School of Civil & Environmental Engineering

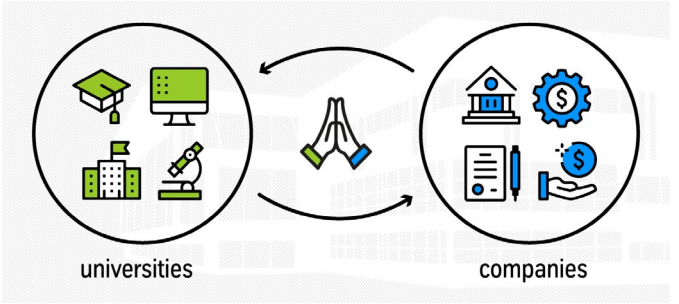
Research at the Faculty of Engineering and IT

Innovate for the future together. UTS is renowned for collaborating with industry partners on research that delivers practical, positive impact.

UTS RESEARCH: STRUCTURAL & MATERIALS ENGINEERING GROUP

Dr Kirk Vessalas
Head of Discipline,
Structural & Materials
Engineering

Cement & Concrete Research



Purpose built facilities at UTS Tech Lab

Industry led projects ($12M cash support)

Research led projects ($3M cash support)

Our expertise encompasses 100 years of industry experience

Structural & Materials Engineering (SME) Group

Dedicated Research Groups & Centres

1. Construction Materials and Structures Group
2. UTS Boral Centre for Sustainable Building
3. Centre for Built Infrastructure and Research

Multifaceted Approach: Scientists & Engineers

CBIR
Centre for Built Infrastructure Research

SME Group

Research Investigators	
Prof. Vute Sirivivatnanon	Dr Jun Li
Prof. Jianchun Li	Dr Wengui Li
Prof. Arnaud Castel	Dr Harry Far
Prof. Chengqing Wu	Dr Sanjay Nimbalkar
A/Prof. Anne Gardner	Dr Jianguang Fang
A/Prof. Shami Nejadi	Dr Mina Mortazavi
A/Prof. Xinqun Zhu	Dr Haleh Rasekh
Dr Kirk Vessalas	Dr Nadarajah Gowripalan
Dr Paul Thomas	Dr Pre De Silva (ACU)
Post Docs, PhDs, Support Staff, Capstones, Honours	

SME Group: Specialisation Areas

Low carbon cement and concrete

- Waste materials, new/next generation binders, rheology, time-dependent behaviour, durability, performance-based

Digital transformation

- Machine learning, smart/remote sensing, health monitoring, condition assessment, smart materials, nanotechnologies

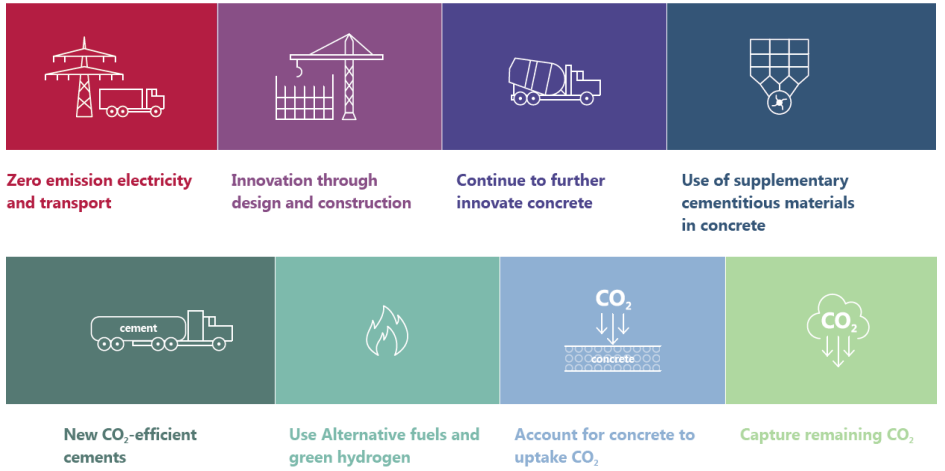
High performance structures

- Static/dynamic/fatigue/impact testing/modelling, ultra-high performance concrete, resilience, rehabilitation, repair

Sustainable buildings

- Zero-energy, green technologies, biogenic concrete, alternative materials, circular economy, life cycle assessment

Advancing Applied Research



Current Industry & ARC Led Projects

- *Balanced alkali limit for ASR risk-assessed concrete systems* (CCAA, $1.2M)
- *Shrinkage, cracking, self-healing and corrosion in blended cement concrete* (LP, $450K)
- *Assessment of slag use in concrete for use in rigid road pavements* (TfNSW, $120K)
- *Development of ultra-high performance concrete columns against blasts* (DP, $336K)
- *Decarbonising built environments with hempcrete and green wall technology* (LP, $250K)
- *Development of a ferronickel slag-based geopolymer concrete* (Canasia Australia, $60K)

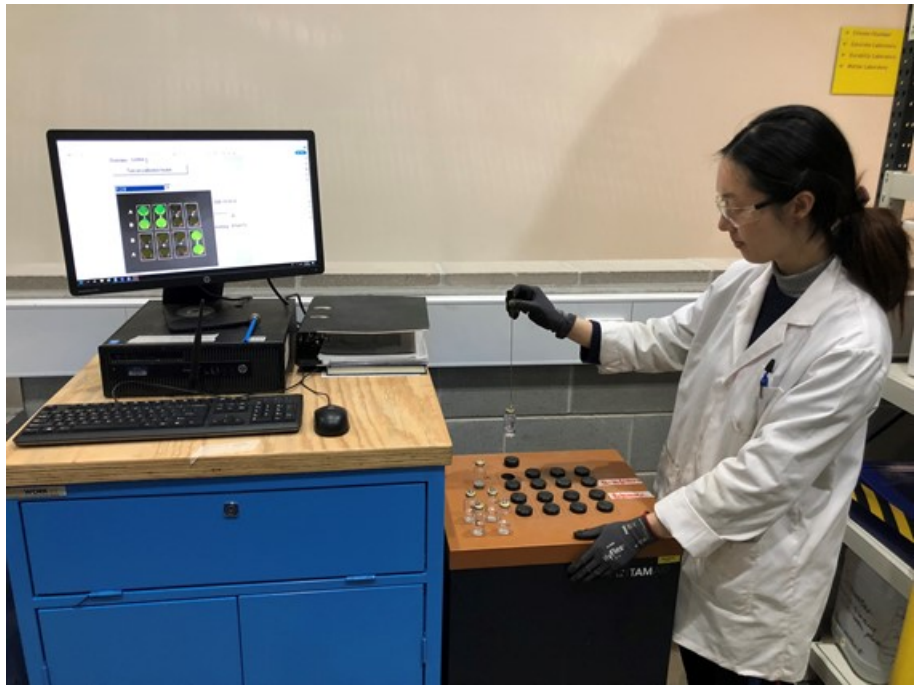
Research & Contract Testing Facilities at UTS Tech Lab

Multiple Batching, Mixing & Stress-Strain Testing Facilities

High Speed High Volume Concrete Mixer & Drying Shrinkage & Creep Testing Facilities

Large Capacity Multi-Solution AMBT & CPT Testing Facilities

Carbonation & RCP & Isothermal Calorimetry Testing Facilities



Collaboration & Partnerships

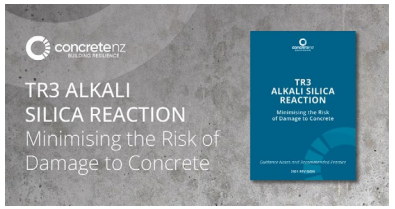
Institutional Collaboration
Prof. Karen Scrivener – EPFL, Switzerland
Prof. Mike Thomas – UNB, Canada
Prof. Doug Hooton – UToronto, Canada
Prof. Muhammed Basheer – UniversityLeeds, UK
Prof. John Provis, SheffieldUni, UK
Prof Raoul François, Université Toulouse, France
Prof. Tengfei Xu, SJWTU, China
Prof. Izabela Hager, Politechnika Krakowska, Poland
Prof. Lawrence Sutter, Michigan Tech, USA

Industry Partners
Dr Jason Nairn – CCAA (TLC, ACTC & CTC)
Dr Harish Srivastava – TfNSW
Mr Rob Gaimster – Concrete New Zealand
Dr Daksh Baweja – BG&E Pty Ltd
Dr Louise Keyte – Boral Australia
Mr Paul Kidd – Cement Australia
Mr Paul Rocker – Holcim Australia
Mr Peter Sleep – Humes Australia
Mr Craig Heidrich – APozA

Advancing Applied Research: Outputs & Impact

- Standards, handbooks, guidelines (SA BD-002, SA BD-007, SA BD-020, SA BD-031 (AS 3582.4:2022), SA BD-090, SA CE-012, SA WS-006, SA HB79, SA HB84, NZ TR 3, NZ TR 11, RILEM TC 283-CAM)
- Journal and conference publications (300+ within last 5 years)
- Spin off projects (Boral, Concrete NZ, Holcim, TfNSW, BG&E, Canasia Australia, Australian Hemp Masonry Company)
- SmartCrete CRC and Innovative Manufacturing CRC
- Industry placements (CCAA, Boral, ARUP, BG&E)
- Industry experts teaching current practice (49151 Concrete Technology and Practice, 42907 Design for Durability and 48352 Construction Materials)

STANDARDS Australia 100
CELEBRATING 100 YEARS 1922-2022



SmartCrete CRC

imcrc

Summary & Conclusions

Expertise developed:

- Assessing efficacy of SCMs, mineral additions and novel SCMs
- Developing and advancing new generation concrete binders
- Developing innovative screening and rapid testing methods
- Repurposing functionality of waste materials for circular economy
- Establishing performance-based criteria and testing framework
- Advancing binder capabilities in concrete to mitigate corrosion and cracking
- Modelling and predicting robustness, serviceability and sustainability metrics

Thank You