WoodWorks™
WOOD PRODUCTS COUNCIL

Wood's Contributions to Biophilic Design

October 20, 2020 | Janelle Leafblad, PE | Regional Director, WoodWorks


Natural Wood Material
Biophilic Design

Study of Wood vs. Non-wood Finishes

Wood and Human Health

- Univ. of British Colombia & FP Innovations study
- 4 rooms: white furnishings vs. wood furnishings; plants vs. no plants

"Stress, as measured by sympathetic nervous system activation, was lower in the wood room in all periods of the study."

Source: *Wood and Human Health*
https://www.woodworks.org/wp-content/uploads/2014-SE-WSF-Fell-Healthy-Buildings.pdf

Biophilic Design Patterns
Nature in the Space

	Pattern	Stress Reduction	Cognitive Performance	Emotion, Mood & Preference
Nature in the Space	Visual Connection w/ Nature	✓	✓	✓
	Non-Visual Connection w/ Nature (smell, touch)	✓	✓	✓
	Non-Rhythmic Sensory Stimuli	✓	✓	
	Thermal & Airflow Variability	✓	✓	✓
	Presence of Water	✓	✓	✓
	Dynamic & Diffuse Light	✓		
	Connection w/ Natural Systems			✓

Source: Terrapin Bright Green: *14 Patterns of Biophilic Design*, 2014

How Might Wood Buildings Contribute to Biophilic Design?

Nature in the Space

	Pattern	
Nature in the Space	Visual Connection w/ Nature	Design opportunity (glazing/ courtyards)
	Non-Visual Connection w/ Nature (smell, touch)	Smell & touch – might the soft wood feel & wood scent contribute?
	Non-Rhythmic Sensory Stimuli	Design opportunity (biomimicry)
	Thermal & Airflow Variability	Wood is a living material & can help control temperature & humidity
	Presence of Water	Design opportunity (water features)
	Dynamic & Diffuse Light	Design opportunity (timber slats)
	Connection w/ Natural Systems	Wood buildings support healthy forests

Source: Conversations and emails between Bill Browning (Terrapin Bright Green) and Melissa Kroskey (WoodWorks)

Biophilic Design Patterns

Natural Analogues

Nature of the Space

	Pattern	Stress Reduction	Cognitive Performance	Emotion, Mood & Preference
Natural Analogues	Biomorphic Forms & Patterns			✓
Natural Analogues	**Material Connection w/ Nature**		✓	✓
Natural Analogues	**Complexity & Order**	✓		✓
Nature of the Space	Prospect	✓	✓	✓
Nature of the Space	Refuge		✓	
Nature of the Space	Mystery			✓
Nature of the Space	Risk/ Peril			✓

Source: Terrapin Bright Green: *14 Patterns of Biophilic Design*, 2014

How Might Wood Buildings Contribute to Biophilic Design?

Natural Analogues

Nature of the Space

	Pattern	
Natural Analogues	Biomorphic Forms & Patterns	Design opportunity (symbolic patterns)
	Material Connection w/ Nature	Wood material connects us w/ nature
	Complexity & Order	Wood grain pattern – might it stimulate our senses?
Nature of the Space	Prospect	Design opportunity (distant views – atriums/ open offices)
	Refuge	Design opportunity (quiet spaces in an office warmed w/ wood)
	Mystery	Design opportunity (open wood screens)
	Risk/ Peril	Design opportunity (view down @ atrium)

Source: Conversations and emails between Bill Browning (Terrapin Bright Green) and Melissa Kroskey (WoodWorks)

Material Connection to Nature (visual)
Biophilic Pattern

- Wood is a natural material – timber is sourced from trees in our forests.
- Exposing natural materials provides a connection to nature in this biophilic pattern

Material Connection to Nature (non-visual)
Biophilic Pattern

Other sensory connections to nature:

- Soft feel of wood – might this contribute to this biophilic pattern?
- Smell of wood in offices- might this contribute to this biophilic pattern?
- Smell of wood has surprised some designers who didn't consider it in design

Albina Yard
LEVER Architecture | Photo: LEVER Architecture


Office Buildings
Biophilic Design

Wellness + Wood = Productivity

Workplaces

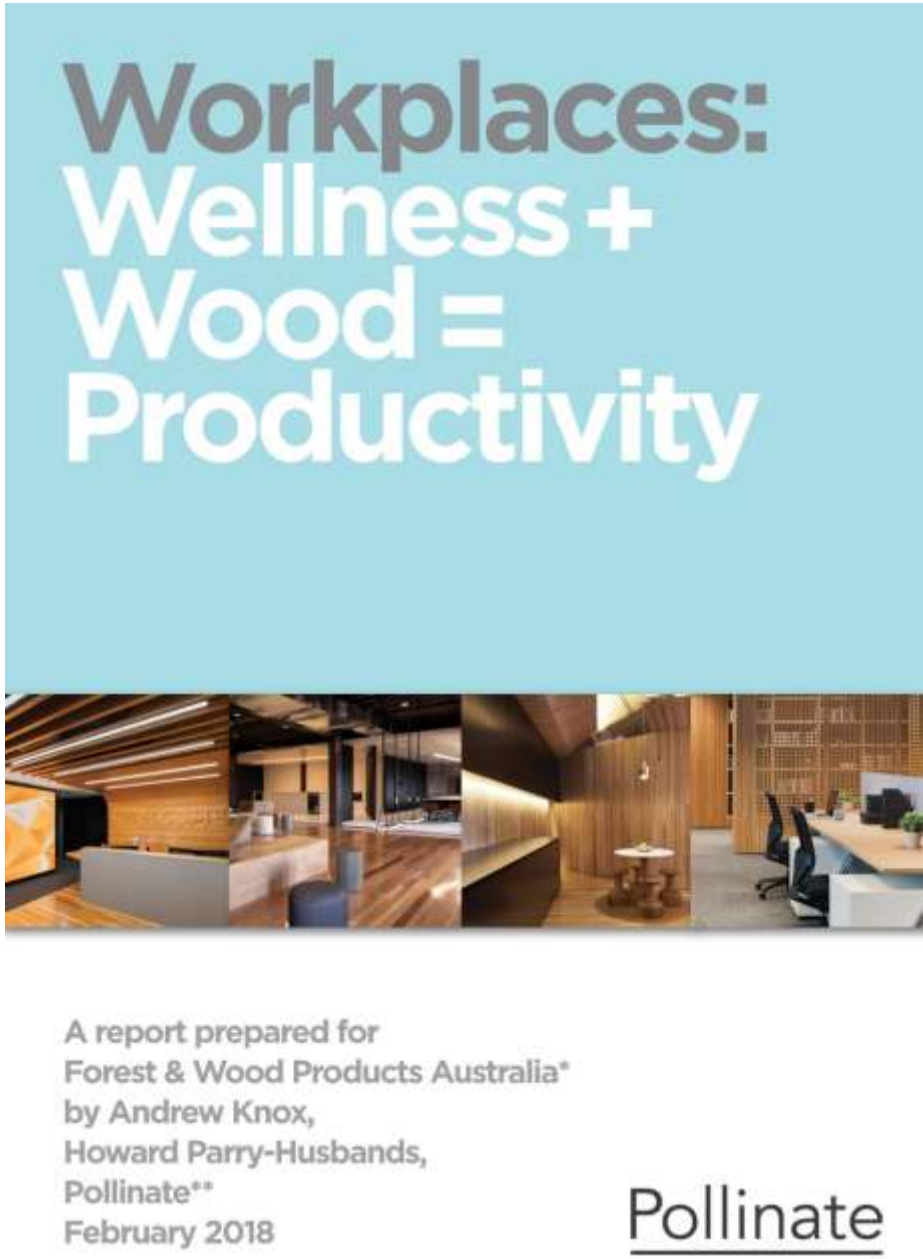
"Those in workplaces with a higher proportion of **visible wood** **feel more connected to nature** and rate their working environment far more positively."

These people report:

- lower stress levels
- higher concentration
- improved overall mood

"**Wood** in the workplace is associated with **higher productivity** and **reduced sick leave**."

Report based on survey of 1,000 typical Australians working indoors



First Tech Credit Union | Image: Hacker

Employee Retention
Healthy Building/ Biophilia

Cost of losing an employee (assume: $33/ hr):

$ 1,000 termination
$ 9,000 replacement
$15,875 lost productivity
$25,875 total

The Hudson
Mackenzie | Photo: Christian Columbres

Sources by Terrapin Bright Green:
- *Economics of Biophilia*, 2012
- *14 Patterns of Biophilic Design*, 2014
  (includes list of testing citations)

Natural Materials for Warm Gathering Spaces
Amenity Spaces

- Modern amenities battle: Spaces for informal collaboration are in demand
- Amenities provide a place to recharge & interact
- Connection to nature proven most impactful through outdoor access*
- Connection to nature indoors through materials & views is beneficial*

Clay Creative
Mackenzie | Photo: Christian Columbres

T3 Minneapolis
Michael Green Architecture | Photo: Ema Peter

* Source: *14 Patterns of Biophilic Design*, Terrapin Bright Green, 2014
(includes list of testing citations)

Heavy Timber Revolution: California's Hip New Commercial Block
ICE Block I

Location: Sacramento, CA
Architect: RMW Architecture & Interiors
Engineer: Buehler Engineering

IIIB

- 3 Story heavy timber over podium
- 87,460 sf
- Traditional heavy timber

"The **building sold itself** because of its unique character. There was no competition. **A lot of the credit goes to the fact that it is a timber building**."

– Mike Heller, Heller Pacific

Tech Companies Invest in Healthy Corporate Campuses

Microsoft Silicon Valley Campus

Microsoft Campus | Image: WRNS Studio

Connecting with Nature & Targeting Environmental Goals

Microsoft Silicon Valley Campus

Microsoft Campus | Images: WRNS Studio

Biophilic Design Schools

A Living/ Learning Destination for Students

Adohi Hall, University of Arkansas


Photo: Timothy Hursley

Location: Fayetteville, AR
Architect: Leers Weinzapfel Associates; Mackey Mitchell Architects; Modus Studio (AOR)
Structural Engineer: Equilibrium Consulting; Engineering Consultants, Inc.

IIIB

- 202,000 sf
- 708 bed student housing
- CLT and glulam framing

"…the wood-based construction system we developed forges a bond between setting, human comfort, and sustainability."

– Andrea Leers, Leers Weinzapfel

Biophilic Design
Multifamily Residential

Multifamily – Structural Warmth is a Value-Add

TMBR (unbuilt) Minneapolis, MN | Images: D/O Architects

Innovative, Sustainable, Tall Timber Multifamily
Carbon 12

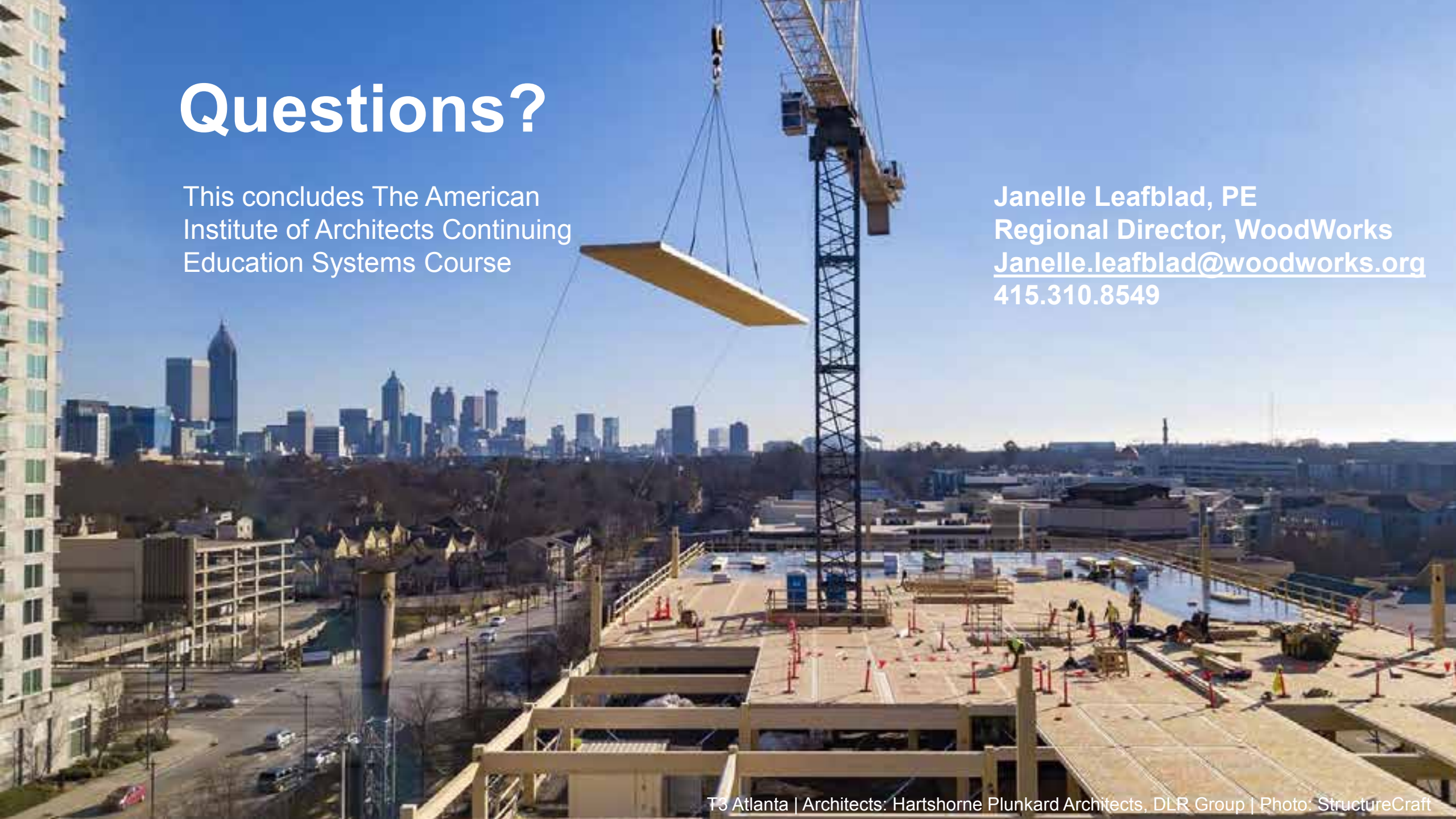
- 42,000 sf
- 8-story tower
- 14 condos + 2 retail units
- CLT and glulam framing
- Each unit has light & ventilation from 3 sides

Location: Portland, OR
Architect: Path Architecture
Structural Engineer: Munzing Structural Engineering

Questions?

This concludes The American Institute of Architects Continuing Education Systems Course

Janelle Leafblad, PE
Regional Director, WoodWorks
Janelle.leafblad@woodworks.org
415.310.8549



T3 Atlanta | Architects: Hartshorne Plunkard Architects, DLR Group | Photo: StructureCraft

Copyright Materials