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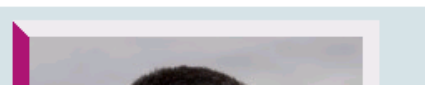
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Research

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Frank Lam

Professor

Senior Chair Professor Wood Building Design and Construction

Research Interests: [engineering](#), [wood products](#)

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[Teaching and Research](#)

[Publications](#)

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My main research interests are in the development of fundamental knowledge on the performance of solid sawn timber, wood-based composites, and engineered wood systems. The aim is to qualify performance and apply the developed basic knowledge to improve the utilization of structural wood products by addressing issues relevant to the forest products industries in the field of timber engineering and wood-based composites mechanics.

Specific interests include:

- Modeling the interacting influence of wood fiber geometry and orientations on the physical and strength properties of wood based composites through the applications of stochastic theory, engineering mechanics, finite element methods, and robot-based forming systems.
- Use of fiber reinforcement to enhance the performance of wood products.
- Modeling and testing of timber components and structures subject to seismic and other loadings.
- Development of random field model to study the within member variation of strength properties in lumber.
- Establishing in-grade based test data to evaluate mechanical properties of wood products.
- Development of advance grading techniques to improve strength predictions of lumber.
- Reliability-based evaluation of performance.

Projects

Strategic Network on Innovative Wood Products and Building Systems

NSERC

Reliability of Timber Structure Under Seismic Loading

NSERC

Performance of structural composite lumber

Ainsworth Lumber Co.

Size effect adjustment factor of glulam

NRCAN Value to Wood

Development of Technology for Cross Laminate Timber Building Systems

FII program

Study of production of laminae and performance of laminated structural products from BC coastal hemlock

FII program

Structural Performance of Japanese Post and Beam Shear Wall Systems

Coast Forest Lumber Assoc.

Unit Associations

Institute for Computing Information and Cognitive System (ICICS)

Professional Affiliations

Association of Professional Engineers and Geoscientists of BC APEGBC

Canadian Society of Civil Engineers CSCE

Fellow International Academy of Wood Science IAWS

Fellow, Institute of Wood Science

Awards

L.J. Markwardt Wood Engineering Award, Forest Products Society – for distinguished contribution to the knowledge of wood as an engineering material and to the enhancement of the efficient utilization of this renewable resource 1999

Japan Science and Technology Agency (STA) Research Fellowship, Government of Japan Science and Technology Agency 2001

Current Graduate Students

Yuan (Alex) Li, PhD

Jingjing Liu, PhD

Hyung-Suk (Thomas) Lim, PhD

Seismic performance assessment of wood composite post-and-beam shear wall.

Xiaoqin (Lisa) Liu, PhD

Current Courses

Summer 2013

No WOOD course(s) were found for S2013 term. Summer 2013

No WOOD course(s) were found for S2013 term. Summer 2013

No FRST course(s) were found for S2013 term.

Selected Publications

Li Z., M. He, F. Lam, M. Li, R. Ma, Z. Ma (2014). **Finite element modeling and parametric analysis of timber-steel hybrid structures** John Wiley & Sons, Ltd. *The Structural Design of Tall and Special Buildings*

Chang F-C, F. Lam, J.F. Kadla (2014). **The effect of temperature on creep behavior of wood-plastic composites** *Journal of Reinforced Plastics and Composites*

Yang R.Z., Y. Xiao, F. Lam (2014). **Failure analysis of typical Glulam with bidirectional fibers by off-axis tension tests** Elsevier Science *Construction & Building Materials* 58:9-15

Klippel M, C. Leyder, A. Frangi, M. Fontana, F. Lam, A. Ceccotti (2014). **Fire Tests on Loaded Cross-laminated Timber Wall and Floor Elements** *In Proc. 11th International Symposium on Fire Safety Science*

Chang F-C, F. Lam, J.F. Kadla (2013). **Using master curves based on time-temperature superposition principle to predict creep strains of wood-plastic composites** *Wood Science and Technology* 47(3):571-584

Chang F-C, F. Lam, J.F. Kadla (2013). **Application of time-temperature-stress superposition on creep of wood-plastic composites** *Mechanics of Time-Dependent Materials* 17(3):427-437

Chen Y. and F. Lam (2013). **Bending performance of box based cross laminated timber systems** *Journal of Structural Engineering. ASCE* 139(12)04013006

He M., Z. Li, F. Lam, R. Ma, Z. Ma (2013). **Experimental investigation on lateral performance of timber-steel hybrid shear wall systems** *Journal of Structural Engineering ASCE Accepted for publication April 2013*

Closen M. and F. Lam (2012). **Performance of Moment Resistance Self-tapping Screw Assembly under Reverse Cyclic Load** *-In Proc. 12th WCTE Auckland, New Zealand. CD-ROM Proceedings.*

Liu X. and F. Lam (2012). **Reliability Based Evaluation of Single Lateral Bracing Forces in Compression Web Members of Metal Plated Wood Trusses** *-In Proc. 12th WCTE Auckland, New Zealand. CD-ROM Proceedings.*

Zhu F., Z. Chen, J. Ren, F. Lam (2012). **Structural Performance of Box Gable Roofs of Xing-Yuan Wood**

Li M., Z. Chen, J. Pan, F. Lam (2012). **Structural Performance of Dou-Gong Brackets of Tingxian Wood Pagoda under vertical loading** *In Proc. 12th WCTE Auckland, New Zealand. CD-ROM Proceedings.*

Song X+ and F. Lam (2012). **Stability analysis of metal-plate-connected wood truss assemblies** *-Journal of Structural Engineering. ASCE. 138(9):1110-1119.*

Li M., F. Lam, B.J. Yeh, T. Skaggs, D. Rammer and J. Wacker (2012). **Modeling Force Transfer around Openings in Wood-frame Shear Walls** *-Journal of Structural Engineering. ASCE. 138(12):1419-1426.*

Li M. +, F. Lam, R.O. Foschi, S. Nakajima, T. Nakagawa (2012). **Seismic Performance of Post and Beam Timber Buildings I: Model Development and Verification** *-Journal of Wood Science. 58:20-30.*

Li M. +, F. Lam, R.O. Foschi, S. Nakajima, T. Nakagawa (2012). **Seismic Performance of Post and Beam Timber Buildings II: Reliability Evaluations** *Journal of Wood Science. 58:135-143.*

Li, M. +, Foschi, R. O. and F. Lam. (2012). **Modeling hysteretic behaviour of panel-sheathed wood shear walls with protocol-independent nail connection algorithm** *Journal of Structural Engineering. ASCE. 138(1):99-108.*

Robertson A.B., F. Lam, and R.J. Cole (2012). **A Comparative Cradle-to-Gate Life Cycle Assessment of Mid-Rise Office Building Construction Alternatives: Laminated Timber or Reinforced Concrete.** *-Buildings 2:245-270.*

Hong J.P.+ , J.D. Barrett and F. Lam (2011). **Three-dimensional finite element analysis of the Japanese traditional post and beam connection** *-Mokuzai Gakkaishi (Journal of the Japan Wood Research Society). 7:119-125.*

Wang J.B. +, F. Lam, R.O. Foschi (2011). **Duration-of-load and creep effects in strand-based wood composite: experimental research.** *-Wood Science and Technology. 46:361-373.*

Wang J.B. +, , R.O. Foschi, F. Lam (2011). **Duration-of-load and creep effects in strand-based wood composite: a creep-rupture model** *-Wood Science and Technology. 46:375-391.*

Tannert T, Lam F and Vallée T (2011). **Structural performance of rounded dovetail connections: experimental and numerical investigations** *European Journal of Wood and Wood Products. 69:471–482.*

Lam, F., M. Li, R.O. Foschi, S. Nakajima, T. Nakagawa (2011). **Performance of Timber Buildings in Earthquakes** *-In Proc. 11th Int'l Conf. on Applications of Statistics and Probability in Civil Engineering. Zurich Switzerland.*

Skaggs, T., B.J. Yeh, F. Lam, M. Li, D. Rammer, J. Wacker (2011). **Modelling Force Transfer Around Openings of Full-Scale Shear Walls** *-In Proc. Int'l Council for Building Research and Innovation in Building and Construction Working Commission W18-Timber Structures, Alghero, Italy. CIB-W18/44-15-3. pp10.*

Song X. and F. Lam (2010). **Stability capacity and lateral bracing requirements of wood beam-columns** - *Journal of Structural Engineering*. ASCE. 136(2):211-218

Song X. and F. Lam (2010). **Reliability analysis of metal plate connected wood truss assemblies concerning buckling failure** -In Proc. 11th WCTE Riva del Garda, Italy. CD-ROM Proceedings.

Tannert T., T. Vallee, F. Lam (2010). **Probabilistic capacity prediction of timber joints under brittle failure modes** -In Proc. Int'l Council for Building Research and Innovation in Building and Construction Working Commission W18-Timber Structures, Nelson N.Z. CIB-W18/43-*. pp13.

Skaggs, T., B.J. Yeh, F. Lam, D. Rammer, J. Wacker (2010). **Full-scale shear wall tests for force transfer around openings** -In Proc. Int'l Council for Building Research and Innovation in Building and Construction Working Commission W18-Timber Structures, Nelson N.Z. CIB-W18/43-*. pp10.

Lam F., M. Li, R. Foscho, S. Nakajima, N. Kawai C. Minowa, M. Okabe, N Yamaguchi, and T. Nakagawa (2010). **Seismic performance of post and beam buildings** -In Proc. 11th WCTE Riva del Garda, Italy. CD-ROM Proceedings.

ValleeT., T. Tannert and F. Lam (2010). **Probabilistic design method for timber joints** -In Proc. 11th WCTE Riva del Garda, Italy. CD-ROM Proceedings.

Tannert T, Lam F, Vallee T (2010). **Strength prediction for rounded dovetail connections considering size effects** ASCE Journal of Engineering Mechanics, 136(3):358:366

Chang, F.C. and F. Lam (2010). **Feasibility of using mountain pine beetle attacked wood to produce wood-plastic composites: preliminary work** -*Wood and Fiber Science*. 42(1):107-116.

Song X., F. Lam., H. Huang+, and M. He (2010). **Capacity of Metal Plate Connected Wood Truss Assemblies.** - *Journal of Structural Engineering*. ASCE. 136(6):723-730.

Gehloff M. +, M. Closen +, and F.Lam (2010). **Reduced edge distances in bolted timber moment connections with perpendicular to grain reinforcements** -In Proc. 11th WCTE Riva del Garda, Italy. CD-ROM Proceedings

Lam F., M. Gehloff M.+, and Closen M.+ (2010). **Moment resisting bolted timber connections** -*Proceedings of the Institution of Civil Engineers – Structures and Buildings* 163(4):267-274.

Song X.+ and F. Lam (2009). **Laterally braced wood beam-columns subjected to biaxial eccentric loading** - *Computers and Structures*. 87:1058-1066.

Y. Chen, J.D. Barrett and F. Lam (2009). **Mechanical properties of Canadian coastal Douglas-fir and Hem-Fir** - *Forest Products Journal*. 59(6): 44-54.

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Tannert T. and F. Lam (2008). **Design Guideline for Rounded Dovetail Connections** -*18th Analysis and Computation Specialty Conference. ASCE Structural Congress 2008 Crossing Borders. Vancouver Canada. CD-ROM Proceedings.*

Song X. and F. Lam (2008). **Stability analysis of eccentrically loaded wood beam-columns** -*18th Analysis and Computation Specialty Conference. ASCE Structural Congress 2008 Crossing Borders. Vancouver Canada. CD-ROM Proceedings.*

Lam F., M. Schulte-Wrede +, C.C. Yao and J.J. Gu (2008). **Moment resistance of bolted timber connections with perpendicular to grain reinforcements** -*In Proc. 10th WCTE Miyazaki, Japan. CD-ROM Proceedings.*

Lam F., M. Li, S. Nakajima, and N. Kawai (2008). **Modeling 3-D Response of Japanese Post and Beam Structures** -*In Proc. 10th WCTE Miyazaki, Japan. CD-ROM Proceedings.*

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Chen Z.Y., E.C. Zhu and F. Lam (2008). **Sampling of Dimension Lumber for On-site Testing in China – Background Study** -*In Proc. 10th WCTE Miyazaki, Japan. CD-ROM Proceedings.*

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F. Lam (2006). **State of earthquake research in North America and Japan** -In *Proceedings of the 12th International Wood Construction Conference Holzbauforum Garmisch-Partenkirchen Germany Nov 6, 2006*

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Wang, B., X. Liu and F. Lam (2006). **Computational modeling of lateral load transfer capacity of rimboard** -In *Proceedings of the 9th WCTE. Portland USA CD-ROM Proceedings*

Chen, Y., F. Lam and J.D. Barrett (2006). **Bending strength and modulus of elasticity of BC coastal timbers** -In

Barrett, J.D., F. Lam, F. Rouger and Y. Wang (2006). **The proposed ISO strength class system: An update** -In *Proceedings of the 9th WCTE. Portland USA CD-ROM Proceedings*

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Byeon H.S., H.M. Park and F. Lam (2005). **Nondestructive evaluation of strength performance for finger-jointed wood using flexural vibration techniques.** -*Forestry Products Journal.* 55(10):37-42

García P.J., S. Avramidis and F. Lam. (2004). **Regression modelling of two-dimensional internal temperature and gas pressure distributions during panel hot-pressing** *Holz als roh und werkstoff.* 62(4):316-320

Lam F., J.D. Barrett , and S. Nakajima (2004). **Influence of Knot Area Ratio on the Bending Strength of Canadian Douglas-Fir used in Japanese Post and Beam Housing** -*Journal of Wood Science. Japan Wood Society.* 51(1):18-25

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Lam F., G. Lee, H. Yan, J. Gu, A.A. Saravi (2004). **Structural Performance of Wood-based Stair Stringers** -*Forestry Products Journal.* 54(4) 39-44

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