Centre for Future Timber Structures
Joe Gattas, School of Civil Engineering, University of Queensland
About Me: Origami Engineer

Space Solar Panel
NASA Jet Propulsion Laboratory

Military Shelter
Kinetic Structures Laboratory, University of Notre Dame

Origami Stent
University of Oxford

Transitional Shelter
University of Oxford & University of Queensland

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BrisBIM
12 April 2017 | 2/19
Parametric Geometry

Origami

Kirigami

Modular

Form Found
(Sheet) Material Fabrication
Overall Objective: Tall Timber

Tallest built:

- Limnologen (8) Sweden
- Murray Grove (9) UK
- Forté (9) Melbourne

Tallest under construction:

- Dalston Lane (10) London
- Trehus (14) Norway
- Brock Commons (17) Canada
- The Toothpick (??) UK

Tallest possible?

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Fire Engineering

How does timber burn? Timber lining self-extinguish under the right conditions.

UQ Fire Lab
Testing a wide range of scales (~0.1 mm to ~10 m) for comprehensive characterisation of material/product fire response.
Structure & Systems

Hybrid & integrated products/systems

New Engineered Wood Products

Vibration, acoustic & thermal performance, moisture & durability, connections & robustness

PassivHaus New Zealand [PHNZ], Paola Leardini
Computational Design: Smart Operations & Simulation

Simulation based analysis: Construction process modelling with virtual reality
Sensor-based operations analysis & decision support systems for construction

Further information: SangHyung Ahn
<sanghyung.ahn@uq.edu.au>
Computational Design: Mechanics, Optimisation & AI

Computational geometry & mesh generation
Computational mechanics & materials
Genetic algorithms, multi-objective optimisation & artificial intelligence

Further information: Dorival Pedroso < pedroso@cpmech.com>
Computational Design: Digital Fabrication (of Timber)
Prefabricated State-of-the-Art

Image: Wood Innovation Design Centre
6 Storey, Commercial, Pure Timber

Image: Brock Commons
18 Storey, Residential, Hybrid

Post-and-Beam

Panelised
Digital Fabrication State-of-the-Art

Image: Seine Musicale by Shigeru Ban, Paris
1200+ Glulam pieces, ~110 lamella ea.

Image: Tamedia Office Building
7 Storey, Commercial, Pure Timber including Connections

Control & Speed

Value Capture
Integrated Computational Design – Where To?

- CAD (Design)
- BIM (Construction)
- Analysis
Integrated Computational Design – Where To?

Parametric Design

- CAD (Design)
- BIM (Construction)

Analysis
- Operations Simulation
- Digital Fabrication

Optimisation
- Visualisation & Monitoring (VR, AR, Scans, Smart Sites)
- Robotic Construction
Thank You & Questions

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