Concrete Research at UQ

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THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

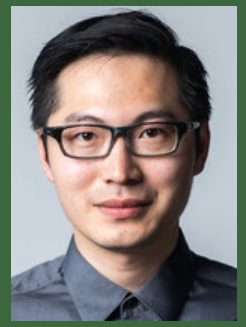
Presentation at *Pathways to Concrete Research Forum, 2022*

Concrete/Structures Academics @ UQ

Concrete/Structures group members:

- Dr Shujian Chen
- A.Prof Vinh Dao
- A.Prof Johnny Ho
- A.Prof Liza O'Moore
- **New member**: the new TMR Chair



Structures members with concrete-related research:

- Prof. Chien Ming Wang
- Prof. Sritawat Kitipornchai
- A.Prof Joe Gattas
- Dr David Lange




Researchers from Sustainable Minerals Institute; Australian Institute for Bioengineering and Nanotechnology; School of ITEE; Advanced Water Management Centre;

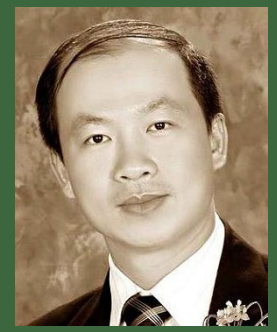
Concrete/Structures Facilities @ UQ

Advanced Engineering Building:

- Dedicated Concrete Lab;
- Structures Lab;
- Fire lab;
- Materials/composite/… Labs;

Concrete/Structures Research @ UQ

- → Low-carbon-footprint high-performance cement/concrete;
- → Performance of concrete/structures from early age;
- → Crack control in concrete structures;
- → Creep, shrinkage, durability of concrete structures;
- → 3D/4D concrete printing;
  - A.Prof Vinh Dao
  - A.Prof Liza O'Moore
  - A.Prof Johnny Ho
  - Dr Shujian Chen (ARC DECRA Fellow)
- → Performance of concrete/structures at elevated temperatures:
  - A.Prof Vinh Dao; Dr David Lange
- → LC^3 :
  - Prof Daniel Frank; A.Prof Vinh Dao; Dr Pratheep Kumar Annamalai;
- → Non-destructive assessment/evaluation technologies :
  - Prof Amin Abbosh;



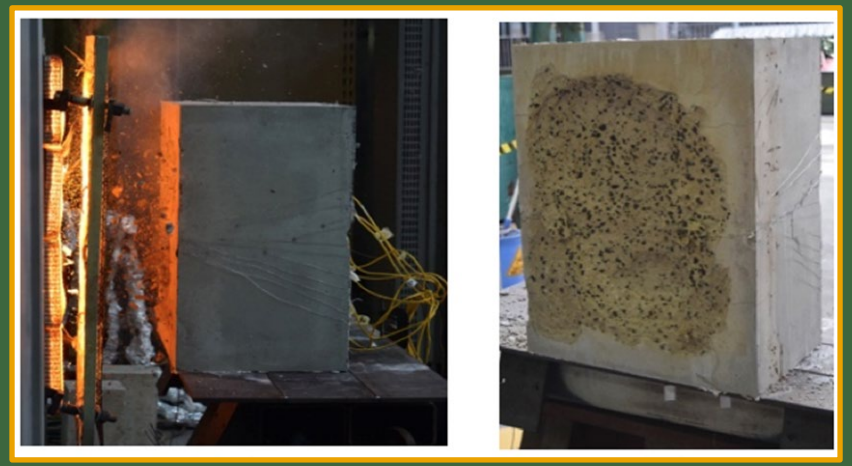


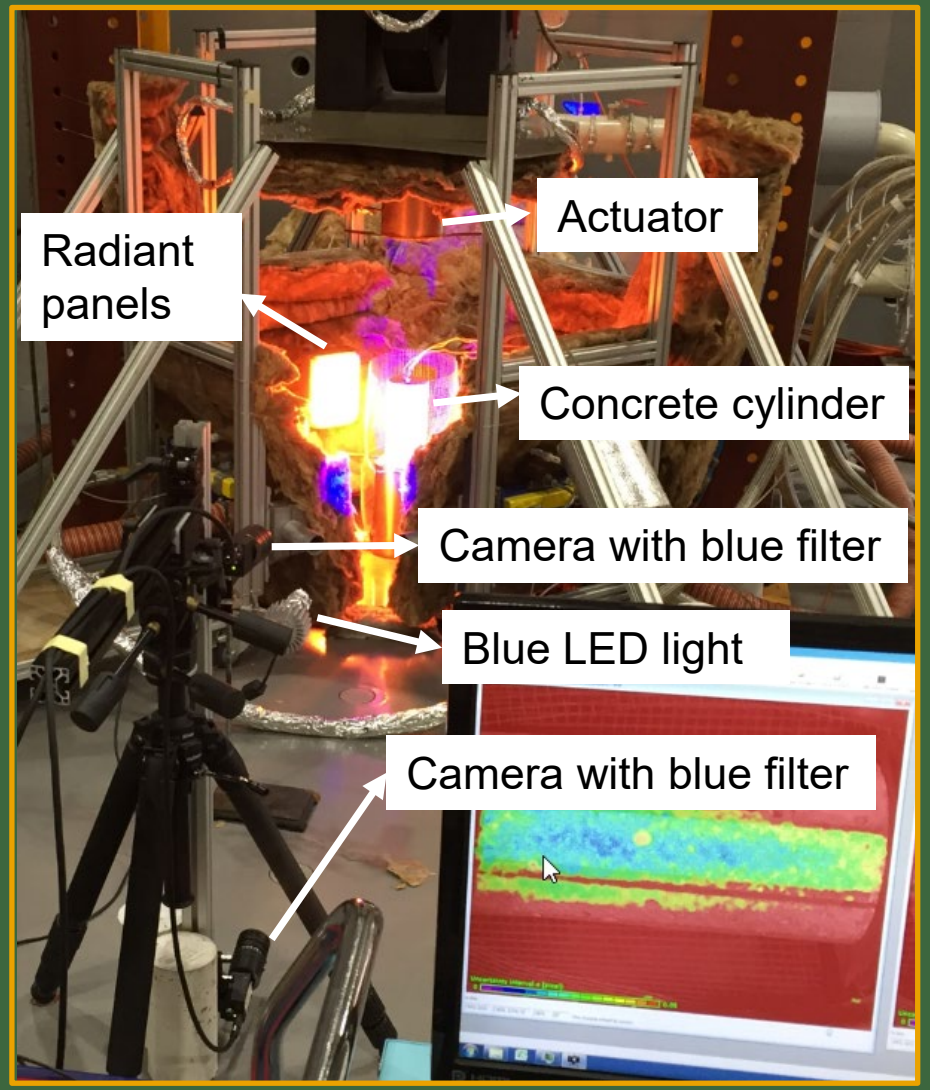
Performance of concrete/structures at elevated temperatures

Key research objectives:

- Thermal boundary conditions in fire tests
- Deformation capturing of concrete at elevated temperatures

- Revised materials/structural models
- Coupled effects of stress and temperature changes
- Concrete spalling in fire





Performance of concrete structures from early age

$$\sigma_t = RKE_c[\varepsilon_{as} + \varepsilon_{th} + \varepsilon_{ds}] \rightarrow [f_t]$$

Key research objectives:

- Autogenous shrinkage ε_{as}? ε_{as} for practical temperature histories?
- Thermal deformation: CTE, zero-stress temperature,
- Creep,…
- Effective crack control
- Coupled effects of stress and temperature change