGUES WHO RAPIDLY UPSKILLED IN ORDER TO BE ABLE TO RISE TO THESE CHALLENGES:



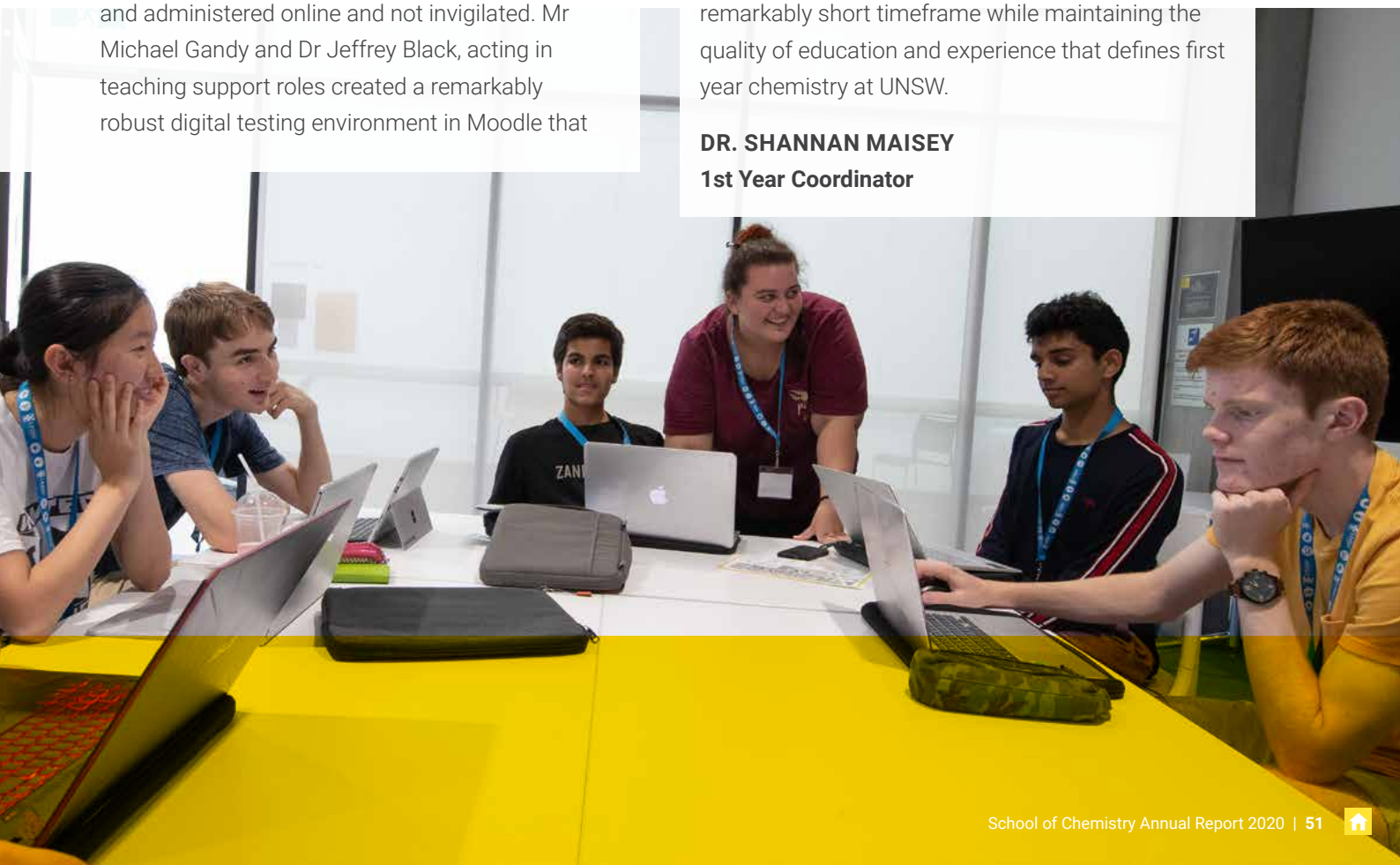
Plans to roll out the threshold- mastery design to the Chem1B classes were once again put on hold as these materials were not yet ready for roll out in T1. With assistance from the digital uplift team in the PVCE, 8 weekly lessons and a small question bank were developed over T1 and T2 that allowed for these materials to be used in beta testing as revision materials in the T3 Chem1021 course.

Unsurprisingly, there was significant disruption to all courses because of the COVID-19 pandemic and rapid shift to remote delivery mid-way through week 5 of T1. Dr Kim Lapere was remarkable in developing training and resources for teaching staff in the school which ensured all staff were trained and capable of delivering lectures, tutorials and laboratory classes through Blackboard Collaborate from the day after the announcement was made. The decision to grade all courses as Satisfactory/Unsatisfactory meant that our Chem1A courses were in an ideal position to quickly transition, with digital lessons and assessments already existing to allow for a pass level only method of grading. All first-year laboratory classes use a core and non-core assessment model that, thanks to the first-year Lab Director Dr Ron Haines, were quickly converted to a series of online quizzes.

From T2 onwards however we were faced with a double-barrelled challenge of having no sessional staff and all assessment being graded and administered online and not invigilated. Mr Michael Gandy and Dr Jeffrey Black, acting in teaching support roles created a remarkably robust digital testing environment in Moodle that allowed us to run the large scale first year tests and exams remotely while allowing students high levels of technical support. They also developed a digital chem-draw like plugin, overcoming the issue of how organic mechanisms could be assessed digitally. Dr Haines should be commended for developing online learning modules, synchronous lesson plans and digital assessment activities for every lab in our first-year courses. This ensured that weekly laboratory themed learning activities continued for all students throughout the year without disruption.

The predominant challenges faced were ensuring that a lively and engaging online community was built around an equitable and robust online assessment model. Student feedback indicated that effort to sustain the former was very well appreciated. I would sincerely like to thank my colleagues who rapidly upskilled in order to be able to rise to these challenges: taking on additional laboratory and tutorial classes, tackling issues of academic integrity and collaborating to extend our skills to develop new digital assessment and delivery formats in a remarkably short timeframe while maintaining the quality of education and experience that defines first year chemistry at UNSW.

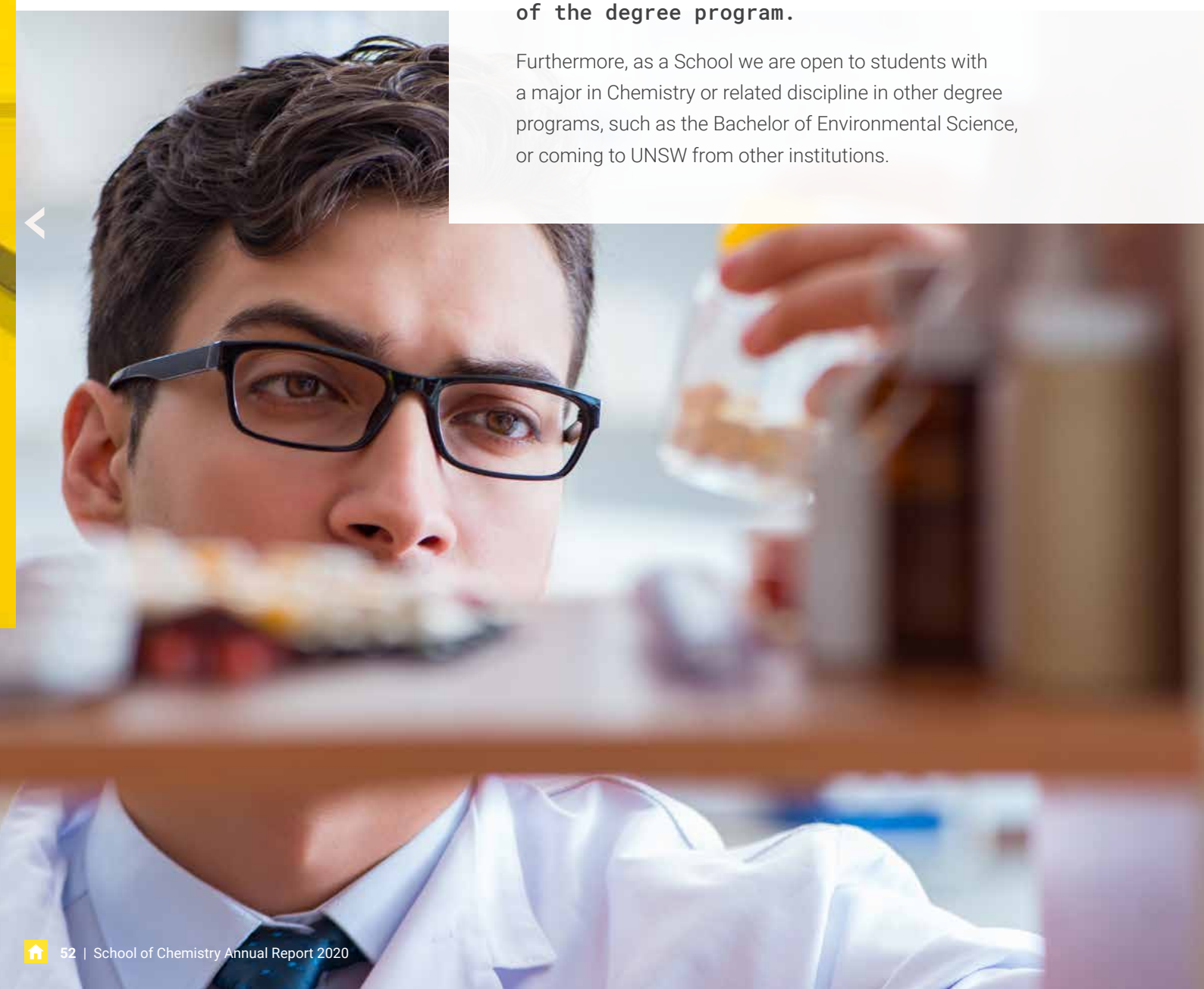
DR. SHANNAN MAISEY
1st Year Coordinator



HONOURS PROGRAM

The School of Chemistry runs the research-intensive Honours Program for students that have typically majored in Chemistry via a Bachelor of Science or Bachelor of Advanced Science degree (or dual degrees with these degrees), Bachelor of Medicinal Chemistry and Bachelor of Nanoscience. Each program is subtly different tailoring to the needs of the degree program.

Furthermore, as a School we are open to students with a major in Chemistry or related discipline in other degree programs, such as the Bachelor of Environmental Science, or coming to UNSW from other institutions.



In 'Chemistry' Honours an entire year is spent on a research project in collaboration with a member of the academic staff. In addition, students undertake a series of chemistry short modules delivered by experts in the field and by visiting researchers via the Howard endowment. In 'Medicinal Chemistry' Honours students can choose year-long research projects in either the School of Chemistry or with academic staff in the Pharmacology section of the School of Medical Sciences, and they undertake a specialised course in Term 1. In 'Nanoscience' Honours the research project comprises 80% of the year and can be undertaken in the Schools of Chemistry, Physics or Materials Science and Engineering.

In 2020, 25 students completed the Chemistry, 11 completed Medicinal Chemistry and 4 (all of whom performed research projects in the School of Chemistry) completed Nanoscience Honours programs. This includes the T2 and T3 2019 and T1 2020 Honours starters. Sherrie Liu (Chemistry, T3 2019), Lisa Hua (Chemistry, T1 2020), Jasmin Borsovszky (Chemistry, T1 2020) and Jack Bennett (Medicinal Chemistry, T1, 2020) received the University Medal for their outstanding performance across their respective degree programs. Lisa Hua was also awarded the Angyal Prize for the best performance in a Chemistry Honours, with Sam Somerville awarded the Nanoscience Prize for best performance in Nanoscience Honours and Jack Bennett shared the Cavill Prize for the best performance in a Medicinal Chemistry Honours. Congratulations to all our graduating students – well done!

2020 was a challenging year featuring the largest Honours cohort to date with the backdrop of COVID-19. The students and supervisors handled the ever-changing conditions with incredible tenacity, working in a safe and supportive manner wherever possible. The research went on and the projects were presented superbly. We used video conferencing for all seminars and oral defense assessments and this worked incredibly well. It is great that these students were able to undertake research in these trying circumstances.

The chemistry Honours coursework modules were all presented online and have been designed to be presented in a similar or hybrid manner for the foreseeable future. These modules are now designed to run yearly providing clear options for students.

Finally, a big thank you to all of my colleagues for engaging with the Honours program, from supervising students to assessing their presentations and thesis. To the students well done and enjoy the future – hopefully with lots of chemistry in there.

ASSOCIATE PROFESSOR NEERAJ SHARMA
Honours Coordinator

POSTGRADUATE RESEARCH REPORT

This year was quite challenging for our postgraduate research cohort who performed admirably during the ongoing pandemic. For example, there were 29 completions recorded including 26 PhDs and 3 MSc/MPhil over the course of 2020.

The School has maintained a strong track record of on-time completions, leading the Faculty in this regard. Chemistry has also done quite well in terms of on-time reviews with very few cases outstanding due to special circumstances.

We were very fortunate to welcome Sheree Munro into the Postgraduate Administrator role who has done a remarkable job helping to ensure our postgraduates are well supported. Our former Postgraduate Coordinator Ken McGuffin earned a well-deserved retirement from this role after many years of service to the School.

OVERALL, OUR HIGHER DEGREE RESEARCH ENROLMENTS WERE STRONG GIVEN THE PROLONGED BORDER CLOSURES.

We had a massive scholarship round at the end of 2019 and nearly all of our T1 2020 starters were able to come onshore and commence their studies before the height of the pandemic. For example, we had 44 postgraduate enrolments in 2020, which is comparable to what we normally have since 2014 when we had 43 enrolments. The mix of domestic and international students has been steady at approximately a 50:50 ratio. Thus, we are in about as strong a position as we can be going into our second year of the pandemic.

The students' progress was showcased in various research days. The first year students each gave a 12 minutes presentation as part of their confirmation while the second year students gave a one-minute talk in the same format as the Postgraduate Research Competition and prepared a poster suitable for a general science audience. The third year PhD students each gave a thirty-minute presentation.

Best First Year Oral Presentation winners:
LORRIE JACOB

Best One-Minute Presentation winners:
DIANA ZHANG

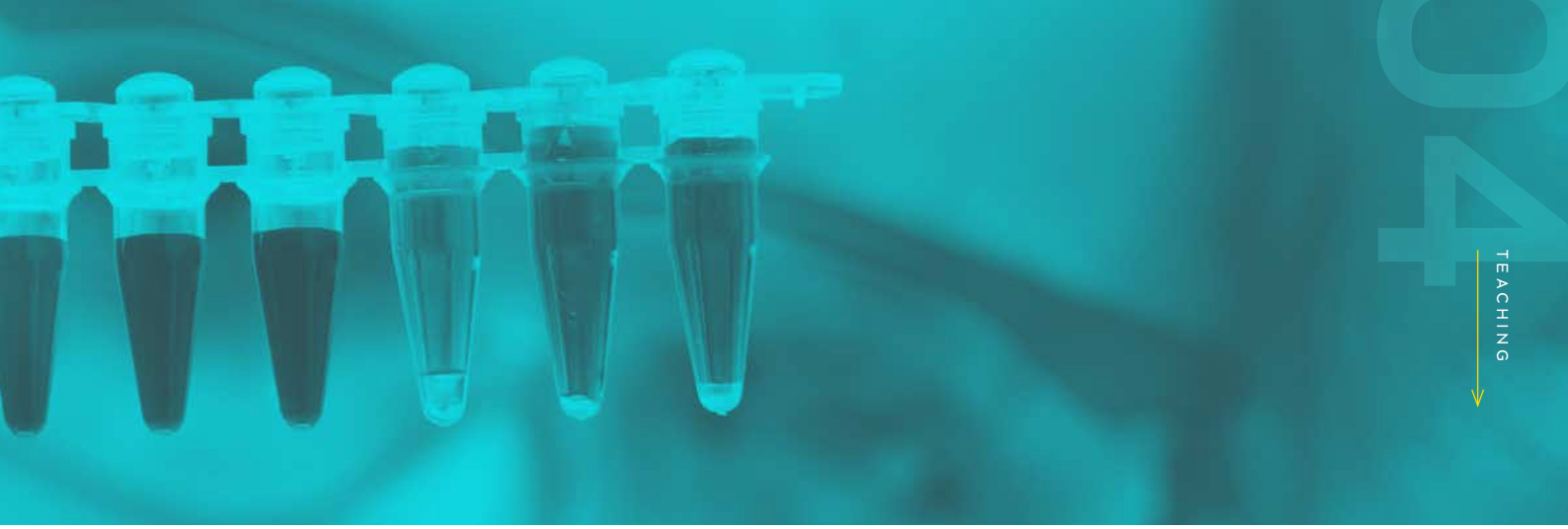
Best Third Year Presentation winners:
SUSANNAH BROWN

The School had a strong presence at the Faculty of Science Postgraduate Research Showcase with our students doing their best in a one-minute pitch showcasing their research. Congratulations to Blair Welsh in winning in a four-way tie for the best entrant prize overall and to Diana Zhang for winning the School of Chemistry prize.

GRADUATING STUDENTS:

The following PhD. students graduated in 2020:

Student	Research Area	Supervisor
Mushi He	Ligand exchange processes in transition metal alkane and alkene complexes	A/Prof. Graham Ball
Aaron Kennedy	Controlling molecular properties with light	A/Prof. Jon Beves
Ena Luis	Supramolecular chemistry of ruthenium photocatalysts	A/Prof. Jon Beves
Tom MacDonald	Controlling molecular motion	A/Prof. Jon Beves
Giang Nguyen	Nanoscale ion emitters in native mass spectrometry for measuring ligand-protein and ligand-DNA binding affinities	A/Prof. Alex Donald
Alyssa Gilbert	Understanding the effects of ionic liquids as solvents on reactions involving carbocation intermediates	A/Prof. Jason Harper
Fida'A Alshawawreh	Use of personal glucose meter for detecting procalcitonin through a network of glucose encapsulated within liposomes	Scientia Prof. Justin Gooding
Sanjun Fan	Understanding and utilising electrochemical control over single molecule fluorescence for biosensor application	Scientia Prof. Justin Gooding
Mohaddeseh Kahram	Responsive polymer brushes as tools for modulating biointerfaces	Scientia Prof. Justin Gooding
Duyen Nguyen	Bio-tuneable RAFT polymeric hydrogels for 3D printable cell cultures	Scientia Prof. Justin Gooding
Kelly Zong	Exploring the role of surface chemistry on the transport of gold nanorods in cells: An auto- and pair correlation microscopy study	Scientia Prof. Justin Gooding
Alyssa Gilbert	Understanding the effects of ionic liquids as solvents on reactions involving carbocation intermediates	AProf. Jason Harper & Dr. Ron Haines
Kieran Rowell	Structure–Activity Relationships for Carbonyl Photolysis	Prof. Scott Kable
Vina Aldilla	Glyoxylamide- and anthranilamide-based self-assembled hydrogels for antibacterial therapy	Prof. Naresh Kumar
Basmah Almohaywi	Disrupting chemical communication in bacteria: Design and synthesis of new quorum sensing inhibitors	Prof. Naresh Kumar



Student	Research Area	Supervisor
Daniel Wenholz	Development of bacterial RNA polymerase holoenzyme inhibitors and total synthesis of an archaea signalling molecule	Prof. Naresh Kumar
Stephen Butler	Degradation Ahead: Development of Small Molecule Scaffolds for the Degradation of Biologically-Relevant Proteins	Prof. Jonathan Morris
Stephen Wearmouth	Probing the Periphery of Variolin B: Developing Synthetic Routes to Novel Kinase Inhibitors	Prof. Jonathan Morris
Mohanad Hussein	Development of new synthetic strategies in organic chemistry	Dr. Vinh Nguyen
Giulia Oss	Development of Novel Synthetic Applications of Tropylium Ions and New Catalytic Methods for Carbonyl-Olefin Metathesis Reactions	Dr. Vinh Nguyen
Junnan Liu	Electrochemical modification of negative thermal expansion materials	A/Prof. Neeraj Sharma
Jeaniffer Eliezar Yap	Visible Light Responsive Drug Delivery Nanoparticle Using Donor Acceptor Stenhouse Adducts DASA	Scientia Prof. Martina Stenzel
Zhichen (Jeffrey) Yan	Taking graphene materials toward applications - Chemistry at the nano-surface	A/Prof. John Stride
Eric Du	Multicomponent self-assembled peptide hydrogels for biomedical cell culture applications	Prof. Pall Thordarson
Xin Bo	Chromium-Doped Transition Metal Oxyhydroxide Catalysts for Electrochemical Water Oxidation	Prof. Chuan Zhao
Wanfeng Yang	Nanostructuring Metal-based Catalysts for Enhanced Electroreduction of Carbon Dioxide	Prof. Chuan Zhao

ASSOCIATE PROFESSOR ALEX DONALD

Postgraduate Research Coordinator:

Student Review and Completion

OUTREACH AND MARKETING REPORT

Chemistry outreach in 2020 started strong with two major events in January.

First, we welcomed 14 students for a week-long Chemistry research experience as part of the popular and well-received Faculty SciX program. Within the SciX chemistry projects, PhD student Sylvia Ganda led a project for 8 students on the "Potential origins of cell-based life" with Dr Anna Wang as academic lead, while PhD student Anna-Maree Syme led a project for 6 students on "Using molecular spectroscopy to find indicators of life on other planets" with Dr Laura McKemmish as academic lead. 89% of students from across SciX were extremely glad they attended, with the remaining 11% very glad.

Second, we hosted a Professional Development Day for 44 high school chemistry teachers. The day combined lectures with hands-on activities within our Analytical Chemistry laboratory, all aimed to give teachers the knowledge and confidence to teach new Year 12 syllabus material.

Shortly afterwards, the COVID19 pandemic hit causing the cancellation of all other in-person 2020 events.

OPEN DAY AND INFO DAY WAS DELIVERED ONLINE, WITH A VIDEO PRODUCED TO ENABLE STUDENTS TO SEE THE CHEMISTRY LEARNING VENUES AND HEAR FROM STUDENTS.

Chemistry students presented in the online University of the Third Age seminar series to retirees.

DR LAURA MCKEMMISH
Outreach & Marketing Coordinator

UNSW CHEMICAL SOCIETY (CHEMSOC)

The UNSW Chemical Society (formerly the Sydney Technical College Chemical Society, founded 1913) assists in the organisation of the School Seminar Series, a weekly program of talks from distinguished academics around Australia and the world.

In addition, the society organises a number of prestigious, endowed lectureships each year.

Unfortunately, due to COVID both the Cavill and Howard lectures had to be postponed. We look forward to welcoming academics back on campus in 2022 to deliver the following lectures:

- Mellor Lecture
- Howard Lecture
- Howard Nobel Lecture
- Kornis Lecture

The School will also name a Howard Fellow for terms 2 & 3 in 2022.

05 STUDENTS

SOCS PRESIDENT REPORT

The Students of Chemistry Society has had a successful 18 months since our last AGM in October 2019 when the current committee were elected. We have continued to contribute to the School culture through social events and acted as a valuable communication point between the School and its students.

Firstly, I would like to thank the SOCS executive for fulfilling their roles for longer than expected and doing so to such a high standard. They are as follows:

PRESIDENT
David Neale

TREASURER
Surabhi Naik

SECRETARY
Chelsea Forest

SOCIAL CO-ORDINATOR
Tess Mutton

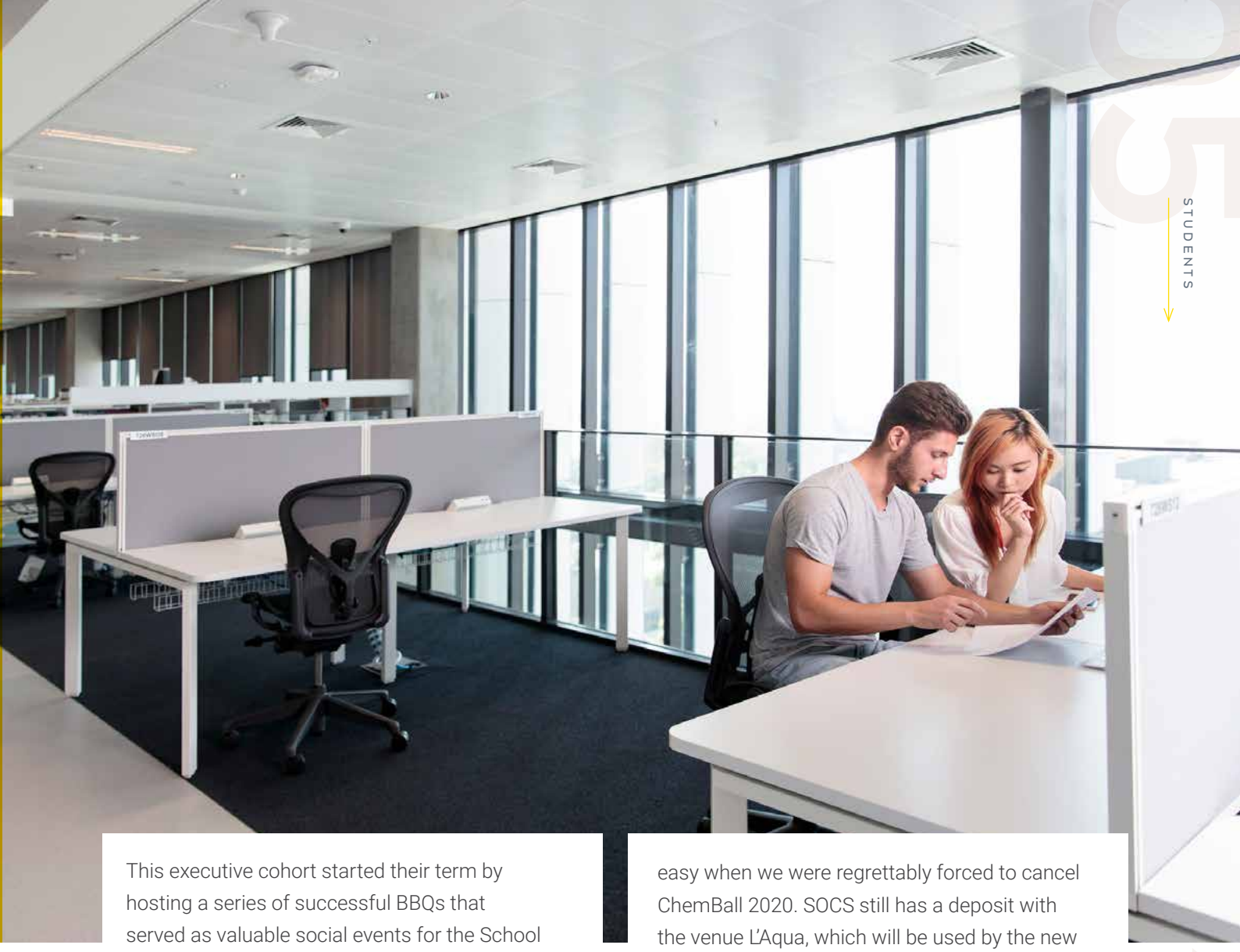
MERCHANDISING OFFICER
Arvind Kamath, succeeded by Jack Bennett

ARC DELEGATE
Kenny Liu

MEDICINAL CHEMISTRY REP.
Yiling Liu

NANOSCIENCE REP.
Liam Barrera

SCIENCE/ ADVANCED SCIENCE REP.
Stephen Bortolussi



This executive cohort started their term by hosting a series of successful BBQs that served as valuable social events for the School community, and provided a small revenue stream for SOCS. These would have been considerably more difficult to organise were it not thanks to the previous executive who purchased a new BBQ with a bespoke stand. The events were complimented with a series of seminar receptions hosted on behalf of ChemSoc, including one for Nobel Laureate Richard Schrock, which was well received. The relationship between SOCS and ChemSoc has thrived over the past 2 years and I hope it continues to do so into the future.

It was not long after this that the coronavirus pandemic put an end to all social events both on and off campus. This prevented any more BBQs and most significantly prevented SOCS from hosting our annual ChemBall event in 2020. I would like to thank Tess and Surabhi for their initial efforts in organising ChemBall. In particular I want to highlight the decision to distribute tickets through Eventbrite which made refunds very easy when we were regrettably forced to cancel ChemBall 2020. SOCS still has a deposit with the venue L'Aqua, which will be used by the new executive to initiate plans for ChemBall 2021.

I'd also like to extend a special thank you to Professor Scott Kable and the School of Chemistry for their continued support of SOCS both through consultation and financial contributions.

Once again, I'd like to sincerely thank this year's executive for all their hard work and going beyond their initial commitment in order to make SOCS great.

DAVID NEALE
SOCS President

UNDERGRADUATE STUDENT PRIZES

HONOURS PRIZE WINNERS

THE ANGYAL PRIZE

Best performance in Honours Chemistry

LISA HUA

THE CAVILL PRIZE

Best performance in Honours Medicinal Chemistry

JACK BENNET

THE NANOSCIENCE HONOURS PRIZE

Best performance in Honours Nanoscience

SAM SOMMERVILLE

THIRD YEAR PRIZE WINNERS

THE SCHOOL OF CHEMISTRY PRIZE

and

School Medal for best performance in Level 3 Chemistry

LUCIA CHEN

MEDICINAL CHEMISTRY PRIZE

Best performance in Level 3 Medicinal Chemistry

ANIKA MOLLER

THE RACI ANALYTICAL CHEMISTRY GROUP PRIZE

Best performance in Level 3 Analytical Chemistry

JASNOOR MANN

THE UNIVERSITY OF NEW SOUTH WALES CHEMICAL SOCIETY DWYER PRIZE

Best performance in Level 3 Inorganic Chemistry

LUCIA CHEN

THE BOSWORTH PRIZE

and

Medal for best performance in Level 3 Physical Chemistry

ARMANDO PERRI

THE UNIVERSITY OF NEW SOUTH WALES PARK POPE PRIZE

Meritorious performance in Level 3 Chemistry courses

ANIKA MOLLER

SECOND YEAR PRIZE WINNERS

THE SCHOOL OF CHEMISTRY PRIZE

and

School Medal for best performance in Level 2 Chemistry

RAYMOND LI

HOWARD PRIZE LEVEL 2 INORGANIC CHEMISTRY

RAYMOND LI

HOWARD PRIZE LEVEL 2 ORGANIC CHEMISTRY

ZHIYUAN ZHANG

HOWARD PRIZE LEVEL 2 PHYSICAL CHEMISTRY

ZHIYUAN ZHANG

THE UNIVERSITY OF NEW SOUTH WALES CHEMICAL SOCIETY GEORGE WRIGHT PRIZE

Meritorious performance in Level 2 Chemistry Courses

ZHIYUAN ZHANG

YEAR 10 PRIZE WINNER

THE SCHOOL OF CHEMISTRY PRIZE

For Excellence and Enthusiasm in Chemistry for Year 10 students – Sydney Girls High School

JESLYN YU

POSTGRADUATE PRIZE WINNER AND SCHOLARSHIPS

DON CRAIG MEMORIAL PRIZE

For academic excellence in a research project in the area of Crystallography

HAOCHENG GUO

PADDON- ROW SCHOLARSHIP

For the highest ranked commencing local PhD student

LISA HUA

BLACK SCHOLARSHIP

For the highest ranked commencing international PhD student

XIAOJING HUANG

TEACHING FELLOWS

MERRYN BAKER

SUSANNAH BROWN

GRACE CONSTABLE

MICHAEL FENECH

SAM MILES

SURABHI NAIK

DOMENIC PACE

PATRICK RYAN

JENNY STANSBY

KRISTINE TOLENTINO

BLAIR WELSH

LAURA WIMBERGER

06 SCHOOL

PUBLICATIONS

Below are a sample of publications by academic staff from the School of Chemistry in 2020. For the full list of publications please see Appendix A.

Associate Professor Graham Edwin Ball

Das, B; Jia, C.; Ching, K.; Bhadbhade, M.; Chen, X.; Ball, G. E.; Colbran, S. B.; Zhao, C. "Ruthenium Complexes in Homogeneous and Heterogeneous Catalysis for Electroreduction of CO_2", *ChemCatChem*, 2020, *12*, 1292. doi:10.1002/cctc.201902020

Serobian, A.; Pracey, C. P.; Thomas, D. S.; Denny, W. A.; Ball, G. E.; Wakelin, L. P. G. "Structures and dynamics of DNA complexes of the des-methyl analogue of the cytotoxin MLN944: Insights into activity when a methyl isn't futile" *J. Mol. Recognit.* 2020, *33*, e2843. doi: 10.1002/jmr.2843

Gilbert-Wilson, R.; Das, B.; Mizdrak, D.; Field, L.D.; Ball, G.E. "Observation and Analysis of Large Dynamic Frequency Shifts in the ^{1}H NMR Signals of H–D in Deuterium-Substituted Dihydrogen Complexes" *Inorg. Chem.* 2020, *59*, 15570 doi:10.1021/acs.inorgchem.0c02082.

Associate Professor Jonathon Beves

A. D. W. Kennedy, I. Sandler, J. Andréasson, J. Ho, J. E. Beves, Visible light photoswitching by azobenzazoles, *Chem.- Eur. J.* 2020, *26*, 1103–1110.

N. Mallo, A. Tron, J. Andréasson, J. B. Harper, L. S. D. Jacob, N. D. McClenaghan, G. Jonusauskas, J. E. Beves*, Hydrogen-Bonding Donor-Acceptor Stenhouse Adducts, *ChemPhotoChem*, 2020, *4*, 407-412.

M. S. Coles, G. Quach, J. E. Beves, E. G. Moore*, A Photophysical Study of Sensitization-Initiated Electron Transfer: Insights into the Mechanism of Photoredox Activity, *Angew. Chem., Int. Ed.*, 2020, *59*, 9522-9526.

E. T. Luis,*A. I. Day, B. Konig, J. E. Beves*, Activity and Host-Guest Behavior of Ruthenium Polypyridyl Catalysts Encapsulated in Cucurbit[10]uril, *Inorg. Chem.* 2020, *59*, 9135–9142.

I. Sandler, F. A. Larik, N. Mallo, J. E. Beves, J. Ho, Binding Affinity: Acidity versus Conformational Effects, *J. Org. Chem.* 2020, *85*, 8074–8084.

Emeritus Professor Roger Bishop

Gao J, Bhadbhade MM, Bishop R, Multimolecular weak-force tectons and their alternative clathrate forms, Crystal Growth & Design, 20, 3701-3712 (2020)

Emeritus Professor David St Clair Black

Qu, J., Wenholz, D. S., Kumar, N. and Black, D. StC., Synthesis of 3-indolylimines from 3-acetamido-2-phenylindole, *Tetrahedron*, 76, 131224 (2020).

Sabir, S., Subramoni, S., Das, T., Black, D. StC. Rice, S., A. and Kumar, N., Design, synthesis and biological evaluation of novel anthraniloyl-AMP mimics as PQS biosynthesis inhibitors against *Pseudmonas aeruginosa* resistance, *Molecules*, 25, 3103-3119 (2020).

Alamgir, M., Condie, G. C., Martinovic, V., Wood, J., Sholihin, H., Bowyer, P. K., Kumar, N. and Black, D. StC., Synthesis of dimethoxy activated benzimidazoles and bisbenzimidazoles, *Heterocycles*, 100, 1189-1217 (2020).

Qu, J., Bhadbhade, M., Dobrowolski, J. C., Kumar, N. and Black, D. StC., Unusual rearrangements in activated indoles: synthesis of indoloquinolines, dibenzonaphthyridines and indolobenzodiazepines, *Tetrahedron*, 76, 131375 (2020).

Alamgir, M., Condie, G. C., Martinovic, V., Wood, J., Bhadbhade, M., Kumar, N. and Black, D. StC., Reactivity of 4,6-dimethoxy activated benzimidazoles, *Heterocycles*, 100, 1371-1404 (2020).

Dr Joseph Brophy

Lum, B.J., Brettell, T.A, Brophy, J.J., Hibbert, D.B. Identification of a new class of thermolabile psychoactive compounds, 4-substituted 2-(4-X-2,5-dimethoxyphenyl)- N-[(2-hydroxyphenyl)methyl] ethanamine (25X-NBOH, X= Cl, Br, or I) by gas chromatography-mass spectrometry using chemical derivatization by heptafluorobutyric anhydride (HFBA). *Forensic Chemistry* 20 100266 (2020). http://doi.org/10.1016/j.forc.2020.100266

D. Bush , J. Brophy , W. Bolatolu , S. Dutt , S. Hamani , J. Doran & L. Thomson (2020) Oil yield and composition of young *Santalum yasi* in Fiji and Tonga, Australian Forestry, 83:4, 238-244. https://doi.org/10.1080/00049158.2020.1834278

Dr Robert Chapman

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Professor Timothy Schmidt

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Associate Professor Neeraj Sharma

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Scientia Professor Martina Heide Stenzel

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Associate Professor John Arron Stride

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Professor Pall Thordarson

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Professor Richard Tilley

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Dr Anna Wang

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Professor Chuan Zhao

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GRANTS AND RESEARCH FELLOWSHIPS

AUSTRALIAN RESESARCH COUNCIL

Discovery Projects

Investigator(s)	$	Project
A/Prof J.B. Harper, Dr W.S. Price	140,000	Designer ionic liquids to control reaction outcome: Ionic liquids for solvent-controlled reactivity
A/Prof S. Neville, et al.	70,000	Emergent properties in spin crossover materials
Scientia Prof. M.H. Stenzel, Dr Garvey	130,000	Bioactive Polymer Platelets
Prof. P. Thordarson, Prof. R. Astumian	110,000	Performing work through actively-driven self-assembled systems
Prof. S.H. Kable	200,000	The forgotten role of the ground state in atmospheric photochemistry
Prof. S.H. Kable, Prof. T.W. Schmidt	135,000	Resolving the interstellar carbon crisis with multilaser spectroscopy
A/Prof. N. Sharma	75,000	All-solid-state: new hybrid materials for next-generation lithium batteries
Prof R. Tilley	150,000	Multi-Coloured' Tracers for Magnetic Particle Imaging
Scientia Prof. M.H. Stenzel, Dr Garvey	135,000	Virus-inspired nanoparticles based on polyion complex micelles
A/Prof J. Beves	120,000	Metal complexes for sustainable light-driven synthesis
A/Prof W.A. Donald		
Dr T.V. Nguyen	145,000	Organic Linchpin Reagents to Construct Structural Diversity and Complexity

Laureate Fellowship

Investigator(s)	$	Project
Scientia Prof J.J. Gooding	1,300,932	The first generation of single entity measurement tools for analysis

Future Fellowship

Investigator(s)	$	Project
Prof C. Zhao	263,000	Nanoconfined Ionic Liquids for Electrochemical Reduction of Carbon Dioxide
A/Prof J. Beves	187,376	Controlling chemistry with light powered molecular machines
A/Prof S. Neville	230,000	Molecular Switching Nanomaterials for Modern Technolgy
Dr V. Nguyen	190,000	Novel Organic Architectures and Functional Materials from Tropylium Ions

Centre of Excellence

Investigator(s)	$	Project
Scientia Prof J.J. Gooding, Prof P. Thordarson, et al	3,750,000	ARC Centre of Excellence in Convergent Bio-Nano Science and Technology
Prof T.W. Schmidt, A/Prof D. McCamey et. al.	627,584	ARC Centre of Excellence in Exciton Science ACEX

Industrial Training Centre

Investigator(s)	$	Project
Scientia Prof M.H. Stenzel, Prof P. Thordarson, Dr V. Nguyen, A/Prof J. Beves, et al	252,000	Training Centre for the Chemical Industries

Linkage Program

Investigator(s)	$	Project
Scientia Prof JJ. Gooding,	131,000	Bioinks for the 3D printing of cells made from off-the-shelf components
Prof N. Kumar	419,930	Microbiologically Induced Stress Corrosion Cracking in Underground Mines

LIEF Program

Investigator(s)	$	Project
Scientia Prof J.J. Gooding	389,000	Rapid Molecular (Bio)material Imaging by Infrared and Raman Microscopies
Scientia Prof J.J. Gooding	1,200,000	In situ Environmental Electron Microscope Facility

Special Research Initiatives

Investigator(s)	$	Project
Prof N. Kumar	340,764	Development of electrochemically activated sorbents for PFAS defluorination

DECRA: Discovery Early Career Researcher Award

Investigator(s)	$	Project
Dr C. Medcraft	117,900	
Dr Y. Zhong	122,751	High Performing Multifunctional Silicon Nanomaterials for Bioapplications
Dr N. Rijs	100,000	Deconstructing molecular self-assembly by advanced mass spectrometry
Dr K.M. Mohibul Kabir	132,000	High-performance, portable ion-mobility surface-acoustic wave spectrometry
Dr J. Ho	35,000	Anion transporters as novel therapeutic agents
Dr C. Hansen	139,912	The true impact of fluorinated compounds in the atmosphere

NATIONAL HEALTH & MEDICAL RESEARCH COUNCIL

Investigator(s)	$	Project
Prof J.C. Morris	105,574	Targeting nicotinamide adenine dinucleotide biosynthesis to improve metabolism
Scientia Prof J.J. Gooding, Prof. M. Kavallaris, Prof B. Davis et al	1,417,704	Precision nanomedicine-based diagnostics and therapeutics for refractory malignancies
A/Prof K. Kilian	1,185,410	Mechanosensors in Cancer
Scientia Prof J.J. Gooding	260,000	Building better ex vivo 3D cancer models with 3D printing
Prof N. Kumar	273,139	Tackling Hospital Acquired Infections with Peptide Mimics

UNIVERSITY OF NEW SOUTH WALES GRANTS

Research Infrastructure Scheme

Investigator(s)	$	Project
A/Prof J. Beves, Dr R. Chapman, A/Prof J.B. Harper, Dr D. Mawad, A/Prof S. Neville, Dr V. Nguyen, Dr D.M. Peeks, Prof T.W. Schmidt, Scientia Prof M.H. Stenzel, Prof P. Thordarson	130,000	Broadband spectroscopy: from molecules to materials
Dr L. McKemmish	10,000	Effective Modelling of Core Electrons with Mixed Ramp-Gaussian Basis Sets: Preliminary Investigations

Faculty Research Grant

Investigator(s)	$	Project
Dr J. Ho	15,000	Development of efficient QM/MM models
Dr M.D. Peeks	10,000	Antiaromaticity in molecular wires

Goldstar

Investigator(s)	$	Project
Prof C. Zhao	25,000	Advanced electrocatalysts for ammonia synthesis with validated analysis
A/Prof G.E. Ball	25,000	New solution NMR tools for locating hydrogen atoms in inorganic systems

COVID – 19 Rapid Response Research Initiative

Investigator(s)	$	Project
Scientia Prof J.J. Gooding	295,683	Point of Care, rapid testing for SARS CoV2 - Single molecule plasmonic sensor for amplification-free detection

Education Focused Careers

Investigator(s)	$	Project
Dr S. Wills	2,500	Professional Development

UNSW – Tsinghua Seed Grant

Investigator(s)	$	Project
Prof C. Zhao	15,000	Development of bifunctional oxygen electrocatalysts for water splitting and metal-air batteries

Scientia Fellow Award

Investigator(s)	$	Project
Dr M.D. Peeks	30,000	
Dr N. Rijs	30,000	Deconstructing molecular self-assembly by advanced mass spectrometry

AUSTRALIAN GRANTS

Investigator(s)	$	Project	Source
Scientia Prof J.J. Gooding, Prof B. Eggleton (USyd)	1,000,000	New South Wales Smart Sensing Network (NSSN)	New South Wales State Government
Prof N. Kumar	27,510	New treatments for Myopia	Brien Holden Vision Institue
Prof N. Kumar	26,745	Structure activity relationship study of isoflavone analogues	Noxopharm Ltd
Dr A. Fahrenbach	16,000	Abiotic Ribonucleotide Synthesis from Energy-Driven Chemical Evolution, Access to Gamma Radiolysis Facility	ANSTO
Scientia Prof J.J. Gooding	420,000	Smart Sensor & Deep Learning Behavioural Engine for Personalised Health Monitoring	Cooperative Research Centre Project
Prof C. Zhao	89,436	Highly efficient and low cost photovoltaic electrolysis (PVE) system to generate hydrogen by harvesting the full spectrum of sunlight	Australian Renewable Energy Agency
Prof C. Zhao	276,828	Low-Cost Perovskite/Silicon Semiconductors Integrated with Earth Abundant Catalysts for Efficient Solar Hydrogen Generation	Australian Renewable Energy Agency
Prof C. Zhao	293,755	3D Oxygen Electrode	Kohodo Hydrogen Energy Ltd.
Dr J. Ho	176,000	National Computational Infrastructure	National Computational Merit Allocation Scheme
Prof T.W. Schmidt	100,326	Imaging Multiple Plates for quantitative polymerase chain reaction (qPCR)	Innovations Connections
A/Prof L. Hunter	1,000,000	Zero-Spin Silicon via Laser Isotope Separation for Quantum Computer Chips	Australian Government, Cooperative Research Centres Project (CRCP)
Prof N. Kumar	40,000	Canola Oil based surfactants Albright and Wilson Australia Ltd	
A/Prof K. Kilian	1,584,780	Microtumor arrays for the development of combination therapies for malignant melanoma	National Cancer Institute
A/Prof K. Kilian	100,000	Priming therapeutic efficacy in mesenchymal stromal cells	Innovation Connections Grant, Australian Government; Cynata Therapeutics
A/Prof S. Neville	200,000	Novel processing of pyrite ore to produce battery grade cobalt and supfur	Australian Government Cooperative Research Centres Projects.
Prof W.J. Goscinski, Prof P. Thordarson et al	100,000 (UNSW portion)	The Australian Characterisation Commons at Scale	Australian Research Data Commons (ARDC) Platform grant
Prof G. Sizer, Prof R. Nordon, Prof P. Thordarson et al	100,000 (UNSW portion)	Making cell & gene therapy affordable with a Microbioreactor	Australian Government Cooperative Research Centres Projects
Prof J.A. McCarrol, Prof P. Thordarson et al	24,000	Application of gene-silencing nanodrugs to inhibit medulloblastoma growth	Cancer Australia - Priority-driven Collaborative Cancer Research Scheme
Prof K. Rye, Prof S. Thomas, Prof P. Thordarson,	62,500	Preventing and Reversing Accelerated Atherosclerosis in Patients with Diabetes	NSW Health / Cardiovascular Research Capacity Program - Senior Researcher Grants

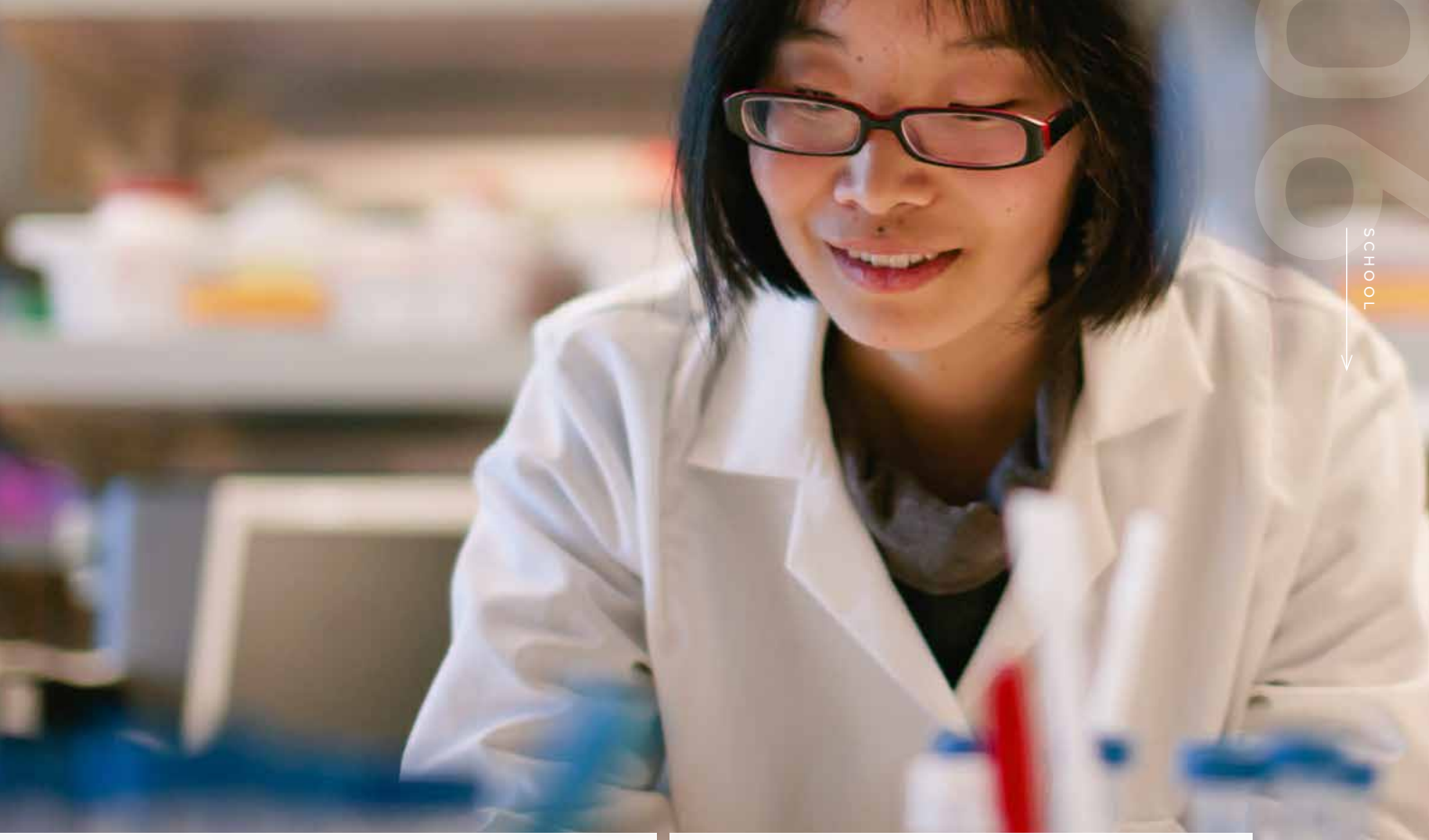
INTERNATIONAL GRANTS

Investigator (s)	$	Project	Source
Dr C. Medcraft	9,000	Researcher Mobility grant	Royal Society of Chemistry (UK)
Dr C. Medcraft	11,500	Research Stays for University Academics and Scientists	Deutscher Akademischer Austauschdienst
Dr A. Wang	500,000	Stable propagation of a minimal synthetic cell	Human Frontier of Science Program
Dr T.V. Nguyen	21,000	Interactive online demonstrations for undergraduate organic chemistry laboratory experiments	Universitas 21 GEEF Education grant

INDUSTRY AND COMMUNITY INTERACTION

Listed below are the companies, government authorities, societies and educational institutions that academic staff interacted with in 2020.

- Albright & Wilson (Australia) Pty Ltd
- Anna University, Chennai
- ANSTO - Australia's Nuclear Science and Technology Organisation
- ANSTO - Synchrotron
- Archer Limited
- Argonne National Laboratories
- Armagh Observatory
- AusDiagnostics (AusDX)
- Australian Academy of Science
- Australian Broadcasting Corporation (ABC)
- Australian Centre for Astrobiology
- Australian Research Council (ARC)
- Australian Museum – Eureka Prize
- Australian National University (ANU)
- Australian Science Media Centre
- Australian Synchrotron
- AWTA (Australian Wool Testing Authority
- Bentham Science Publishers
- Bluescope
- Brien Holden Vision Institute
- CAP-XX
- Charles Sturt University
- Chief Scientists Office
- Children's Cancer Institute
- CICenergigune, Spain
- Citta degli Studi Univ, Biella, Italy
- City University of Hong Kong
- CK Cell Technologies
- Cobalt Blue
- Crosbe Cement
- CSIRO
- CSIRO Australian National Telescope Facility
- CSIRO Manufacturing
- Curtin University
- Cynata Therap;eutics Ltd.
- Dalian Institute of ChemicalPhysics
- Data 61 (CSIRO)
- Delhi Institute of Textiles and Clothing
- Deutsches Elektronen-Synchrotron
- Donghua University, Shanghai
- Dupont
- Earth-Life Science Institute, Tokyo Institute of Technology



- Ec0-Aid Pty Ltd
- Ege University
- Elletra Sincrotrone Trieste
- Emenda
- Emory University
- Engineering Science and Technology University, Xi'an, China
- Envirostream Australia
- Eurofins Scientific
- European XFEL
- Faculty of Medicine, UNSW
- Ferranova Pty Ltd.
- Fiber Society, USA
- Flame Security International
- Florida State University
- Garvan Institute
- German Academic Exchange Service (DAAD)
- Harness Racing Victoria
- Harvard University
- Heriot Watt University, Edinburgh, UK
- Higher Education Research and Development Society of Australia (HERDSA)
- Hong Kong Polytechnic University
- Hong Kong Government - Research Assessment Exercise (RAE2020)
- Hunter Valley Signs (HiVis)
- Indian Institute of Technology, Kharagpur
- Institut des Sciences Moléculaires d'Orsay
- International Union of Pure and Applied Chemistry
- Inventia Life Sciences
- Kansas State University
- King Saud University, Saudi Arabia
- King's College London
- Kohodo Hydrogen Energy Pty Ltd.
- Kyoto Institute of Technology
- Kyoto University Dept of Polymer Chemistry
- Loop Hydrometallurgy
- Lowy Cancer Research Centre
- Macquarie University
- Mahidol University (Thailand)
- Manchester University, UK
- Massachusetts General Hospital
- Melbourne University

- Memjet
- Monash Institute of Pharmacy
- Monash University
- Mu'tah University, Jordan
- Nagasaki University (Japan)
- National Aeronautics and Space Administration (NASA)
- National Health and Medical Research Council
- National Measurements Institute
- National Association of Testing Authorities
- National Wine and Grape Research Industry Centre
- Newcastle University
- North Carolina State University
- Noxopharm Ltd
- NSW Education Department
- Nutromics Inc
- Plants (Journal)
- Physical Sciences Oncology Network, National Cancer Institute
- Public Broadcasting Service)USA)
- Qingdao University, China
- Royal Australian Chemical Institute, NSW (RACI)
- Royal Institute of Technology, Stockholm, Sweden
- Royal Melbourne Institute of Technology (RMIT)
- Royal Melbourne Institute of Technology (RMIT), Centre for Advanced Material and Industrial Chemistry
- Royal Society of Chemistry
- Royal Society of New South Wales
- RR MedSciences Pty Ltd.
- Rux Energy Pty Ltd.
- Saint Mary's College, Hobart
- Sandia National Laboratories
- Schlumberger Industries, Guebwiller, Alsace, France
- School of Chemical Engineering, UNSW
- SDx Tethered Membrances
- Shanghai University, China
- Shanghai Zhizhen Medical Science and Technology Co., Ltd, China
- Shinshu University, Ueda, Japan
- Shoalhaven Starches Pty Ltd.
- Silex
- Silicon Quantum Computing
- Springer Dordrecht, Netherlands
- Strasbourg University, University of Haute Alsace, Mulhouse, France
- Sydney Water
- Synchrotron Soleil

- Technical University, Liberec, Czech Republic
- Technical University, Tunisia
- TED-Ex
- Textile Machinery Society of Japan
- THC Pharma Pty Ltd
- The Textile Institute, Manchester
- Tokyo Institute of Technology
- Tsinghua University
- Unisearch
- Universitá degli Studi di Bologna (Italy)
- University of Alberta (Canada)
- University of Babylon, Iraq
- University of Bristol
- University of California (San Diego)
- University of California, Davis, USA
- University of Cambridge
- UNSW Canberra
- University of Florence
- University of Iceland
- University of Illinois at Urbana Champaign
- University of Kentucky
- University of Leeds
- University of Louisiana at Lafayette
- University of Maine, USA
- University of Melbourne
- University of Newcastle, Molecular Microbiology group
- University of Nottingham, (UK)
- University of Oklahoma (USA)
- University of Oregon
- University of Queensland
- University of South Australia
- University of Sydney
- University of Sydney, Bacterial Pathogens group
- University of Technology Sydney
- University of Texas at Austin, USA
- University of Trento
- University of Western Australia
- University of Western Sydney
- University of Wollongong
- Victor Chang Cardiac research Institute
- Victoria University of Wellington
- Wainwright Analytical Centre UNSW
- Western Sydney University
- Whitely Corporation
- Zodiac Industries, Tunisia

07 EXTERNAL ADVISORY COMMITTEE

The Committee comprises of representatives from our key stakeholder organisations – industry, government, schools and government research institutes. The terms of reference for the committee are as follows:

1. To appraise the School programs in light of the needs of the School stakeholders.
2. To provide advice in regard to the direction that the School should take to best enhance future interactions with stakeholders.
3. To provide advice about the changing needs of industry, research and government organisations to best prepare the School's graduates for future opportunities.
4. To receive and discuss the School of Chemistry's Annual Report.
5. To aid the development of the School in any other way possible.

The EAC was held as a virtual meeting in 2020 due to Covid.

Professor Scott Kable gave the committee a background report of events throughout the year including the change in teaching (face-to-face to totally on-line), budget restraints, the slowdown in growth of the School and the changing student demographic.

When asked what the School should focus on post-Covid the external representatives suggested the following:

- Recognise the importance of mentoring new / young staff.
- Keep track of graduate employment outcomes and post on the School website so potential students can see where a degree in chemistry could lead.
- Look to attract students from markets other than China.
- Expand professional networks as a priority.

The committee went on to discuss several issues including: how the new high school chemistry syllabus is adversely affecting student numbers; expanding industry partners for the Master of Industrial Research and introducing short courses.

The Chair concluded the meeting by thanking the committee members for their time and insightful contributions.

EXTERNAL REPRESENTATIVES:

Dr Christopher Armstrong (Chair)
Director, Office of the NSW Chief Scientist and Engineer

Emeritus Prof. Bruce Sutton
Honorary Professor (Agronomy), The University of Sydney

Professor Michelle Coote
Australian National University

Dr Sharon Chapman
Head of Science,
Randwick Girls High School

Ms Natalie Chapman
Managing Director, genmaker

Mr Luke Hanson
Head of Science, SCEGGS

Mr Dave Sammut
Principal, DCS Technical

EX OFFICIO MEMBERS

Professor Scott Henderson Kable
Head, School of Chemistry

Professor Tim Schmidt
Director of Research

Professor Pall Thordarson
Deputy Head of School

A/Prof Jason Harper
Director of Teaching

Scientia Professor Justin Gooding
Director of Strategy

A/Prof John Stride
Incoming Director of 1st Year

Scientia Professor Martina Stenzel
ITTC Director

A/Prof Alison Beavis
Faculty of Science representative

Dr. Toby Jackson
School Manager

08 RETIREMENTS AND FAREWELLS

Three of the School's longest serving and most popular members of staff retired in 2020, leaving shoes that will be difficult to fill.

We wish them all a very long and happy retirement, but hope to catch up with them into the future.

DR GAVIN EDWARDS

After graduating from Monash University Gavin joined the School as a lecturer in 1990. He was appointed Senior Lecturer in 1999, served as Director of Teaching 2005 – 2016, Deputy Director of Teaching 2017 – 2020 and Associate Dean (Undergraduate Programs) 2011 – 2020.

Gavin was also a member of numerous School committees over the years including the Teaching Committee, the School Executive Committee and the School Visiting Committee (now the External Advisory Committee). He was also a wise and enthusiastic mentor to junior academic staff.

Apart from his dedication to ensuring students received the best chemistry education possible at the School, Gavin will be missed for his humour, wit, and ability to put even the most difficult situations into perspective.

IAN ALDRED

After serving 22 years in the Royal Australian Navy, Ian commenced employment with the School in 1994 as a store man when the School stores were located in the Heffron building. He supervised the two store moves, first to F10 and then to the SEB in 2018.

Ian served on the School Safety Committee for 22 years which enabled him to establish protocols and procedures essential for the safe running of the store.

HIS LONG SERVICE WITH THE SCHOOL ALSO ENABLED HIM TO BUILD FIRM RELATIONSHIPS WITH INTERNAL AND EXTERNAL PROVIDERS, WHICH FACILITATED QUICK RESOLUTIONS TO MOST PROBLEMS.

Although nicknamed "Captain Grumpy" by some (mainly students), Ian built lasting friendships with School, Faculty and UNSW staff.

KEN McGUFFIN

Ken first joined the School in 1976 as a lab technician. After 21 years he left UNSW to complete a degree before returning to the School as Post Graduate Administrator in 2004.

Ken's love of history saw him take the role of unofficial historian of the School. He collected and stored School literature, theses and equipment which were invaluable resources for Peter Southwell-Keely who wrote the official School history (published in 2020).

ENSURING POSITIVE STUDENT EXPERIENCES WAS A PRIORITY TO KEN.

He worked proactively with School committees, academic and technical staff, faculty representatives and the student executive to promote Chemistry at UNSW as the best learning institution in Australia.

09

OBITUARY

ASSOCIATE PROFESSOR MICHAEL GALLAGHER

Associate Professor Michael John Gallagher, who died on 3 October 2020, was an admired and well-respected member of the School of Chemistry at the University of New South Wales. He was almost 85.

Mike was a Queenslander and did his undergraduate degree at the University of Queensland, followed by an MSc, on natural products, under Maurice Sutherland. He then went to England where he completed a PhD under FG Mann in the field of organophosphorus chemistry at Cambridge University in 1962. He was a member of Trinity College and attended Cambridge University at the same time as David Black and Graham Johnston. Then followed two years at the Milstead Laboratory of Chemical Enzymology with Nobel Laureate Sir John Cornforth.

Mike was appointed to the University of New South Wales in 1964 as a lecturer in the Department of Organic Chemistry. In his first year of teaching, he was given

FROM AN INDUSTRIAL PERSPECTIVE MICHAEL GALLAGHER'S EXPERTISE WAS HIGHLY REGARDED.

the nickname "Smiley" by one of the students (a young lady). He was promoted to Senior Lecturer in 1969 and to Associate Professor in 1978. He retired at the end of 1996. His field of research was organophosphorus chemistry. He was the only academic in Australia carrying out research in this area at the time. His Research Interests, as listed in the School of Chemistry Research Activities include an interest 'Predominantly in the fields of heterocyclic derivatives of main group elements (P, As) and in methods for generating reactive intermediates involved in the chemistry of these organometallic compounds'. He also had interests in the stereochemistry of phosphorus compounds,31P, 1H and 13C nmr, phosphorus isosteres and the synthesis of heterocycles containing more than one phosphorus atom. Mike is the author or co-author of approximately 90 publications including a number of invited book chapters. He spent a year of study leave at the Paul Sabatier University in Toulouse, working with the leading phosphorus chemist Robert Wolf.

Bob Ryan, a friend and industrial colleague, wrote that "From an industrial perspective Michael Gallagher's expertise was highly regarded. A significant example was his solution of the field problems (flammability and polymer formation blockages) associated with a patented phosphine gas agricultural fumigant. His knowledge of phosphorus chemistry, 31P NMR analysis, expert lab skills and sampling innovations solved product and field applications issues. This agricultural phosphine gas fumigant has ongoing importance to Australian grain exports as most Australian grain is fumigated using phosphine insuring insect-free and residue-free export grain. Results were published locally: RACI 11th Australian Analytical Conference, Hobart, 1991, and in Israel: Phosphorus, Sulfur and Silicon, 1996, Vol 111, p89. Details published include the issue of the pyrophoric white phosphorus and diphosphine, toluene extraction of impurities in high pressure liquid phosphine, the unique polymer formation reaction between phosphine and carbon dioxide in the presence of air, identification and formula of the unique polymer, and formation of the three phosphoric acids."

IN HIS FIRST YEAR OF TEACHING, HE WAS GIVEN THE NICKNAME "SMILEY" BY ONE OF THE STUDENTS (A YOUNG LADY).

Mike's organisational activities included being on the editorial board of the Journal of Heteroatom Chemistry, being the Presiding Member of the Faculty of Science in the three years before his retirement, being a past President and a past Secretary of the RACI NSW Branch, and a past President of the RACI Organic Division. Mike co-authored the School history book celebrating the 50th anniversary of the School in 1999. In 1990, together with David Black and Roger Read, Mike initiated the annual series of Southern Highlands Conferences on Heterocyclic Chemistry, now into their 30th year. These conferences broke new ground by collecting a relatively small, but international group in a comfortable and relaxed country environment. Mike served nobly as the committee Treasurer from the outset until 2007.

Away from the bench, Mike was a committee member of the Oriental Rug Society, his interest in oriental rugs being sparked by the chemical components in the dyes. His home had many examples hanging from the walls. Mike was also a superb cook and host, and a connoisseur of fine wines. His knowledge of food and wine was greatly developed by his year of study leave in Toulouse. He made an enormous contribution as a committee member of the UNSW Senior Common Room Club, when it existed at the university, and not surprisingly helped to establish an impressive wine collection. He was, in his younger days, a very good competition squash player, and was still playing with Les Field, and Scott Kable etc. in the early part of this decade.

Mike was a pillar of Australian organic chemistry in his day, an absolute gentleman and delightful company. He will be sadly missed by his many friends, who at least will retain a legacy of even more wonderful memories.

10 APPENDIX A

Associate Professor Graham Edwin Ball

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Associate Professor Jonathon Beves

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Emeritus Professor Roger Bishop

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Emeritus Professor David St Clair Black

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Dr Xianjue Chen

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