An incredibly complex structure of the pentagonal prismatic molecule discovered when Dr Jack Clegg, along with collaborators at The University of Cambridge, and Randolph-Macon College in the USA, transformed a tetrahedral molecule into a second structure – a barrel-like pentagonal prism.

Understanding the structure of such synthetic molecules which are able to reorganise themselves is important as it helps scientists to understand natural processes in molecules such as viruses which are assembled from small parts.
UQ is a pacesetter in discovery and translational research across a broad spectrum of disciplines, ranging from bioscience and nanotechnology to mining, engineering, social science and humanities. UQ offers undergraduate and postgraduate programs informed by the latest research and delivered in state-of-the-art learning spaces. Its teachers have won more Australian Awards for University Teaching than any other Australian university.

The Faculty of Science is UQ's largest Faculty. It consists of eight teaching and research schools and a number of research centres. It offers undergraduate programs in Science, Agricultural Science, Biomedical Science, Biotechnology, Environmental Science, Environmental Management, Marine Studies, Regional and Town Planning and Veterinary Science, and contributes to programs in many of the professional degree areas, such as Health Sciences and Engineering. Postgraduate coursework and higher degree by research programs are popular and highly regarded. For further information on the Faculty of Science, go to science.uq.edu.au.

Research in the Faculty of Science is contributing to knowledge in all disciplines and to outcomes in climate change, sustainability, disease detection and management, and rehabilitation of the environment.

The School of Chemistry & Molecular Biosciences is one of the largest and most successful teaching and research Schools in the Faculty of Science and the University. Its major discipline areas are Chemistry, Biochemistry & Molecular Biology, Microbiology, Parasitology and Biotechnology. It enrols the full-time equivalent of nearly 1,500 students each year, around a third of whom are from overseas. The School has more than 40 active research groups and five research centres that together explore the molecular basis of living and non-living things and create new materials and biologically active agents. Many of the School’s academic staff hold competitive research fellowships or have won prestigious research and teaching awards. Significant investment has been made in laboratories and facilities, and the School has a growing program of engagement with industry, international partners, secondary schools and alumni.
The School of Chemistry & Molecular Biosciences teaches students in Science, Biotechnology, Engineering, Health Sciences and Veterinary Science and encompasses a diverse range of disciplines spanning Biochemistry, Chemistry, Cell Biology, Molecular Biology, Molecular Genetics, Immunology, Microbiology and Parasitology. The common thread in the School’s teaching is the molecular basis of life and functional material, and the application of molecular based approaches to understand life, detect and treat diseases and design and test new products.

Our teaching builds on the strong culture of research in the School. We aim to convey the essential theory and background knowledge of the field, make clear the importance of the study area in the context of modern society, train students in the relevant practical skills for working in our sciences, and convey our commitment to research and innovation.

Our graduates are industry-ready and well informed about recent developments in science and technology.
We teach Chemistry as an enabling science, a science in its own right, and as a science deeply embedded in Biology. An understanding of molecular processes is now such a fundamental component of modern science that almost all students whose studies incorporate ‘Science’ need some Chemistry. Our program explores how atoms interact with one another to form bonds, the properties of gases, chemical equilibrium, energetics and chemical reactions. Students are also introduced to organic molecules, the carbon containing compounds that are the building blocks of life amongst other things. This work paves the way for an exploration of ‘molecules of life’ which is of fundamental importance for any modern biologist.

Our Biochemistry teaching starts with fundamental processes such as the structure and function of DNA, the synthesis of proteins and the behaviour of enzymes. Subsequently, our Biochemistry teaching starts with fundamental processes such as the structure and function of DNA, the synthesis of proteins and the behaviour of enzymes. Subsequently, students are introduced to the integration of these concepts in understanding issues such as metabolism. The School also teaches in the field of Molecular Genetics and the sub-disciplines of genomics, proteomics and bioinformatics, which are underpinning the ongoing molecular revolution.

Our teaching in Microbiology has the world of bacteria, viruses and parasites as its subject matter. These microbes are perhaps of primary importance in causing diseases in humans and animals and plants but increasingly our teaching also explores their importance in ecosystems and as systems for biotechnological development. Our teaching in this discipline starts with the basics of "what is a microbe?" and how to establish a bacterial culture on an agar plate through to complex molecular manipulation.

Biochemistry and Molecular Biology are fields that have given the world some breathtaking scientific advances in the last few decades.

Our third year courses are in many ways the most exciting as they explore science close to or at the edge of what has been revealed by research, and many of them are interdisciplinary in content, thus breaking down traditional subject boundaries. All lecturers are active researchers and their dynamic research programs are used to inform their teaching. In many undergraduate courses there are opportunities for project work based on laboratory, field or library studies where students begin to gain a sense of the reality of scientific research.

The Honours year, as well as our postgraduate coursework programs in Biotechnology, Molecular Biology and Bioinformatics are designed not only to prepare students for further work in industry, but also to provide further exposure to research to those who choose this career path.

Research training is integrated within the School’s overall research program and constitutes a significant part of its research effort and outcomes. The School’s cohort of higher degree by research students is one of the largest in the University with many of these students supported by competitively awarded scholarships. Of the 237 higher degree by research enrolments in 2012, most were located within the School laboratories under the direct supervision of the School staff or in other UQ schools, institutes or research centres. Some were located externally to UQ, e.g., the Queensland Institute of Medical Research, with School staff as co- or associate advisors. Our research students generally work on projects that are funded by nationally or internationally competitive external research grants. The School also provides additional support to enable students to present at an international conference and spend time in a research laboratory overseas. Several staff have won awards for the quality of supervision provided to higher degree by research students.
The appointment of several teaching-focused academics has provided the expertise to drive and sustain teaching innovations. The teaching-focused academics also act as collaborators and mentors for non-teaching-focused academics who wish to innovate in teaching. The School’s teaching-focused academics have already had an impact by ensuring that recent changes in curriculum, assessment, course structure, and program progression pathways are underpinned by contemporary pedagogical practices.

The quality of innovation in the School has been recognised by two Australian Government Office for Learning and Teaching grants, three UQ Excellence in Learning and Teaching Awards and four Faculty of Science Teaching Excellence Awards in the last five years.

Dr Gwen Lawrie and Dr Susan Rowland, two of the School’s highly successful teaching-focused staff.

INNOVATIONS IN TEACHING DELIVERY

The School has a strong culture of teaching innovation, including the introduction of Peer-Assisted Study Sessions (PASS), and Centre for Authentic Science Practice in Education (CASPIE) and Active Learning Laboratory Undergraduate Research Experiences (ALLURE) models.

Our teaching laboratories continue to be refurbished to a standard consistent with the delivery of modern undergraduate and postgraduate coursework programs in science.
The School of Chemistry & Molecular Biosciences is a diverse and powerful research unit with unique expertise in the chemical and molecular life sciences. Biomolecular research in the School spans the range from small synthetic molecules through proteins, nucleic acids, viruses and microorganisms. Materials research encompasses the design and synthesis of molecular devices, functional polymers and nanomaterials as key strengths.

We enjoy collaborative interactions with the other schools and centres within the Faculty of Science as well as the Health Sciences and Engineering Faculties at UQ and with many other universities and institutions in Australia and overseas. A number of staff hold joint or affiliate appointments with the Institute for Molecular Bioscience, the Australian Institute for Bioengineering and Nanotechnology, and the UQ Diamantina Institute.
Infection & Immunity

Research in the theme of Infection & Immunity at the School encompasses the study of microbial pathogens and the response to infection by their hosts.

Specific areas of interest include molecular virology, bacterial and fungal pathogenesis, parasitology and innate immunity. Virology research ranges from epidemiological studies through to research aimed at understanding the molecular basis of pathogenesis as well as the development of new diagnostics, vaccines and anti-viral strategies to control infection.

A major focus is mosquito-borne arboviruses (Barnard, Hall, Khromykh, Young). Bacterial pathogenesis is a well established research area with a focus on several major human pathogens including Group A Streptococcus, multidrug resistant Escherichia coli, Streptococcus pneumoniae, Neisseria gonorrhoeae, Haemophilus influenzae and Mycobacterium tuberculosis (Kappler, McEwan, Schembri, Walker, West). Fungal pathogenesis focuses on the human pathogenic fungus Cryptococcus neoformans, a yeast that is one of the leading causes of opportunistic fungal infections in immunocompromised individuals (Fraser).

Parasitology research includes the evolutionary genetics and genomics of arthropods and clinical protozoology (O’Donoghue). Innate immunity research includes the cellular and molecular biology of phagocyte function as well as pathogen recognition by the innate immune system (Kellie, Stacey).

Molecular Genetics and Genomics

Research in Molecular Genetics and Genomics at the School encompasses the application and analysis of targeted and high-throughput approaches to better understand all domains of life.

Vertebrates, plants, insects, microorganisms and microbial communities are subject to cutting-edge methodologies to elucidate evolution, ecology and function at the genetic and regulatory level.

Recent highlights include the establishment of The Australian Centre for Ecogenomics (Hugenholtz and Tyson), an invited perspective article in Science on a genome-led epidemiological study of hospital outbreaks (Beatson), identification of new genomic biomarkers of breast cancer susceptibility and progression mapping to key gene regulatory regions (Brown) and transcriptomic analysis of insect cells to enable improved production of recombinant medical, veterinary and biocontrol products (Reid). Development of new tools for integrating and analysing both genomic and proteomics data has been published in the premier bioinformatics journal (Boden).
Nanotechnology and Materials Chemistry

Organic, inorganic, physical, and computational chemistry underpin the School’s Nanotechnology and Materials Chemistry theme.

The theme draws together expertise in synthesis (including self-assembly), characterisation (including spectroscopy, colloid and surface science) and computational modelling, and applications (optoelectronics, clean energy generation and storage, separation technologies, biomaterials, nanomedicine, molecular recognition) of organic, inorganic, and composite materials from small molecules to macromolecular structures including polymers, dendrimers, frameworks, gels, and nano-porous structures.

One of the key strengths of the theme is that there is a focus on real world applications, which is underpinned by world-class fundamental research. Members of the Nanotechnology and Materials Chemistry theme plan to build on its existing strengths in the areas of materials and healthcare.

In the area of the optical and electronic properties of materials, separation technologies, and clean energy generation and storage, efforts will focus on the development of new materials for battery and supercapacitor technologies, hydrogen generation, organic light emitting diodes, photovoltaics, sensors, hydrogen generation, active channel field effect transistors, spectroscopic and theoretical understanding of fundamental properties, analysis of surfaces and solid-state structures, and gas separation and storage. In the area of healthcare, efforts will focus on controlling the dimensionality and shape of macromolecular structures (both organic and inorganic), understanding their fundamental properties using computational modelling of structure and flow dynamics, surface modification, and applications in the areas of biomarkers, molecular machinery, single molecule detection, tissue engineering and regenerative medicine, implants, and drug and vaccine delivery.
RESEARCH THEMES

Medicinal Chemistry

Medicinal Chemistry in the School involves chemistry and pharmacology and aims to develop bioactive molecules suitable for therapeutic use.

Medicinal chemistry is a multidisciplinary field requiring expertise in organic & physical chemistry, biochemistry, pharmacology, structural biology, microbiology, immunology, enzymology, molecular biology and computer modelling. Medicinal chemists are involved in molecular design, chemical and enzymatic synthesis, and in vitro & in vivo evaluation with the aim of designing compounds with properties suitable for pharmaceutical evaluation.

Medicinal chemistry encompasses drug and vaccine development and delivery; compound screening; combinatorial chemistry; lead compound identification; structure activity relationship studies; the synthesis and biotransformation of medicinal compounds; exploration of naturally occurring, biologically active molecules; and the use of metal compounds as medicinal agents.

The principal research areas within the Medicinal Chemistry theme at the School are: drug design, development and delivery; immunoadjuvants; development of central nervous system active drugs and their delivery across the blood brain barrier; carbohydrate, lipid, peptide, nucleoside and nucleotide chemistry and biological activities; physicochemical and pharmaceutical properties; polymer nanostructures; advanced ligation chemistries; and reaction mechanisms of metal ion dependant enzymes.

Biomolecular Chemistry

The Biomolecular Chemistry theme at the School encompasses a diversity of research activities, including the structure, reactions and synthesis of biologically important small molecules and chemical investigations of proteins and enzymes.

The members of the theme are brought together by their common interest in understanding the structures and mechanisms of biologically relevant organic and inorganic molecules at a molecular level which informs their role in nature and their potential applications. Many of the members of this research theme are contributors to the School’s Centre for Metals in Biology which links to this and many other themes.

Research areas at the heart of the Biomolecular Chemistry theme include: small metal-ion chelators as structural and functional biomimetics of metalloenzymes; the total synthesis of bioactive natural products and derivatives (diterpenes, alkaloids and polyketides); metalloenzyme structure, mechanism and catalysis; enzyme electrochemistry; medicinal inorganic chemistry; isolation and structure elucidation of naturally occurring bioactive compounds; total synthesis of biologically active natural products and exploration of their medicinal chemistry; and developing and discovering new synthetic methods to better access biologically important molecules.
Structural Biology and Biochemistry

The Structural Biology and Biochemistry theme at the School focuses on understanding basic processes involved in cell regulation and disease at a molecular level.

Biophysical techniques such as x-ray crystallography and nuclear magnetic resonance spectroscopy are being used, together with computer simulations and modelling techniques, to understand at an atomic level how proteins and peptides interact with each-other and other cellular components such as lipids and sugars to form functional complexes.

Biochemical and molecular biology approaches are being used to probe differences in protein expression, interactions or activity associated with different disease states. Topics under active investigation include the trafficking of proteins, RNA and lipids within cells; proteins and peptides involved in the innate immune system and bacterial, viral and fungal infection; the effects of alcohol on the brain and liver; amyloid formation and the roles this and other factors play in Alzheimer’s and related neurodegenerative diseases; and artificial or in vitro evolution as a way of exploring the sequence space and catalytic potential of cytochrome P450 enzymes, RNA-binding proteins and their roles in development and disease.

PhD student Robyn Aston, from Associate Professor Lisbeth Grondahl’s group, is working on the development of a biomaterial implant as a replacement for knee cartilage in older patients suffering from osteoarthritis.
Australian Infectious Diseases Research Centre (AID)
Director: Professor Mark Walker
AID combines complementary research housed at UQ and the Queensland Institute of Medical Research in partnership with a wide range of Institute and Hospital colleagues across Brisbane, in order to support a coordinated infectious diseases research focus. This combined research effort in parasite, viral, bacterial and fungal infectious diseases brings together basic sciences, clinical research and technological expertise where both UQ and the Queensland Institute of Medical Research have strengths. The aim is to build AID into a world-class centre for infectious disease research on par with similar centres such as those at Imperial College London, Institut Pasteur and the Karolinska Institute. AID will accelerate translational outcomes in diagnostics, vaccine development, and the design and application of new therapeutics against microbial pathogens (aidrc.org.au).

Australian Centre for Ecogenomics
Director: Professor Phil Hugenholtz
The Australian Centre for Ecogenomics was established in August 2010 within the School. It provides a focal point for high-throughput sequence-based analysis of microbial communities and builds strength in this space not only in Queensland, but Australia as a whole. The Centre’s project portfolio is 80% applied research focused on major national research priorities (e.g. climate change, infectious diseases) and 20% fundamental research (see ecogenomic.org/projects).

Centre for Metals in Biology
Director: Professor Paul Bernhardt
The Centre for Metals in Biology is a dynamic multidisciplinary research unit comprising more than 40 researchers from fourteen research groups at UQ. The members of the centre share a common interest in the role of metal ions in biological systems. The research themes cover a broad spectrum that includes enzyme catalysis and mechanism, metalloprotein structure and function and the role of metals in medicine and disease (scmb.uq.edu.au/centre-for-metals-in-biology).

Centre for Organic Photonics and Electronics (COPE)
Director: Professor Paul Burn
COPE is the product of a strategic investment by UQ, and is a joint initiative between the School of Chemistry & Molecular Biosciences and the School of Mathematics and Physics. The mission of the Centre is to develop new ‘organic materials’ that can be used in high performance cutting edge technologies including solar cells, flat panel displays based on organic light-emitting diodes, plastic electronics (transistors), sensors, and fuel cells (physics.uq.edu.au/cope).

Clinical Medical Virology Centre
Director: Associate Professor Nicholas Davis-Poynter
The CMVC, also known as the Sir Albert Sakzewski Virus Research Centre's mission is to conduct basic research in medical virology at the highest international standard. It has a focus on paediatric virology and aims to make significant contributions to improvement in child health, particularly in Queensland, and create an internationally recognised centre of excellence in medical virology. It also promotes excellence in postgraduate training in conjunction with UQ (sasvc.qld.gov.au).
FACILITIES

The School is a leader in structural investigations of small and macromolecular systems. X-ray crystallography and cryo-electron microscopy facilities, state-of-the-art NMR and mass spectrometry equipment underpin all of our investigations in molecular science. Our cutting-edge proteomics facility enables high-throughput analyses of complex mixtures of proteins using a variety of separation and quantitative visualisation techniques. The School has also led the way in real time polymerase chain reaction analysis which underpins many of our molecular genetics research programs. Our experimental studies in structural biology and protein chemistry are linked to programs in computational biomolecular science that explore the molecular dynamics of protein folding and structure.

Equipment housed within the School includes Bruker 300, 400 and 500 MHz NMR spectrometers for detection of ¹H, ¹³C and other nuclei. A Bruker HCT 3D ion trap instrument with ms² capability, a microTOFq-LCMS system (accurate mass capability), and a Finnegan Mat 900 XL Trap double focussing spectrometer (accurate mass capability) are used for small molecule mass spectrometry, while for protein work, we have a brand new ABSciex TripleTof 5600 and QTRAP 5500 mass spectrometers, with nano-, capLC and UHPLC systems for upstream fractionation of samples for discovery and quantitative proteomic work. A state of the art Oxford Diffraction single crystal CCD X-ray diffractometer (with dual Mo/Cu sources) is used for rapid throughput high resolution 3D molecular structure determination.

Equipment used for molecular bioscience applications includes a Biacore 3000 surface plasmon resonance biosensor unit, a Zeiss confocal microscope, an InCell automated epifluorescence microscope, and a MicroBeta² microplate scintillation and luminescence detector. High-throughput cell-based assays can be performed using our Beckman Coulter DTX-880 multimode plate-reader, and a cell counter. In the School’s Molecular Biosciences building, a Rotorgene 3000 and 6000 Corbett and ABI-7900HT & ABI-ViiA7 RTFCR machines with high-resolution melt analysis capability, epMotion 5075 Eppendorf robot, BD AriaIII and Accuri6 flow cytometer and sorter are available.

A Typhoon 9400 variable mode imager is employed for fluorescence imaging, and also for phosphorescence and chemiluminescence detection, while two IPGphor units use isoelectric focusing and vertical electrophoresis for separation on the basis of molecular weight.

Other in-house specialist equipment includes a Jobin Yvon time-correlated single photon counting spectrophotometer, JASCO CD spectrometer, and a Magnetic Circular Dichroism spectrometer, while access to macromolecular X-ray crystallographic facilities is provided in collaboration with UQ’s Institute for Molecular Bioscience. Similarly, there is access to equipment in the Brisbane Surface Analysis Facility, a Faculty Centre housed within the Chemistry building, which includes a Kratos X-ray photoelectron spectrometer, two Bruker X-ray powder diffractometers, a Panalytical small angle X-ray diffractometer and various atomic force microscopes.
Dr Natalie Prow

Natalie completed a PhD in Microbiology at the University of Western Australia in 2006. Since then she has held postdoctoral positions at the University of Texas Medical Branch, Galveston and Johns Hopkins University, Baltimore working on different aspects of neuropathogenesis and drug treatments using murine models of encephalitis.

In 2009, she was awarded an Australian Research Council Postdoctoral Fellowship entitled ‘Detection of imported exotic strains of West Nile virus for national biosecurity surveillance’. Natalie’s research interests include developing novel diagnostic tools, more effective therapeutics and understanding the complex immune pathways involved in the pathogenesis of mosquito-borne viruses that cause encephalitis.

Dr Alpeshkumar Malde

Alpesh was awarded a gold medal for his Masters degree in Medicinal Chemistry at the National Institute of Pharmaceutical Education and Research, India in 2001. He completed his PhD in Pharmaceutical Chemistry at the University of Mumbai in 2007 and joined the Molecular Dynamics group of Professor Alan Mark at the School of Chemistry & Molecular Biosciences as a postdoctoral fellow. In 2009, he was awarded an Australian Research Council Australian Postdoctoral Fellowship for his project titled ‘Development of methodology for high throughput free energy calculations in drug design application’, followed by a UQ Early Career Researcher award in 2010 and UQ ResTeach awards in 2011 and 2012.

His research involves methodological development for understanding the structure and thermodynamics of ligand binding and its applications in structure refinement and drug design employing state of the art computational tools.
Dr Makrina Totsika

Makrina was awarded a prestigious Wellcome Trust Studentship to undertake postgraduate study at the University of Edinburgh. There she earned her MSc in Life Sciences with Distinction and graduated with a PhD in Molecular Microbiology in 2007.

She joined UQ as a postdoctoral research fellow investigating the function of specialised adherence factors (adhesins) produced by pathogenic bacteria during host infection.

In 2011, Makrina was awarded a UQ Early Career Research grant to investigate novel anti-adhesion therapies for treating urinary tract infections caused by pandemic multidrug resistant bacteria. For this work, she visited Washington University in St Louis USA where she established ongoing research collaborations.

Makrina is currently an Australian Research Council Discovery Early Career Researcher. Her research explores what molecular machinery bacteria use to build specialised adhesins and how these adhesins assist global multidrug resistant pathogens, with the aim to design treatments other than conventional antibiotics.

Dr George Vamvounis

George held a prestigious Natural Sciences and Engineering Research Council of Canada industrial postgraduate fellowship to undertake his PhD at Simon Fraser University and the Xerox Research Centre of Canada, developing Polymer Light Emitting Diodes.

From this work, he received the 2004 Macromolecular Science and Engineering Division of the Chemical Institute of Canada award for the best Canadian doctorate in Polymer Science and Engineering.

Following his PhD, George worked at the Royal Institute of Technology in Sweden investigating dendritic macromolecules. George then joined UQ as a senior researcher to investigate electroactive dendrimers.

Currently, George is an Australian Research Fellow supported by the Australian Research Council at UQ’s Centre for Organic Photonics and Electronics.

His research interests lie in the design and preparation of novel organic semiconductors for optical and microelectronic applications.
The School of Chemistry & Molecular Biosciences sets a high priority on engagement with its external stakeholders. These stakeholders include other units within UQ, other universities, industry, government bodies, professional societies, the community (including secondary educational institutions) and alumni.

The School’s public events include lectures (Biochemistry Alumni Lecture, TGH Jones Memorial Lecture, Dillon Steele Lecture, Skerman Lecture); research symposia; a student awards evening; alumni reunions; graduation celebrations; and lab activities for school students.

School staff frequently communicate with the public via the news media. They promote their research and give expert advice regarding scientific developments around the world. Staff also write editorial content, including opinion pieces, for a range of publications aimed at the general public.

From encouraging school students to discover the world of science, to building on links with industry partners and alumni, the School’s staff are active participants.
INTERNATIONALISATION

More than 50 countries are represented within our student body, with the greatest number from Singapore, Malaysia, China and India.

Most students are undertaking either a full degree program at undergraduate or postgraduate level, but a number are on six-month Study Abroad schemes, mainly from Europe or North America.

The School also hosts in its laboratories occupational trainees (overseas postgraduate students doing an internship) from many countries.

Academic staff maintain many international research linkages and frequently travel to meet colleagues at their institutions and at conferences. Reciprocal visits to UQ are hosted on an ongoing basis.

Research grants funded from overseas in recent times include:
- A Washington Vaccine Alliance grant, in association with the Queensland Government Smart State National & International Research Alliances Program for Escherichia coli vaccine for cattle to Professor Mark Schembri and others.
- A Department of Innovation, Industry, Science and Research Australia-India Strategic Research Fund, Grand Challenge grant for Crop plants which remove their own major biotic constraints to Professor Bernie Carroll.
- A University of Arizona grant for dissecting methane flux at the leading edge of global change to Dr Gene Tyson.
- A University of California at San Diego grant for Group A Streptococcus to Professor Mark Walker.
- An Organic Solar Cell Alliance grant, in association with the Queensland Government Smart State National & International Research Alliances Program to Professor Paul Burn, Dr Lawrence Lo and others.
- A Baoshan Iron and Steel Co Ltd grant for Advanced materials for new generation energy storage to Professor Ian Gentle.
- A Canadian Institutes of Health Fellowship for Dr Penny Rudd (Khromykh group).

The School seeks to diversify the sources of its international students and to encourage Australian students to have overseas university experiences as part of their UQ degrees.
The Australian Research Council’s Linkage Scheme is a funding mechanism by which School staff can initiate internationally-competitive research projects with partners from the commercial and government sectors, and is an effective way to leverage research dollars or to co-fund research scholarships in an area of common interest. The School’s staff have been involved in 13 of these projects over the past five years.

Industry partners have direct access to UQ’s innovation and commercialisation specialists (from UniQuest, Australia’s largest resource of technology commercialisation expertise) who are involved with state and federal government research commercialisation initiatives as well as national and international research alliances and who can provide expert advice on commercialisation issues and options.

The School’s research has led to the filing of more than 40 patents and the creation of a number of spin-off companies including:

- **Alchemia** – using expertise in chemistry to discover and develop human therapeutic products.
- **Impedimed** – pioneering the use of next generation bioimpedance spectroscopy technology.
- **Neurotide** – creating the next generation of pain killers based on the body’s own natural pain killer, endomorphin.
- **Replikun Biotech Ltd** – building vaccines against infectious diseases and cancer.
- **TetraQ** – offering preclinical services to the biotechnology and pharmaceutical industries.

Industry personnel can be appointed as adjunct staff within the School, and contribute to our programs in both teaching (often as guest lecturers) and in research. A number of industry partners offer scholarships and prizes to the School’s students. Each year the School hosts a student awards night for winners of substantial prizes and awards, to which it invites representatives of sponsor organisations.

The School encourages its students to consider internships with industry, typically via a ‘sandwich semester’ or summer vacation project during undergraduate studies or by undertaking an Honours project with industry. The School is a partner in the Future Scientists industry placement program run by Kelly Scientific Resources (the world’s largest scientific recruiter), and in the CEED program run by Corporation Technologies Pty Ltd, which links companies to students completing a project as part of their biotechnology degrees.
OUTREACH TO SCHOOLS AND THE PROFESSIONS

A number of academic staff visit schools either informally or as part of scientist-in-residence programs.

The School of Chemistry & Molecular Biosciences works together with the Faculty of Science and UQ to provide opportunities for secondary school students to experience university science and find out about associated careers.

Activities include hands-on school vacation workshops, immersion programs, campus visits and competitions (eg, the well known Royal Australian Chemical Institute national titration competition).

Professional development workshops for teachers are offered, in Chemistry, Molecular Biology and Microbiology.

Each year, The School mounts a significant display with activities, demonstrations and talks as part of UQ's Open Day. More information is available at scmb.uq.edu.au/schools-outreach-activities.

The School has strong links to a number of learned societies and professional associations, with several School staff holding senior positions (eg, President or President-Elect).

Staff are also involved in the organisation and hosting of a number of major conferences at both national and international levels.

The School's senior students work as tutors at UQ's annual Open Day.

The School maintains strong links with its alumni, through communication and activities, such as online social networking (Facebook and LinkedIn) and reunion events. An alumni newsletter is published and alumni are invited to and welcomed at the School's public events, such as its lecture series and annual Open Day.

Alumni interested in promoting scholarship and student opportunity have donated prizes for academic achievements (awarded annually at a ceremony), funded an annual Biochemistry lecture, supported travel scholarships for postgraduate students and made donations to enable disadvantaged students to attend university.

If you are an alumnus of UQ chemistry, biochemistry, microbiology, parasitology or biotechnology, please see what opportunities are available to you and check that your details are up-to-date at scmb.uq.edu.au/alumni.

ALUMNI