

## SWIRL - SURREY WATER INNOVATION RESEARCH & LEARNING

**SWIRL IS A COMMUNITY OF PEOPLE ENGAGED AT THE UNIVERSITY OF SURREY IN WATER RELATED INNOVATION, RESEARCH AND LEARNING.**

Members of SWIRL represent many of the wide range of disciplines required to deal with local or global water, wastewater and health related issues. By working with external collaborators and partners we seek to add complementary skills to our research and help apply our academic knowledge, learning processes and understanding to solving real “world water” challenges.

### **OUR ACADEMIC COMMUNITY HAS EXPERTISE:**

- from water rights and regulation to public perception and health surveillance
- from chemical and microbial analysis to public health engineering
- from nanoscale materials and desalination treatment processes to community scale appropriate and sustainable technology
- from city scale infrastructure optimisation modelling to global reach satellite disaster monitoring

### **OUR EXTERNAL COLLABORATORS AND PARTNERS CURRENTLY INCLUDE:**

- many other UK and international academic institutions
- the World Health Organisation
- Government agencies responsible for drinking water quality, the water environment and for international development
- international water, sanitation, public health and disaster response NGOs
- utilities and city or regional scale development agencies
- industry providers of water technology and consulting services

### **WE PARTICULARLY FOCUS OUR RESEARCH, INNOVATION AND TEACHING TO IMPACT SPECIFIC SOCIETAL CHALLENGE AREAS:**

- meeting the global Millennium Development Goals for sustainable provision of safe drinking water and sanitation to all
- developing low carbon footprint solutions for desalination of saline waters
- optimising whole life cycle solutions for urban network infrastructure management
- understanding complex societal attitudes to water, from public perception of water quality and water rights to socio-economic and environmental regulation

# WATER INNOVATION CYCLE @ SWIRL



## LEARNING

- We start by supporting interest and learning about water at schools.
- We introduce undergraduates to water issues and challenges.
- Our multi-pathway water MSc provides in-depth learning on public health, science, engineering and regulation with an international context.
- We are a UK leader in the Industrial Doctorate Training Centre programme.
- We support continuous professional development including training NGO staff on water and sanitation aid and emergency response.



## PARTNERSHIP

Water is such a vital and pervasive part of life on our planet that no single organisation can meet all of our learning, research or innovation needs.

We understand the value of long-term collaboration and partnerships with others, from joint research to improving and optimising existing infrastructure and service offers.

We are experienced in sharing knowledge, staff and specialist facilities with organisations in many regions of the world and can leverage funds to support knowledge exchange and technology transfer.



## CHALLENGES ON PLANET WATER

We call our planet "Earth" but viewed from space, "Planet Water" might be a more accurate description. Water, with about 3.5% of dissolved salts, covers 75% of the surface of our world. These oceans hold an estimated 1.4 billion cubic kilometres of this vital, life-supporting resource.

Energy from the sun has driven evaporation and our weather systems to produce rain and freshwater for life on the planet for perhaps 4 billion years. So, contrary to some media articles, the planet is unlikely to run out of water soon.

However, in the 21st century, human population growth, urbanisation, our behaviour and our use of technology result in potentially undesirable rates of change to the distribution and quality of our water environment.

Many of the water challenges we are facing are about fair, timely and affordable access to freshwater, safe drinking water and non-polluting waste disposal, for both humanity and our environment.



## RESEARCH

We are unusual in having active, water related researchers, in every one of our faculties. This enables researchers to develop both a deep understanding of their specific water challenge and also a wider, multi-disciplinary and societal context to their research.

We have a wide funding base for water research, from UK and EU research councils to international agencies, and the water industry.



## INNOVATION

We seek to go beyond the "research" stage and help others apply new knowledge and understanding to provide solutions and lasting benefits for local or global water related issues. This can vary from laboratory and field trials of new techniques and technologies to contributing to World Health Organisation guidance manuals on public health provision. We actively support our water related spin out companies such as Modern Water.

## SWIRL GENERAL CONTACT

Professor Soon-Thiam Khu (Leader) s.khu@surrey.ac.uk  
Mr Tony Rachwal (Industrial Business Fellow) t.rachwal@surrey.ac.uk  
Miss Kirstie Hatcher (Project Officer) k.hatcher@surrey.ac.uk

## URBAN NETWORK INFRASTRUCTURE, MATERIALS, MODELLING & OPTIMISATION

Prof Soon-Thiam Khu s.khu@surrey.ac.uk  
Prof Marios Chryssanthopoulos mkchry@surrey.ac.uk  
Prof Angela Danil de Namor a.danil-de-namor@surrey.ac.uk  
Prof Paul Smith p.smith@surrey.ac.uk  
Dr Mike Mulheron m.mulheron@surrey.ac.uk  
Dr David Jesson d.jesson@surrey.ac.uk

Key research areas are impact of urbanisation on water infrastructural systems and modelling of urban water systems (Prof. Khu), materials and component condition assessment research (Prof. Smith, Dr. Mulheron, Dr. Jesson), identifying and managing risks, infrastructure resilience (Prof. Chryssanthopoulos), new materials in for environmental protection (Prof. Danil de Namor), and integrating urban utility asset management and urban sustainability.

## NOVEL TREATMENT PROCESSES AND TECHNOLOGIES

Dr Sabeha Ouki s.ouki@surrey.ac.uk (CEHE)  
Dr. Devendra Saroj d.saroj@surrey.ac.uk

## CENTRE FOR OSMOSIS RESEARCH & APPLICATIONS (CORA)

Prof Adel Sharif a.sharif@surrey.ac.uk  
Dr. Aidong Yang a.yang@surrey.ac.uk  
Dr S. Ali Hosseini s.hosseini@surrey.ac.uk

## CHEMICAL SCIENCES

Prof. John Hay j.hay@surrey.ac.uk  
Dr. Gabriel Cavalli g.cavalli@surrey.ac.uk  
Professor Robert Slade r.slade@surrey.ac.uk  
Dr. John Varcoe j.varcoe@surrey.ac.uk  
Prof Neil I Ward n.ward@surrey.ac.uk

Key research areas are: chemical treatment (Dr. Ouki), membranes bioreactors (Dr. Saroj), low energy desalination and membrane separation research with strong funding from industry, such as Modern Water and Middle East funders (Prof Sharif), algae-based multifunctional systems (Dr. Yang), water systems integration, modelling and optimisation (Dr Hosseini), polymers (Prof. Hay, Dr. Cavalli), microbial fuel cells (Prof. Slade, Dr. Varcoe) and chemical analysis of trace elements and heavy metals in water (Prof. Ward).

## WATER, HEALTH AND SANITATION IN THE DEVELOPING WORLD

### CENTRE FOR ENVIRONMENTAL AND HEALTH ENGINEERING (CEHE)

Prof Barry Lloyd b.lloyd@surrey.ac.uk  
Dr. Katrina Charles k.charles@surrey.ac.uk  
Brian Clarke b.clarke@surrey.ac.uk

### POST GRADUATE MEDICAL SCHOOL (PGMS)

Dr Steve Pedley s.pedley@surrey.ac.uk  
Dr Kathy Pond k.pond@surrey.ac.uk

### SURREY SPACE CENTRE

Dr Raffaella Guida r.guida@surrey.ac.uk

### CHEMICAL SCIENCES

Prof Neil I Ward n.ward@surrey.ac.uk

Key research areas are: clean water and sanitation provisions (Prof. Lloyd, Mr. Clarke), risk management and assessment (Dr. Charles), microbiology and public health (Dr. Pedley, Dr. Pond), chemical analysis of trace elements and heavy metals in water (Prof. Ward), applications of satellite technology in water management (Dr. Guida).

## SOCIO-ECONOMIC, LEGAL AND ENVIRONMENTAL IMPACTS OF WATER MANAGEMENT

### LAW

Prof Rosalind Malcolm r.malcolm@surrey.ac.uk  
Prof Alison Clarke a.c.clarke@surrey.ac.uk  
Dr Thoko Kaime t.kaime@surrey.ac.uk

### CENTRE FOR ENVIRONMENTAL STRATEGY (CES)

Prof Matthew Leach m.leach@surrey.ac.uk  
Prof Chris France c.france@surrey.ac.uk  
Dr Jonathan Chenoweth j.chenoweth@surrey.ac.uk  
Dr Yacob Mulugetta y.mulugetta@surrey.ac.uk

### PSYCHOLOGY

Prof Chris Fife-Schaw c.fife-schaw@surrey.ac.uk

### SOCIOLOGY

Dr. Jane Fielding j.fielding@surrey.ac.uk  
Dr. Kate Burningham k.burningham@surrey.ac.uk

Key research areas are economic and environmental impact (Dr. Chenoweth), environmental regulation (Prof. Malcolm), land rights and property rights in natural resources (Prof. Clarke), International environmental law (Dr Kaime), risk perception (Prof. Fife-Schaw), environmental inequalities and vulnerable groups (Dr. Fielding, Dr. Burningham), life-cycle analysis (Prof. Leach, Prof. France), and environmental policy (Dr. Mulugetta).