

PHYSICAL SCIENCES

CHEMISTRY AND PHYSICS

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The School of Chemistry and Physics brings together and consolidates the University's broad-ranging and cutting-edge research in the fundamental disciplines of chemistry and physics. Research within the School is at the forefront of developments in chemistry and physics, and hence receives extensive external funding and involves major collaborations with researchers nationally and internationally. The School houses the ARC Special Research Centre for the Sub-Atomic Structure of Matter, the National Institute for Theoretical Physics, the Centre of Expertise in Photonics and the South Australian Partnership for Advanced Computing. To conduct this research, the School has a wide range of state-of-the-art equipment, IT and infrastructure supported by technical and workshop staff.

CHEMISTRY

Web: www.chemphys.adelaide.edu.au/chemistry/research/

Research within the field of chemical sciences has international recognition for excellence in the areas of laser and ion chemistry (one of the leading facilities in the southern hemisphere), biological chemistry, molecular recognition and new materials. Molecular design and nanoscience research at the University involves the design and construction of new molecules and molecular assemblies, incorporates fundamental scientific advances and involves a range of advanced materials such as peptides and other polymers, catalysts, molecular wires and optical switches and sensors.

Researchers within chemistry have been extremely successful in attracting funding for instrumentation and Adelaide has outstanding spectroscopic facilities for current research programs, including structure determination of large biologically important molecules like peptides and proteins. The research interests in chemistry are grouped into the following themes:

- Analytical and green chemistry
- Biological chemistry



- Chemical synthesis
- Laser and ion chemistry
- Molecular recognition
- New materials.

PHYSICS

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In the physics discipline, astrophysicists are leading the world in studies of extreme environments near super-massive black holes at the centres of galaxies. Likewise, the optics group is at the forefront of international laser research for astronomy, remote sensing and as part of one of the most exciting national and international efforts in experimental physics to detect and use gravitational waves in astronomy. The Centre of Expertise in Photonics, a joint venture between the University and the Defence Science Technology Organisation, focuses on the area of soft glass optical fibres. The Centre for the Subatomic Structure of Matter (CSSM) in theoretical nuclear and particle physics is making

major advances of world significance in the understanding of the structure of hadronic matter and is viewed internationally as one of the three centres in the world for research in nuclear theory. The Theory Group in the discipline of Physics, along with e-Research South Australia applies theoretical and computational techniques to topics in science and engineering such as chaotic systems, photonics, atmospheric physics, computational chemistry, bioinformatics, nanoscience, robotics and defence science.

Major research programs include:

- Atmospheric physics
- Geophysics
- High energy astrophysics
- High performance computing
- Medical physics
- Optics and photonics
- Theoretical physics.

For information on specific research projects, visit our website.



Hilary Coleman B.Sc (Honours Chemistry) 2006, Phd - current



“The double major saw me working in the lab and travelling Australia on field trips.”

Hilary Coleman has always liked science at school, so she applied for a Bachelor of Science at the University of Adelaide. She chose to major in chemistry and geology, subjects she had never studied before but found she loved once given the opportunity to study it. “I found the general Bachelor of Science to be very rewarding as it allowed me to keep my options open and choose all of my own courses. The double major was a wonderful combination and saw me working in the lab as well as traveling Australia on field trips in my third year.”

IN HER HONOURS YEAR, HILARY WORKED IN THE LAB TO SYNTHESISE A MOLECULE THAT BINDS TO ZINC IN CELLS, REVEALING ITS LOCATION AND CONCENTRATION.

She carried over her work on zinc into a PhD which she began in 2007. The behavior of zinc in the human body is related to many diseases, and so it is hoped Hilary's work may lead to a better understanding and improved treatment of such conditions as Alzheimer's Disease, Parkinson's Disease, forms of Leukemia, Asthma and Diabetes to name a few.

Now she is very involved in university teaching, from tutoring first year students and supervising second year practicals to teaching Introductory Chemistry bridging courses. She has also written science articles.