... we want 400 m tall timber buildings

... and we can’t wait!
Enormous pressure ...

Murray Grove – UK (9)

Forté – Melbourne (9)

Limnologen – Sweden (8)

Tall Wood Research Project (10-30)

Barenthus, Norway (17)

Stockholm, Sweden (34)

Dalston Lane
London (10)

Trehus Bergen
Norway (14)

London (80)

Brock Commons
Canada (17)

SOM, Chicago
USA (42)
Media pressure ...

Construction in wood may hold solution to urban sprawl

Would you live in a wooden skyscraper?

A Douglas fir tree is a marvel of nature and engineering. The trunk, made mostly of dense hardwood cells, can reach heights of 200 meters. It is simple and efficient to grow in forests without spraying, yet strong enough to support it and to withstand winds up to 300 miles per hour. Which tree is more sustainable? And a single tree can store ten times its weight in carbon and remove 90% of emissions...it
dramatically justifies wood being valued within our cities.

Not far from Canada, architect with Douglas fir the most obvious effect yet to happen these sustainable qualities in a human structure is using A few kilometers from downtown
• ... more sustainable!
• ... faster and easier to build!
• ... structural engineers can make it happen!
• ... timber engineers can make them durable!

Can anyone afford to be the one that says no?
Encapsulation: Can structural timber be exposed?
• Exposed timber adds a premium ... so lets expose!
... are we capable of delivering safe timber buildings?
Life Safety of Occupants and Firefighters

• The Conventional Fire & Timber Structures
  o Fire growth is unaffected by the timber structure – Life Safety of occupants
  o The fire remains confined to one floor and the maximum magnitude is not affected by the timber structure – Life Safety of firefighters
  o Once the furnishings fuel is consumed the structural timber will self-extinguish – Structural Integrity (Life Safety of occupants and firefighters)
Once all combustible furnishings are consumed (burn-out), the Structural Timber loses the heat feedback from the fire and the flame quenches.
$T_{\text{max}}$ (Thomas, 1972)

Intense Burning (post flashover)

~15 min
Unresolved Problems

- Delamination
  - Thickness of the exposed lamella
  - Integrity of the glue line
  - Influence of mechanical loads
  - etc.
Single Floor Fire: Detailing of the Curtain Wall
Science or Marketing?
Trying to Change the Rules?

Do we create building codes to make projects possible or do we create knowledge that deliver new building codes?

To make the building possible the provincial government of British Columbia had to pass new regulations which allowed Brock Commons to exceed timber-structure height limits as long as it complied with rigorous fire standards. To meet these demands, all of the CLT and glulam components in the project have been enhanced by complete encapsulation with three to four layers of fire-rated Type X gypsum board. This has resulted in a building that is even more resistant to fire than an equivalent concrete or steel tower.
Timber is a wonderful construction materials that has been used in a safe manner for centuries ... we want to extend its use far beyond anything we have done before ... are we being responsible in the way we are doing it?