Australian National University

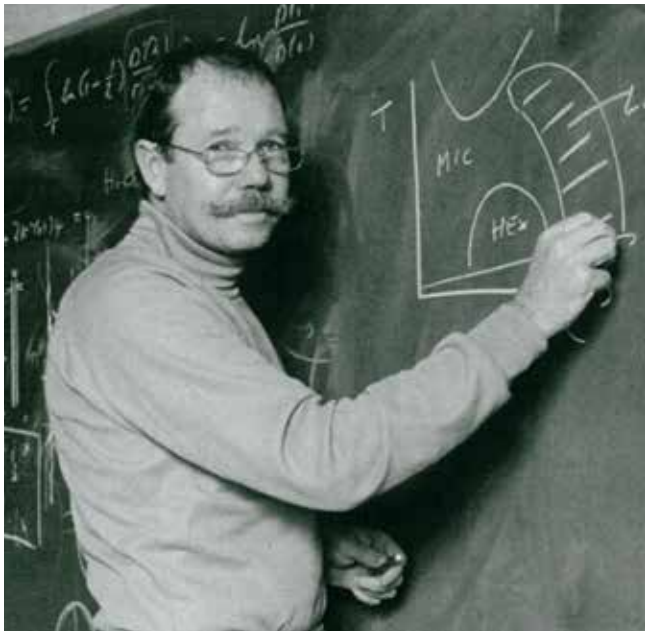

# THE APPLIED MATHEMATICS ENDOWMENT

Department of
Applied Mathematics

Research School of
Physics & Engineering

ANU College of
Physical & Mathematical
Sciences

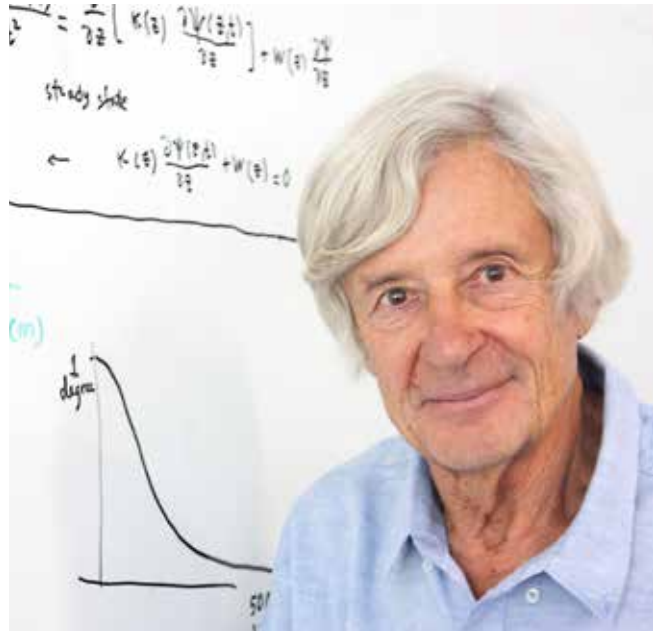
## The Barry Ninham Chair of Natural Sciences



As Foundation Professor, Barry energised staff and collaborators to explore the most challenging topics at the interface of physical and biological sciences. His visionary leadership is characterised by his breadth of knowledge and willingness to collaborate.

In 2008, the quality of scientific leadership essential to the Department was recognised through the establishment of the Barry Ninham Chair of Natural Sciences by the ANU Academic Board. This Chair honours not only his achievements in science, but also, more importantly his insistence that if scientists are given an environment to undertake basic research without boundaries, then understanding and applications will follow. The Chair is awarded to an academic who exemplifies this mandate. Professor Stephen Hyde is the inaugural recipient.

## The Stjepan Marčelja Visiting Fellowship



Stjepan was one of the first to join Barry in the new department and brought with him a complementary and deep theoretical understanding of natural phenomena from superconductivity to ionic solutions. Stjepan's great ability to draw in and engage many visitors invigorated the experimental and theoretical nexus in the Department.

The Stjepan Marčelja Visiting Fellowship will enable up to five visiting researchers from anywhere in the world every year to work in the Department. It has long been recognised that the high flux of international visitors greatly enriches the atmosphere and adds to the breadth of discovery. Reciprocal visits for staff and students also build stronger career opportunities. Equally, collaborations benefit from shared research infrastructure between institutions.

# THE APPLIED MATHEMATICS ENDOWMENT

Since its foundation in 1970 the Department has remained an eclectic, international and interdisciplinary mix of basic and applied sciences, working on theoretical and experimental questions that arise somewhere between physics, biology, geology and chemistry. Many people have contributed to our history, but some deserve special recognition for the principles they have espoused and exemplified. Moreover, the Applied Mathematics Endowment goes further than celebrating the founders; it has been established to sustain the essential elements that define our Department: *leadership* and *community*.

Al Munro, ***Sugar Diffraction*** (detail), 2012, Pencil and pigment marker on paper, 35x35 cm

# THE LEGACY TODAY

The Endowment was seeded through proceeds from the sale of the Department's first spin-off company, Lithicon, in 2014. In many ways this represents an appropriate return to the source of science that created the commercial opportunity, for without the considered and strategic support from fundamental research there can be no future applications.

## Current Research

From the beginning, the prime research motivation was to contribute to the juncture between physical and biological sciences. The foundations laid in the 1970s included optics and physical chemistry. This research led to the development of new theories and instrumentation in fields ranging from vision research, cell membrane mechanics, surfactant and colloidal self-assembly, intermolecular forces, colloid and surface chemistry. This research success was due in no small part to an innovative and dedicated technical team, whose engineering skills were central to the design, construction and maintenance of novel instruments. Most notable among these were the Surface Forces Apparatus and the Heliscan CT (computed tomography). To this day, that technical expertise and agility remain a part of the Department's core strength.

Today, the Department of Applied Mathematics focuses on four core research themes:

1. Porous and disordered materials
2. Surface science and intermolecular forces
3. Soft matter and molecular self-assembly
4. Crystalline and complex networks.

A unique feature of our Department is our interest and ability to undertake cross-disciplinary research by collaborating with other disciplines such as earth science, biology and chemistry as well as the arts.

**Over 1500 papers, over 60,000 citations.**

# RESEARCH FOSTERS RESEARCH

The Endowment will allow us to continue our tradition of encouraging creative thinking across traditional disciplinary boundaries. For example, our recent hosting of and collaborations with visual artists have extended perspectives from both scientific and creative artistic sides. The Department has been fortunate to host three recipients of the newly established Vice-Chancellor's College Visiting Artist Fellowships.

Julie Brooke, ***Surface Tension No.1*** (detail), 2013, Gouache on paper, 56x76 cm

## Dr Julie Brooke

Originally trained as a biologist, Julie investigates the role of mental imagery in the understanding and development of abstract mathematical concepts, and how imagery of this kind can be represented using painting and drawing. This resulted in a 15m-long wall drawing exhibited in the Department. Julie is the 2013 J G Crawford Prize recipient.

## Dr Al Munro

Al Munro is an artist and ANU academic whose research spans textiles, print and drawing-based media. She has an interest in patterns, codes, mapping and measurement and explores the links between mathematics and textile techniques and materials in relation to scientific visualisations of the natural world. Al is represented by Brenda May Gallery, Sydney.

## Ms Erica Seccombe

Erica, as part of her PhD, is investigating the aesthetic possibilities of computational extension of vision with 3D X-ray Microcomputed Tomography, extended in time and subjective experience. Her thesis aims to develop the concept of the fifth dimension.

# WAYS YOU CAN GIVE

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- Workplace giving program for ANU staff members. Visit quicklink.anu.edu.au/workplacegiving
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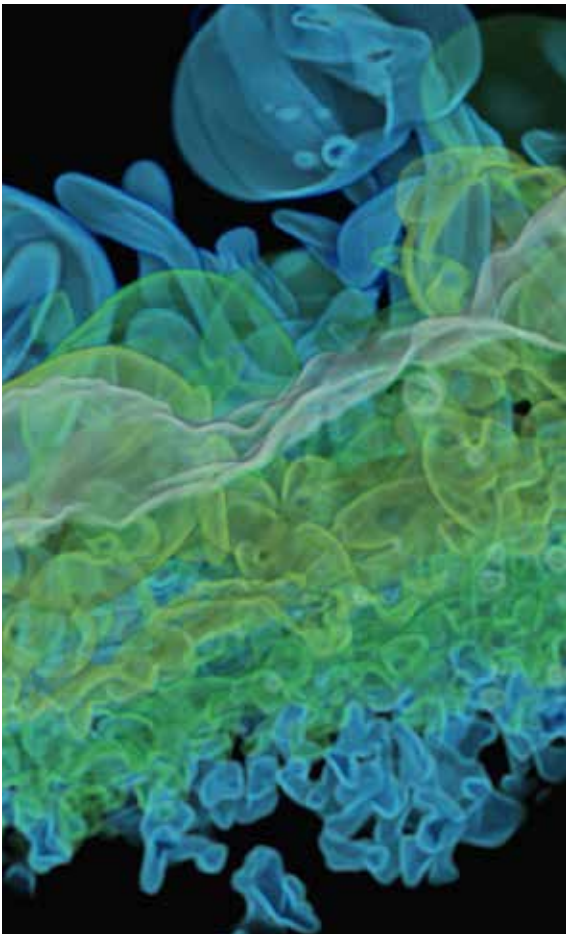
**For a complete list of ways to give, visit philanthropy.anu.edu.au/philanthropy/how-to-give**



ABOVE AND COVER: Erica Seccombe, ***Grow*** (detail), 2013, Digital image of germinating seeds rendered in Drishti (data captured with 3D Microcomputed X-ray Tomography, ANU Department of Applied Mathematics)

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