

# Stanford

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## Sarah Billington

UPS Foundation Professor and Senior Fellow at the Woods Institute for the Environment

Civil and Environmental Engineering

### CONTACT INFORMATION

- **Administrator**

Kim Vonner - Administrative Associate

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### Bio

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#### BIO

My research program focuses on the impact of building design and materials on human wellbeing. This work includes developing design tools to quantify nature experience in buildings, understanding and increasing wellbeing in and through affordable housing, and identifying the risk of forced labor in building material supply chains through fingerprinting and AI methods. The goal of my research program is to provide building occupants, designers, and owners tools to achieve built environments that meet their needs and to design interventions that support human wellbeing over time while preserving privacy. While no longer active in this area, my group has a long history of expertise in the design and evaluation of sustainable, durable construction materials including bio-based composites and ductile cement-based composites.

#### ACADEMIC APPOINTMENTS

- Professor, Civil and Environmental Engineering
- Senior Fellow, Stanford Woods Institute for the Environment
- Member, Wu Tsai Human Performance Alliance

#### ADMINISTRATIVE APPOINTMENTS

- Chair, Department of Civil & Environmental Engineering, (2021- present)
- Associate Chair, Department of Civil & Environmental Engineering, (2009-2015)

#### HONORS AND AWARDS

- Bass University Fellow in Undergraduate Education, Stanford University (2022-present)
- UPS Foundation Professor, Stanford University (2021-present)
- Milligan Family University Fellow in Undergraduate Education, Stanford University (2012-2022)
- American Concrete Institute Fellow, American Concrete Institute (2006-present)
- ACI Structural Engineering Award, American Concrete Institute (2002)
- Fiona Li and Donald Li Excellence in Teaching Award, College of Engineering, Cornell University (2002)
- ARC Career Development Award, ASCE's Civil Engineering Research Foundation (2000)

- NSF Early Career Award, National Science Foundation (2000)
- Fulbright Fellowship, ETH, Zurich, Switzerland (1990-1991)

## BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Board Member, Structural Engineers Association of Northern California (2012 - 2014)
- Board Member, Network for Earthquake Engineering Simulation, Inc. (2006 - 2009)

## PROFESSIONAL EDUCATION

- PhD, University of Texas at Austin , Structural Engineering (1997)
- MSE, University of Texas at Austin , Structural Engineering (1994)
- BSE, Princeton University , Civil Engineering & Operations Research (1990)

## PATENTS

- J.V. Olsson, Y.-L. Chung, R.J. Li, R. Waymouth, E. Sattely, S.L. Billington, C.W. Frank. "United States Patent 9567432 Lignin poly(lactic acid) copolymers", Leland Stanford Junior University, Feb 14, 2017
- W.V. Srubar III, S.L. Billington. "United States Patent 8759424 Coated Biodegradable Building Article", Leland Stanford Junior University, Jun 24, 2014
- W.V. Srubar III, S.L. Billington. "United States Patent 8507588 PHBV/Ground Bone Meal and Pumice Powder Engineering Biobased Composite Materials for Construction", Leland Stanford Junior University, Aug 13, 2013
- S.L. Billington, C.S. Criddle, M.C. Morse, S.J. Christian, A.J. Pieja. "United States Patent 7887893 Bacterial poly(hydroxy alcanoate) polymer and natural fiber composites", Leland Stanford Junior University, Feb 15, 2011

## LINKS

- Billington Lab: <https://www.billingtonlab.org>

## Teaching

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### COURSES

#### 2023-24

- Engineering the Built Environment: An Introduction to Structural Engineering: CEE 80N (Win)
- Seminar on Teaching for TAs: CEE 200 (Aut)

#### 2022-23

- Seminar on Teaching for TAs: CEE 200 (Aut)

#### 2021-22

- Seminar on Teaching for TAs: CEE 200 (Aut)
- Structural Design: CEE 182 (Win)

#### 2020-21

- Engineering the Built Environment: An Introduction to Structural Engineering: CEE 80N (Aut)
- Materials for Sustainable Built Environments: CEE 223 (Spr)
- Structural Design: CEE 182 (Win)

## STANFORD ADVISEES

Isabella Douglas

### Doctoral Dissertation Reader (AC)

Yiwen Dong, Jason Hernandez, Kopal Nihar, Giulia Scagliotti

**Postdoctoral Faculty Sponsor**

Sneha Jain

**Doctoral Dissertation Advisor (AC)**

Basma Altaf, Eva Bianchi, Isabella Douglas

**Master's Program Advisor**

Antonia Farina Silva

**Doctoral (Program)**

Andrea Green, Antonio Skillicorn

## Publications

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### PUBLICATIONS

- **Effects of architectural interventions on psychological, cognitive, social, and pro-environmental aspects of occupant well-being: Results from an immersive online study** *BUILDING AND ENVIRONMENT*  
Bianchi, E., Bencharit, L., Murnane, E. L., Altaf, B., Douglas, I. P., Landay, J. A., Billington, S. L.  
2024; 253
- **Understanding How Racism and Affect Impact Public Opinions toward Affordable Housing in the United States** *JOURNAL OF PLANNING EDUCATION AND RESEARCH*  
Douglas, I. P., Chan, D., Bencharit, L., Billington, S. L.  
2024
- **Using Computer Vision and Parametric Design Software to Quantify Nature Dose in Indoor Built Environments**  
Bianchi, E., Tavakoli, A., Billington, S. L., Turkan, Y., Louis, J., Leite, F., Ergan, S.  
AMER SOC CIVIL ENGINEERS.2024: 93-101
- **Leveraging Immersive Virtual Environments for Occupant Well-Being Analysis**  
Altaf, B., Tavakoli, A., Bianchi, E., Landay, J., Billington, S. L., Turkan, Y., Louis, J., Leite, F., Ergan, S.  
AMER SOC CIVIL ENGINEERS.2024: 85-92
- **A study of the role of indoor nature on solidarity and group identity during remote work** *BUILDING AND ENVIRONMENT*  
Bianchi, E., Bloomfield, L. P., Bencharit, L. Z., Altaf, B., Sawe, N. A., Murnane, E. L., Landay, J. A., Billington, S. L.  
2023; 245
- **Time perception during the pandemic: A longitudinal study examining the role of indoor and outdoor nature exposure for remote workers** *BUILDING AND ENVIRONMENT*  
Altaf, B., Bloomfield, L. P., Karzai, D. N., Sawe, N. A., Murnane, E. L., Bencharit, L., Landay, J. A., Billington, S. L.  
2023; 243
- **The field of human building interaction for convergent research and innovation for intelligent built environments.** *Scientific reports*  
Becerik-Gerber, B., Lucas, G., Aryal, A., Awada, M., Berges, M., Billington, S., Boric-Lubecke, O., Ghahramani, A., Heydarian, A., Hoelscher, C., Jazizadeh, F., Khan, A., Langevin, et al  
2022; 12 (1): 22092
- **Ten questions concerning human-building interaction research for improving the quality of life** *BUILDING AND ENVIRONMENT*  
Becerik-Gerber, B., Lucas, G., Aryal, A., Awada, M., Berges, M., Billington, S. L., Boric-Lubecke, O., Ghahramani, A., Heydarian, A., Jazizadeh, F., Liu, R., Zhu, R., Marks, et al  
2022; 226
- **Seismic Performance of High-Performance Fiber-Reinforced Cement-Based Composite Structural Members: A Review** *JOURNAL OF STRUCTURAL ENGINEERING*  
Shao, Y., Nguyen, W., Bandelt, M. J., Ostertag, C. P., Billington, S. L.  
2022; 148 (10)

● **Physical workplaces and human well-being: A mixed-methods study to quantify the effects of materials, windows, and representation on biobehavioral outcomes** *BUILDING AND ENVIRONMENT*

Douglas, I. P., Murnane, E. L., Bencharit, L., Altaf, B., Costa, J., Yang, J., Ackerson, M., Srivastava, C., Cooper, M., Douglas, K., King, J., Paredes, P. E., Camp, et al  
2022; 224

● **Impact of fiber distribution and cyclic loading on the bond behavior of steel-reinforced UHPC** *CEMENT & CONCRETE COMPOSITES*

Shao, Y., Tich, K. L., Boaro, S. B., Billington, S. L.  
2022; 126

● **Use of Crowdsourced Online Surveys to Study the Impact of Architectural and Design Choices on Wellbeing** *Frontiers in Sustainable Cities*

Altaf, B., Bianchi, E., Douglas, I. P., Douglas, K., Byers, B., Paredes, P. E., Ardooin, N. M., Markus, H. R., Murnane, E. L., Bencharit, L. Z., Landay, J. A., Billington, S. L.  
2022; 19

● **Poster Abstract: Human Wellbeing Responses to Real and Simulated Workplaces**

Bianchi, E., Altaf, B., Tavakoli, A., Douglas, I. P., Landay, J. A., Billington, S. L., ACM  
ASSOC COMPUTING MACHINERY.2022: 299-300

● **Impact of UHPC Tensile Behavior on Steel Reinforced UHPC Flexural Behavior** *JOURNAL OF STRUCTURAL ENGINEERING*

Shao, Y., Billington, S. L.  
2022; 148 (1)

● **Impact of cyclic loading on longitudinally-reinforced UHPC flexural members with different fiber volumes and reinforcing ratios** *ENGINEERING STRUCTURES*

Shao, Y., Billington, S. L.  
2021; 241

● **Gradual Crushing of Steel Reinforced HPFRCC Beams: Experiments and Simulations** *JOURNAL OF STRUCTURAL ENGINEERING*

Shao, Y., Hung, C., Billington, S. L.  
2021; 147 (8)

● **Effect of bubble nucleating agents derived from biochar on the foaming mechanism of poly lactic acid foams** *APPLIED SURFACE SCIENCE ADVANCES*

Haham, H., Riscoe, A., Frank, C. W., Billington, S. L.  
2021; 3

● **Flexural performance of steel-reinforced engineered cementitious composites with different reinforcing ratios and steel types** *CONSTRUCTION AND BUILDING MATERIALS*

Shao, Y., Billington, S. L.  
2020; 231

● **Comparison of nanocrystalline cellulose dispersion versus surface nucleation in poly (3#hydroxybutyrate#co#3#hydroxyvalerate) crystallization** *SPE Polymers*

Haham, H., Shen, M. Y., Billington, S. L., Frank, C. W.  
2020; 1 (1)

● **Effect of Fiber Content Variation in Plastic Hinge Region of Reinforced UHPC Flexural Members** *RILEM-fib International Symposium on Fibre Reinforced Concrete*

Pokhrel, M., Shao Yi, Billington, S., Bandelt, M. J.  
2020

● **Predicting the two predominant flexural failure paths of longitudinally reinforced high-performance fiber-reinforced cementitious composite structural members** *ENGINEERING STRUCTURES*

Shao, Y., Billington, S. L.  
2019; 199

● **Mechanics and failure characteristics of hybrid fiber-reinforced concrete (HyFRC) composites with longitudinal steel reinforcement** *ENGINEERING STRUCTURES*

Nguyen, W., Bandelt, M. J., Trono, W., Billington, S. L., Ostertag, C. P.  
2019; 183: 243–54

- **Simulation of Deformation Capacity in Reinforced High-Performance Fiber-Reinforced Cementitious Composite Flexural Members** *JOURNAL OF STRUCTURAL ENGINEERING*  
Bandelt, M. J., Billington, S. L.  
2018; 144 (10)
- **Finite element models of reinforced ECC beams subjected to various cyclic deformation** *COMPUTERS AND CONCRETE*  
Frank, T. E., Lepech, M. D., Billington, S. L.  
2018; 22 (3): 305–17
- **Experimental Testing of Reinforced ECC Beams Subjected to Various Cyclic Deformation Histories** *JOURNAL OF STRUCTURAL ENGINEERING*  
Frank, T. E., Lepech, M. D., Billington, S. L.  
2018; 144 (6)
- **A lignin-epoxy resin derived from biomass as an alternative to formaldehyde-based wood adhesives** *GREEN CHEMISTRY*  
Li, R., Gutierrez, J., Chung, Y., Frank, C. W., Billington, S. L., Sattely, E. S.  
2018; 20 (7): 1459–66
- **Biocomposite Fiber-Matrix Treatments that Enhance In-Service Performance Can Also Accelerate End-of-Life Fragmentation and Anaerobic Biodegradation to Methane** *JOURNAL OF POLYMERS AND THE ENVIRONMENT*  
Ryan, C. A., Billington, S. L., Criddle, C. S.  
2018; 26 (4): 1715–26
- **Integrating a Digital Textbook into a Statics Course**  
Anagnos, T., Sheppard, S. D., Billington, S. L., IEEE  
IEEE.2018
- **Simulation of reinforced ductile cement-based composite beams under cyclic loads**  
Billington, S. L., Shao, Y., Frank, T. E., Bandelt, M. J., Moreno, D. M., Meschke, G., Pichler, B., Rots, J. G.  
CRC PRESS-BALKEMA.2018: 805–12
- **4D BEYOND CONSTRUCTION: SPATIO-TEMPORAL AND LIFE-CYCLIC MODELING AND VISUALIZATION OF INFRASTRUCTURE DATA** *JOURNAL OF INFORMATION TECHNOLOGY IN CONSTRUCTION*  
Zhang, Z., Hamledari, H., Billington, S., Fischer, M.  
2018; 23: 285–304
- **Historical Analysis of Hydraulic Bridge Collapses in the Continental United States** *JOURNAL OF INFRASTRUCTURE SYSTEMS*  
Flint, M. M., Fringer, O., Billington, S. L., Freyberg, D., Diffenbaugh, N. S.  
2017; 23 (3)
- **Methodology to assess end-of-life anaerobic biodegradation kinetics and methane production potential for composite materials** *COMPOSITES PART A-APPLIED SCIENCE AND MANUFACTURING*  
Ryan, C. A., Billington, S. L., Criddle, C. S.  
2017; 95: 388-399
- **Assessment of models for anaerobic biodegradation of a model bioplastic: Poly(hydroxybutyrate-co-hydroxyvalerate).** *Bioresource technology*  
Ryan, C. A., Billington, S. L., Criddle, C. S.  
2017; 227: 205-213
- **Experimental testing of reinforced concrete and reinforced ECC flexural members subjected to various cyclic deformation histories** *Materials and Structures*  
Frank, T. E., Lepech, M. D., Billington, S. L.  
2017; 50 (5)
- **Engineering Mechanics: Statics: Modeling and Analyzing Systems in Equilibrium**  
Sheppard, S. D., Anagnos, T., Billington, S. L.  
Wiley.2017
- **Bond behavior and interface modeling of reinforced high-performance fiber-reinforced cementitious composites** *Cement and Concrete Composites*  
Bandelt, M. J., Frank, T. E., Lepech, M. D., Billington, S. L.  
2017; 83: 188-201

- **Influence of carbon feedstock on potentially net beneficial environmental impacts of bio-based composites** *JOURNAL OF CLEANER PRODUCTION*  
Miller, S. A., Billington, S. L., Lepech, M. D.  
2016; 132: 266-278
- **Impact of Reinforcement Ratio and Loading Type on the Deformation Capacity of High-Performance Fiber-Reinforced Cementitious Composites Reinforced with Mild Steel** *JOURNAL OF STRUCTURAL ENGINEERING*  
Bandelt, M. J., Billington, S. L.  
2016; 142 (10)
- **Bond behavior of steel reinforcement in high-performance fiber-reinforced cementitious composite flexural members** *MATERIALS AND STRUCTURES*  
Bandelt, M. J., Billington, S. L.  
2016; 49 (1-2): 71-86
- **Introduction Special Issue on "Biobased Construction Materials" in the Journal of Renewable Materials** *JOURNAL OF RENEWABLE MATERIALS*  
Srubar, W. V., Billington, S. L.  
2015; 3 (3): 161–62
- **Integrating durability-based service-life predictions with environmental impact assessments of natural fiber-reinforced composite materials** *RESOURCES CONSERVATION AND RECYCLING*  
Miller, S. A., Srubar, W. V., Billington, S. L., Lepech, M. D.  
2015; 99: 72-83
- **Static versus Time-Dependent Material Selection Charts and Application in Wood Flour Composites** *JOURNAL OF BIOBASED MATERIALS AND BIOENERGY*  
Miller, S. A., Lepech, M. D., Billington, S. L.  
2015; 9 (2): 273-283
- **Incorporating spatiotemporal effects and moisture diffusivity into a multi-criteria materials selection methodology for wood-polymer composites** *CONSTRUCTION AND BUILDING MATERIALS*  
Srubar, W. V., Miller, S. A., Lepech, M. D., Billington, S. L.  
2014; 71: 589-601
- **Nonlinear Constitutive Model for Anisotropic Biobased Composite Materials** *JOURNAL OF ENGINEERING MECHANICS*  
Michel, A. T., Billington, S. L.  
2014; 140 (11)
- **Design Concepts for Controlled Rocking of Self-Centering Steel-Braced Frames** *JOURNAL OF STRUCTURAL ENGINEERING*  
Eatherton, M. R., Ma, X., Krawinkler, H., Mar, D., Billington, S., Hajjar, J. F., Deierlein, G. G.  
2014; 140 (11)
- **Behavior of unreinforced masonry prisms and beams retrofitted with engineered cementitious composites** *MATERIALS AND STRUCTURES*  
Kyriakides, M. A., Billington, S. L.  
2014; 47 (9): 1573-1587
- **Mechanical Characterization and Modeling of Poly (beta-hydroxybutyrate)-co-poly(beta-hydroxyvalerate)-Alfa Fiber-Reinforced Composites** *POLYMER COMPOSITES*  
Ben Cheikh, R., Michel, A., Billington, S.  
2014; 35 (9): 1758-1766
- **Tension stiffening in reinforced high performance fiber reinforced cement-based composites** *CEMENT & CONCRETE COMPOSITES*  
Moreno, D. M., Trono, W., Jen, G., Ostertag, C., Billington, S. L.  
2014; 50: 36-46
- **Influence of temporal resolution and processing of exposure data on modeling of chloride ingress and reinforcement corrosion in concrete** *MATERIALS AND STRUCTURES*  
Flint, M., Michel, A., Billington, S. L., Geiker, M. R.  
2014; 47 (4): 729-748
- **Seismic Retrofit of Steel Moment-Resisting Frames with High-Performance Fiber-Reinforced Concrete Infill Panels: Large-Scale Hybrid Simulation Experiments** *JOURNAL OF STRUCTURAL ENGINEERING*  
Lignos, D. G., Moreno, D. M., Billington, S. L.

2014; 140 (3)

- **Cyclic Response of Nonductile Reinforced Concrete Frames with Unreinforced Masonry Infills Retrofitted with Engineered Cementitious Composites** *JOURNAL OF STRUCTURAL ENGINEERING*

Kyriakides, M. A., Billington, S. L.

2014; 140 (2)

- **Simulating bond-slip effects in high-performance fiber-reinforced cement based composites under cyclic loads** *Euro-C Conference*

Bandelt, M. J., Billington, S. L.

CRC PRESS-TAYLOR & FRANCIS GROUP.2014: 1059–1066

- **Evaluation of Impact of Web-based Activities on Mechanics Achievement and Self-Efficacy**

Billington, S. L., Sheppard, S. D., Calfee, R. C., Boylan-Ashraf, P. C., ASEE  
AMER SOC ENGINEERING EDUCATION.2014

- **Predicting Entrepreneurial Intent among Entry-Level Engineering Students**

Schar, M. F., Billington, S. L., Sheppard, S. D., ASEE  
AMER SOC ENGINEERING EDUCATION.2014

- **Evaluation of a Modular Framework for Performance-Based Durability Engineering through Assessment of a Coastal Reinforced Concrete Structure** *Durability of Building Materials and Components XIII*

Flint, M., Billington, S.

2014

- **Biobased Materials for Sustainable Temporary Disaster-Relief Housing** *3rd International Conference on Urban Disaster REduction, Earthquake Engineering Research Institute*

Michel, A., Srubar III, W., Billington, S.  
2014

- **Stimulation of High-Performance Fiber-Reinforced Cementitious Composites with Bond-Slip Effects** *EURO-C*

Bandelt, M., Billington, S.  
2014

- **Evaluation of a modular framework for performance-based durability engineering through assessment of a coastal reinforced concrete structure** *Durability of Building Materials and Components XIII*

Flint, M. M., Billington, S. L.  
2014

- **Biobased Materials for Sustainable Temporary Disaster-Relief Housing** *Third International Conference on Urban Disaster Reduction*

Michel, A. T., Srubar, W. V., Billington, S. L.  
EERI.2014

- **A modular framework for performance-based durability engineering: From exposure to impacts** *STRUCTURAL SAFETY*

Flint, M. M., Baker, J. W., Billington, S. L.  
2014; 50: 78-93

- **Application of multi-criteria material selection techniques to constituent refinement in biobased composites** *MATERIALS & DESIGN*

Miller, S. A., Lepech, M. D., Billington, S. L.  
2013; 52: 1043-1051

- **A Renewable Lignin-Lactide Copolymer and Application in Biobased Composites** *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*

Chung, Y., Olsson, J. V., Li, R. J., Frank, C. W., Waymouth, R. M., Billington, S. L., Sattely, E. S.  
2013; 1 (10): 1231-1238

- **Evaluation of Functional Units Including Time-Dependent Properties for Environmental Impact Modeling of Biobased Composites** *JOURNAL OF BIOBASED MATERIALS AND BIOENERGY*

Miller, S. A., Lepech, M. D., Billington, S. L.  
2013; 7 (5): 588–99

- **Shake-Table Tests of a 3-Story Masonry-Infilled RC Frame Retrofitted with Composite Materials** *JOURNAL OF STRUCTURAL ENGINEERING*

Koutromanos, I., Kyriakides, M., Stavridis, A., Billington, S., Shing, P. B.

2013; 139 (8): 1340-1351

- **A micromechanical model for moisture-induced deterioration in fully biorenewable wood-plastic composites** *COMPOSITES PART A-APPLIED SCIENCE AND MANUFACTURING*  
Srubar, W. V., Billington, S. L.  
2013; 50: 81-92
- **Graft-polymerization of poly(lactic acid) onto lignin with application to biobased composites**  
Chung, Y., Olsson, J. V., Li, R., Billington, S., Frank, C. W., Waymouth, R. M., Sattely, E.  
AMER CHEMICAL SOC.2013
- **Behavior of Concrete and ECC Structures under Simulated Earthquake Motion** *JOURNAL OF STRUCTURAL ENGINEERING-ASCE*  
Gencturk, B., Elnashai, A. S., Lepech, M. D., Billington, S.  
2013; 139 (3): 389-399
- **Improvement in environmental performance of poly(beta-hydroxybutyrate)-co-(beta-hydroxyvalerate) composites through process modifications** *JOURNAL OF CLEANER PRODUCTION*  
Miller, S. A., Billington, S. L., Lepech, M. D.  
2013; 40: 190-198
- **Seismic Retrofit of Steel Moment Resisting Frames With High Performance Fiber Reinforced Concrete Infill Panels: Large Scale Hybrid Simulation Experiments** *ASCE Journal of Structural Engineering, published online*  
Lignos, D., Moreno, D., Billington, S., L.  
2013
- **Bond Strength and Bond-Slip Behavior of Steel Reinforcement in High-Performance Fiber-Reinforced Cementitious Composites** *Tenth International Conference on Urban Earthquake Engineering*  
Bandelt, M., Billington, S.  
2013
- **Bond of Reinforcement in High-Performance Fiber-Reinforced Concrete** *Seventh National Seismic Conference of Bridges & Highways*  
Bandelt, M., Billington, S.  
2013
- **Bond of Reinforcement in High-Performance Fiber-Reinforced Concrete** *Seventh National Seismic Conference on Bridges & Highways*  
Bandelt, M. J., Billington, S. L.  
2013
- **Characterizing the effects of ambient aging on the mechanical and physical properties of two commercially available bacterial thermoplastics** *3rd International Conference on Biodegradable and Biobased Polymers (BIOPOL)*  
Srubar, W. V., Wright, Z. C., Tsui, A., Michel, A. T., Billington, S. L., Frank, C. W.  
ELSEVIER SCI LTD.2012: 1922-29
- **Extruded foams from microbial poly(3-hydroxybutyrate-co-3-hydroxyvalerate) and its blends with cellulose acetate butyrate** *POLYMER ENGINEERING AND SCIENCE*  
Liao, Q., Tsui, A., Billington, S., Frank, C. W.  
2012; 52 (7): 1495-1508
- **Moisture diffusion and its impact on uniaxial tensile response of biobased composites** *COMPOSITES PART B-ENGINEERING*  
Christian, S. J., Billington, S. L.  
2012; 43 (5): 2303-2312
- **Characterization of poly-hydroxybutyrate films and hemp fiber reinforced composites exposed to accelerated weathering** *POLYMER DEGRADATION AND STABILITY*  
Michel, A. T., Billington, S. L.  
2012; 97 (6): 870-878
- **Modeling the kinetics of water transport and hydroexpansion in a lignocellulose-reinforced bacterial copolyester** *POLYMER*  
Srubar, W. V., Frank, C. W., Billington, S. L.  
2012; 53 (11): 2152-2161

- **Simulation of Unreinforced Masonry Beams Retrofitted with Engineered Cementitious Composites in Flexure** *JOURNAL OF MATERIALS IN CIVIL ENGINEERING*  
Kyriakides, M. A., Hendriks, M. A., Billington, S. L.  
2012; 24 (5): 506-515
- **Mechanisms and impact of fiber-matrix compatibilization techniques on the material characterization of PHBV/oak wood flour engineered biobased composites** *COMPOSITES SCIENCE AND TECHNOLOGY*  
Srubar, W. V., Pilla, S., Wright, Z. C., Ryan, C. A., Greene, J. P., Frank, C. W., Billington, S. L.  
2012; 72 (6): 708-715
- **Tension-Stiffening in Reinforced High Performance Fiber-Reinforced Cement-Based Composites under Direct Tension** *6th International RILEM Workshop on High Performance Fiber Reinforced Cement Composites*  
Moreno, D. M., Trono, W., JEN, G., Ostertag, C., Billington, S. L.  
SPRINGER.2012: 263–270
- **Hybrid simulation of a 2-story steel MRF retrofitted with HPFRC infill panels**  
Lignos, D. G., Moreno, D. M., Billington, S. L., Mazzolani, F., Herrera, R.  
CRC PRESS-TAYLOR & FRANCIS GROUP.2012: 69–74
- **Confinement and Tension Stiffening Effects in High Performance Self-consolidated Hybrid Fiber Reinforced Concrete Composites**  
Trono, W., Jen, G., Moreno, D., Billington, S., Ostertag, C. P., ParraMontesinos, G. J., Reinhardt, H. W., Naaman, A. E.  
SPRINGER.2012: 255–+
- **Hybrid Simulation o fa 2-Story Steel MRF Retrofitted with HPFRC Infill Panels** *7th International Conference on Behavior of Steel Structures in Seismic Areas*  
Lignos, D., Moreno, D., Billington, S.  
2012
- **Creep Behavior and Modeling of PHBV-Based Composites for Construction Application** *Composites 2012*  
Miller, S., Billington, S.  
2012
- **Investigation of Process Improvements on PHBV-Based Composites Using Multi-Criteria Selection** *Composites 2012*  
Miller, S., Billington, S., Lepech, M.  
2012
- **Application of Creep Properties to Service Prediciton in Lifecycle Assessment and Multi-Criteria Material Selection** *12th International Conference on Biocomposites*  
Miller, S., Billington, S., Lepech, M.  
2012
- **Overview of US-Norway Collaboration on Bridge Repair Sustainability** *International Congress on Durability of Concrete*  
Flint, M., Michel, A., Gussias, A., Larsen, C., Ostvik, J., Billington, S., Geiker, M.  
2012
- **Tension Stiffening in Reinforced High Performance Fiber Reinforced Cement-Based Composites** *9th International Conference on Urban Earthquake Engineering*  
Moreno, D., Trono, W., Jen, G., Ostertag, C., Billington, S.  
2012
- **A Probabilistic Framework for Performance-Based Durability Engineering** *In Durability o fBuilding Materials and Components*  
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