Welcome to ICTB 2013!

Building on the success of ICTB 2010 in Lillehammer, Norway, this year’s conference promises to be an exceptional learning opportunity as well as a rare chance to network with an international community of experts on timber bridges, including highway, railway and pedestrian structures.

We received over 60 technical abstracts—from practitioners, academics, bridge owners and government researchers—and have created a program that offers global perspectives on topics such as timber bridge design, inspection, field testing, performance monitoring and management. The goal of this year’s event is to foster new collaboration; as such, we encourage you to engage with as many speakers and attendees as possible, to hear their timber bridge-related experiences, and to share your own unique perspectives.

I hope you were able to attend the pre-conference tour of Iowa’s historic Bridges of Madison County, which showcased the American tradition of bridge building with heavy timber trusses that was prevalent during the late 19th century. The post-conference tour is intended to inspire in a different way—with the natural beauty of the amazing Grand Canyon in Arizona. If you haven’t already signed up, I encourage you to do so.

ICTB 2013 is a joint effort of the USDA Forest Products Laboratory, the National Center for Wood Transportation Structures, the Federal Highway Administration, and WoodWorks. On behalf of these organizations, as well as our sponsors, I welcome you to Las Vegas and to the 2nd International Conference on Timber Bridges.

James Wacker
Research Engineer, USDA Forest Products Laboratory
Conference Chair

James studied Civil Engineering at the University of Wisconsin-Madison and has been a researcher with the USDA Forest Products Laboratory for the past 22 years. His past research has focused on the field inspection and field monitoring of timber highway bridges. His current research is focused on the development of new technologies needed for the structural health monitoring of glulam timber bridges. He currently chairs the American Society of Civil Engineers’ Bridges Technical Committee.

International Scientific Committee
Erik Aasheim, Treteknisk (Norway)
Carlito Calil Junior, University of São Paulo (Brazil)
Aarne Jutila, Helsinki University of Technology (Finland)
Otto Kleppe, Public Roads Administration (Norway)
Robert Kliger, Chalmers University of Technology (Sweden)
Gerhard Schickerhofer, Graz University of Technology (Austria)
Tom Williamson, T. Williamson Timber Engineering LLC (USA)

Conference Planning Committee
Dawn Condotti, WoodWorks
Karen Droste, WoodWorks
Sheila Duwadi, Federal Highway Administration
Jaime Krohn, WoodWorks
Karen Martinson, USDA Forest Products Laboratory
Michael Ritter, USDA Forest Products Laboratory
Roxane Ward, WoodWorks
Tom Williamson, T. Williamson Timber Engineering LLC
James Wacker, USDA Forest Products Laboratory

ITCB 2013 Committees
Michael Ritter is Assistant Director of the Wood Products Research Group at the USDA Forest Products Laboratory (FPL). He provides program oversight for research units covering wood anatomy, wood engineering, bio-deterioration of wood, wood protection and economics. He also heads the Advanced Housing Research Center at FPL, which evaluates and develops technology for both new and existing housing in which wood and/or wood-based products are used as primary or secondary building components. In the past, he helped lead the National Wood In Transportation program that fostered inter-agency collaborations between the US Forest Service and Federal Highway Administration, and with several other research partners.

Carlito Calil Junior is a Professor in the Department of Structural Engineering at the School of Engineering, São Carlos University in São Paulo, Brazil. He graduated in Civil Engineering in 1975, and received his MSc from São Paulo University in 1978. In 1982 he received his PhD from the Polytechnic University of Barcelona, Spain. Interested in education, development, design and research related to timber structures in Brazil, he is Director of The Laboratory of Wood and Timber Structures, President of the Brazilian Institute for Wood and Timber Structures and a member of the International Association of Wood Products Societies (IAWPS) – Japan.

Erik Aasheim has worked at the Norwegian Institute of Wood Technology for more than 40 years, with an emphasis on timber structures and, more recently, the certification of timber products according to European and Japanese standards. He has been active in the development of standards, including Eurocodes, and is a frequent presenter at world conferences on timber engineering. Erik was coordinator of the Nordic Timber Bridge Program (1996-2002) and is still involved with timber bridge development. He graduated from the Technical University of Norway in 1970.
### Monday - September 30

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 a.m. – 1:00 p.m.</td>
<td>Presenter Check-in</td>
<td>Arizona Ballroom, Salon G</td>
</tr>
</tbody>
</table>
| 10:00 a.m. – 4:00 p.m. | Opening Session – Conference Overview: James Wacker, USDA Forest Products Laboratory  
Welcome: Sheila Rimal Duwadi, Federal Highway Administration | Arizona/Nevada Ballroom Foyer |
| 1:00 – 1:30 p.m. | Coffee Break – Exhibitors & Posters                                         | Nevada Ballroom A/C           |
| 1:30 – 2:10 p.m. | Keynote Presentation: Michael Ritter, USDA Forest Products Laboratory         | Nevada Ballroom A/C           |
| 2:10 – 2:40 p.m. | Concurrent Technical Sessions:  
Technical Session 1 – Bridge Inspection I  
Technical Session 2 – Wood/Concrete Bridges | Nevada Ballroom A/C (Odd-numbered sessions in B; even-numbered sessions in D) |
| 5:00 – 6:30 p.m. | Cocktail Reception                                                           | Nevada Ballroom A/C           |
| 7:00 (9:30 p.m. return) | Bus to Fremont Street Experience (Optional - complimentary)               | Flamingo Street Valet Area    |

### Tuesday - October 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Location</th>
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<tbody>
<tr>
<td>8:00 – 11:00 a.m.</td>
<td>Presenter Check-in</td>
<td>Arizona Ballroom, Salon G</td>
</tr>
<tr>
<td>8:00 – 11:00 a.m.</td>
<td>Registration</td>
<td>Arizona/Nevada Ballroom Foyer</td>
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<tr>
<td>7:30 – 8:45 a.m.</td>
<td>Continental Breakfast</td>
<td>Arizona Ballroom</td>
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<tr>
<td>9:00 – 9:45 a.m.</td>
<td>Keynote Presentation – Carlito Calil Junior (Brazil)</td>
<td>Arizona Ballroom</td>
</tr>
<tr>
<td>9:45 – 10:00 a.m.</td>
<td>Coffee Break – Exhibitors &amp; Posters</td>
<td>Nevada Ballroom A/C</td>
</tr>
</tbody>
</table>
| 10:00 a.m. – 12:00 p.m. | Concurrent Technical Sessions:  
Technical Session 3 – Bridge Case Studies I  
Technical Session 4 – Cross Laminated Timber (CLT) & Glulam | Nevada Ballroom B and D (Odd-numbered sessions in B; even-numbered sessions in D) |
| 12:00 – 1:00 p.m. | Lunch                                                                       | Arizona Ballroom              |
| 1:00 – 2:20 p.m. | Concurrent Technical Sessions:  
Technical Session 5 – Covered Bridges I  
Technical Session 6 – Bridge Inspection II | Nevada Ballroom B and D (Odd-numbered sessions in B; even-numbered sessions in D) |
| 2:20 – 2:40 p.m. | Coffee Break – Exhibitors & Posters                                         | Nevada Ballroom A/C           |
| 2:40 – 4:00 p.m. | Concurrent Technical Sessions:  
Technical Session 7 – Covered Bridges II  
Technical Session 8 – Load Testing | Nevada Ballroom B and D (Odd-numbered sessions in B; even-numbered sessions in D) |
| 4:00 – 5:00 p.m. | Poster Presentation Session                                                 | Nevada Ballroom A/C           |
| 5:00 – 6:30 p.m. | Cocktail Reception                                                          | Nevada Ballroom A/C           |
| Hotel Schedule – every 30 min. | Shuttles to Las Vegas Strip                                              | Flamingo Street Valet Area    |

### Wednesday - October 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Location</th>
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<tbody>
<tr>
<td>7:30 – 8:45 a.m.</td>
<td>Continental Breakfast</td>
<td>Arizona Ballroom</td>
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<tr>
<td>9:00 – 9:40 a.m.</td>
<td>Keynote Session – Erik Aasheim (Norway)</td>
<td>Arizona Ballroom</td>
</tr>
<tr>
<td>9:40 – 10:00 a.m.</td>
<td>Coffee Break – Exhibitors &amp; Posters</td>
<td>Nevada Ballroom A/C</td>
</tr>
</tbody>
</table>
| 10:00 a.m. – 12:00 p.m. | Concurrent Technical Sessions:  
Technical Session 9 – Bridge Case Studies II  
Technical Session 10 – Bridge Durability | Nevada Ballroom B and D (Odd-numbered sessions in B; even-numbered sessions in D) |
| 12:00 – 1:00 p.m. | Lunch                                                                       | Arizona Ballroom              |
| 1:00 – 2:20 p.m. | Concurrent Technical Sessions:  
Technical Session 11 – Field Monitoring  
Technical Session 12 – Wood Composites | Nevada Ballroom B and D (Odd-numbered sessions in B; even-numbered sessions in D) |
| 2:20 – 2:40 p.m. | Coffee Break – Final Exhibitors & Posters period                            | Nevada Ballroom A/C           |
| 2:40 – 3:00 p.m. | Close-out Session: James Wacker, USDA Forest Products Laboratory            | Arizona Ballroom              |
| 5:30 – 6:30 p.m. | Cocktail Reception                                                          | Arizona Ballroom              |
| 6:30 – 8:30 p.m. | Dinner Banquet: Remarks: Jennifer Cover, WoodWorks                         | Arizona Ballroom              |

### Thursday - October 3

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:45 a.m. – 9:00 p.m.</td>
<td>Grand Canyon Bus Tour (Optional)</td>
<td>Flamingo Street Valet Area</td>
</tr>
</tbody>
</table>
### Keynote Presentation: 1:30 – 2:10 p.m.

**TIMBER BRIDGES IN THE US – PAST, PRESENT AND FUTURE**

Speaker: Michael Ritter, USDA Forest Products Laboratory (USA)

The use of timber as a bridge material has a long history in the United States. Timber bridges were instrumental in the transport of horses, railroads and vehicles over the past two centuries, and continue to play a vital role in the present transportation network, mainly on rural roads and in the railroad system. This presentation will highlight the timber bridge systems that have been most popular, examine current trends, and make predictions for the future prospects and challenges of the industry.

### 2:40 – 4:20 p.m.

#### NEVADA SALON A

**Technical Session 1 – Bridge Inspection I**

Moderator – James Wacker, USDA Forest Products Laboratory (USA)

<table>
<thead>
<tr>
<th>Title</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Performance of US Timber Bridges: A National Study (ID-132)</td>
<td>Brian Brashaw, NRRI – University of Minnesota Duluth (USA)*</td>
</tr>
<tr>
<td></td>
<td>James Wacker, USDA Forest Products Laboratory (USA)</td>
</tr>
<tr>
<td>Inspection of Louisiana’s Timber Bridges (ID-91)</td>
<td>Vijaya Gopu, Louisiana Transportation Research Center &amp; University of New Orleans (USA)*;</td>
</tr>
<tr>
<td></td>
<td>James Wacker, USDA Forest Products Laboratory (USA)</td>
</tr>
<tr>
<td>Condition Assessment of Iowa Timber Bridges Using Advanced</td>
<td>Travis Hosteng, Bridge Engineering Center (BEC) – Iowa State University (USA)*</td>
</tr>
<tr>
<td>Inspection Tools (ID-125)</td>
<td>Brent Phares, BEC – Iowa State University (USA)</td>
</tr>
<tr>
<td>Inspection of Timber Bridges in the Pacific West (ID-150)</td>
<td>Tom Williamson, T. Williamson – Timber Engineering LLC (USA)*</td>
</tr>
<tr>
<td></td>
<td>Lola Coombe, Rogue River Siskiyou National Forest Service (USA)</td>
</tr>
<tr>
<td></td>
<td>David Strahl, US Forest Service – Pacific Northwest Region (USA)</td>
</tr>
<tr>
<td>Inspection of Timber Bridges in the Southern US (ID-151)</td>
<td>P. David Jones, Mississippi State University (USA)*</td>
</tr>
<tr>
<td></td>
<td>Joseph Dahlin, University of Georgia (USA)</td>
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<tr>
<td></td>
<td>Rubin Shmulsky, Mississippi State University (USA)</td>
</tr>
</tbody>
</table>

#### NEVADA SALON D

**Technical Session 2 – Wood/Concrete Bridges**

Moderator – Dr. Carlito Calil Junior, São Paulo University (Brazil)

<table>
<thead>
<tr>
<th>Title</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood-Concrete Composite Beams Under Low-to-High Cycle Loading (ID-85)</td>
<td>Jeno Balogh, Metropolitan State University of Denver (USA)*</td>
</tr>
<tr>
<td></td>
<td>Massimo Fragiacomo, University of Sassari (Italy)</td>
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<td></td>
<td>Richard Gutkowski, Colorado State University (USA)</td>
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<td></td>
<td>Rebecca Atadero, Colorado State University (USA)</td>
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<tr>
<td>Fatigue Performance of Single Span Wood-Concrete Composite</td>
<td>Leander Bathon, University of Wiesbaden (Germany)*</td>
</tr>
<tr>
<td>Bridges (ID-69)</td>
<td>Oliver Bletz-Müldorfer, University of Wiesbaden (Germany)</td>
</tr>
<tr>
<td>Influence of Concrete Cracking on Wood-Concrete Composite Bridges</td>
<td>Frank Schanack, Austral University (Chile)*</td>
</tr>
<tr>
<td>(ID-74)</td>
<td>Juan Patricio Reyes, Austral University (Chile)</td>
</tr>
<tr>
<td></td>
<td>Óscar Ramón Ramos, University of Cantabria (Spain)</td>
</tr>
<tr>
<td>The Durability of Wood-Concrete Composite Bridges (ID-141)</td>
<td>Lauri Salokangas, Aalto University (Finland)*</td>
</tr>
<tr>
<td></td>
<td>Aarne Jutila, Extraplan Oy (Finland)</td>
</tr>
<tr>
<td>Development of a Slab-on-Girder Wood-Concrete Composite Highway</td>
<td>Andrew Lehman, Delcan (Canada)*</td>
</tr>
<tr>
<td>Bridge (ID-113)</td>
<td>David Moses, Moses Structural Engineers (Canada)</td>
</tr>
</tbody>
</table>

*Indicates the presenter. The lead author is listed first.
The Emerging Timber Bridge Program in São Paulo State was established in 2003 to address a lack of familiarity with timber structures among bridge designers and builders, which had resulted in a proliferation of expensive, unsafe and low-durability bridges. After ten years, twenty demonstration timber bridges have been constructed through the program, including composite timber/concrete bridges, log timber girder bridges with transversal sawn decks, transversal lumber prestressed timber bridges, a transversal cellular plywood box prestressed bridge and a transversal cellular glulam box prestressed bridge. This paper presents the details of the current emphasis areas for the design and construction of timber bridges, including project plans and the Brazilian timber strength class recommendations for bridges construction.
2:40 – 4:00 p.m.

**TECHNICAL SESSION 7 – COVERED BRIDGES**

**Moderator** – Sheila Rimal Duvadi, Federal Highway Administration (USA)

**The Bartonsville Covered Bridge Replacement (ID-65)**
Phillip Pierce, CHA Consulting, Inc. (USA)*

**Chambers Covered Railroad Bridge Emergency Salvage, Rehabilitation, and Development of Interpretative Center (ID-82)**
Gregory Ausland, OBEC Consulting Engineers (USA)*
Tony La Mortella, OBEC Consulting Engineers (USA)

**Kings Covered Bridge Rehabilitation Somerset County PA (ID-102)**
William Collins, Simone Collins Landscape Architecture (USA)*
Samer Petro, Herbert, Rowland & Grubic Inc. (USA)

**Simplified Analytical Model of a Covered Burr-Arch-Truss Timber Bridge (ID-83)**
Fouad Fanous, Iowa State University (USA)
Terry Wipf, Iowa State University (USA)
Douglas Rammer, USDA Forest Products Laboratory (USA)*

4:00 – 5:00 p.m.

**POSTER SESSIONS – NEVADA A/C**

**New Timber Bridges – Inventive Design by Bgluing (ID-63)**
Frank Miebach, Engineers Office Miebach (Germany)
Jürgen Schaffitzel, Schaffitzel Holzindustrie GmbH

**The First Timber Road Bridge in Korea (ID-67)**
Kwang-Mo Kim, Korea Forest Research Institute (S. Korea)
Sang-Joon Lee, Korea Forest Research Institute

**Shear Performance of Wood-Concrete Composite (ID-68)**
Sang-Joon Lee, Korea Forest Research Institute (S. Korea)
Joo Saeng Park, Korea Forest Research Institute

**Field Load Testing of the First Vehicle Timber Bridge in Korea (ID-75)**
Wonsuk Park, Seoul National University (South Korea)
Ji-Woon Yi, Seoul National University (South Korea)*

**Kull Cross-Over Bridge, Norway (ID-98)**
Per Kristian Ekberg, Norconsult AS (Norway)
Yngve Artun, PLAN arkitekter AS

**Behavior of Paving Geogrid on Prestressed Box Beam Timber Bridge Deck (ID-106)**
Ricardo de Mello Scaliente, University of São Paulo (Brazil)
Natalia de Souza Correia, University of São Paulo
Fernando Henrique Martins Portelinha, Federal University of São Carlos
Carlito Cali Junior, University of São Paulo

**Interconnections Between Panels for Glulam Timber Bridges (ID-110)**
Ricardo de Mello Scaliente, University of São Paulo (Brazil)
Diego Henrique de Almeida, University of São Paulo
Carlito Cali Junior, University of São Paulo

**Structural Behavior in Field of “Queen Post Bridges” in Brazil (ID-129)**
Andrés Batista Cheung, Federal University of Mato Grosso do Sul (Brazil)
Ricardo de Mello Scaliente, Carlito Cali Junior, University of São Paulo

**Analysis of the Behavior of Wood-Concrete Composite Systems to Deck Bridges (ID-119)**
Julio César Molina, Carlito Cali Junior, University of São Paulo (Brazil)

**New York City Oyster Bridge (ID-121)**
Morton Levshes, Levshes + Partners AS (Norway)

**ASCE Timber Bridge Committee’s National Timber Bridge Survey (123)**
Phil Pierce, CHA Consulting Inc. (USA)
Brian Kukay, Montana Tech University

**Learn-by-Doing – Building a Timber Bridge (ID-127)**
Rakesh Gupta, Oregon State University (USA)

**Major Pathological Manifestations Detected in Timber Bridges in Brazil (ID-131)**
Leandro Dussarrat Brito, Carlito Cali Junior, University of São Paulo (Brazil)

**Comparative Study of Two Stress-Laminated Timber Bridges with Different Anchor Systems (ID-135)**
Glória Esther Unze Cefeirino, University of São Paulo (Brazil)
Carlito Cali Junior, University of São Paulo

**Structural Performance of a Timber-Concrete Bridge Prototype (ID-138)**
Peder Gutenberg de Alcântara Segundinho, Federal University – Espirito Santo (Brazil)
José Antonio Matthiesen, University of São Paulo
Marcelo Rodrigo Carreira, Federal Technical University of Paraná

**Wood Anatomy Determines Drilling, Stress Wave, and Sonic Tomography (ID-140)**
Frank Rinn, Rinn Tech Inc. (Germany)

**Comparison Between Resistance Drilling, Stress WaveTiming, and Sonic Tomography for Condition Assessment of Timber (ID-144)**
Frank Rinn, Rinn Tech Inc. (Germany)

**Experimental Study on Connection and Model for Timber Truss Bridge (ID-150)**
Nak-Hoon Shin, Myongji University (South Korea)

**Mechanical Properties of Laminated Hardwood for Bridge Mat Applications (ID-162)**
P. David Jones, Mississippi State University (USA)
Daniel Seale, Mississippi State University
Bonnie Yang, Mississippi State University
Rubin Shmulsky, Mississippi State University

**Impact of MCA Treatment on Mechanical Properties of Laminated Hardwood Bridge Mats (ID-163)**
P. David Jones, Mississippi State University (USA)
Daniel Seale, Mississippi State University
Bonnie Yang, Mississippi State University
Rubin Shmulsky, Mississippi State University

**Life Cycle Assessment Comparing Short Span Wood and Steel Bridges (ID-164)**
Rick Bergman, USDA Forest Products Laboratory (USA)
James Wacker, USDA Forest Products Laboratory
Maricely Ramirez-Hernandez, University of Puerto Rico
Francisco Negrón Avilés, University of Puerto Rico

**Development of Lightweight Deck Systems for Historic Covered Bridge Rehabilitation (ID-165)**
Brian Brashaw, University of Minnesota-Duluth (USA)
James Wacker, USDA Forest Products Laboratory
Kristoffer Ekholm, WSP Bridge & Hydraulic Design (Sweden)
While timber was Norway’s dominant bridge construction material until the 20th century, preferences gave way to steel and concrete in the early 1900s—until preparations for the 1994 Olympic Games in Lillehammer placed an emphasis on environmentally-friendly construction materials such as timber. Through the Nordic Timber Bridge program (1996-2002), cooperation between the industry, government and research institutes led to a renaissance in timber bridges, some spanning as much as 295 feet. This presentation will feature several of these bridges as well as a discussion on the future of timber bridge construction in Norway.

Keynote Presentation: 9:00 – 9:40 a.m.

**NORWEGIAN TIMBER BRIDGES: CURRENT TRENDS AND FUTURE DIRECTIONS**

Speaker: Erik Aasheim, Norwegian Institute of Wood Technology (Norway)

10:00 a.m. – 12:00 p.m.

**Technical Session 9 – Case Studies II**

Moderator – Paul Gilham, Western Wood Structures Inc. (USA)

- **Case Study of the Longest Single Span Timber Bridge for Highway Loads in Sweden (ID-73)**
  - Kristoffer Ekholm, WSP Bridge & Hydraulic Design (Sweden)*
  - Peter Nilsson, WSP Bridge & Hydraulic Design (Sweden)
  - Erik Johansson, Moelven Tøreboda (Sweden)

- **Steien Network Arch Bridge (ID-112)**
  - Johannes Veie, Norwegian Public Roads Administration (Norway)*
  - Rune Abrahamson, Sweco (Norway)
  - Egil Rønnekleiv, PLAN arkitekter AS (Norway)

- **Tretten Bridge – Timber and Steel in Harmony (ID-100)**
  - John Are Härstad-Eyen (Norway)*
  - Hilde Rannem Isaksen, Norconsult AS (Norway)
  - Bjørn Olav Vik, Norconsult AS (Norway)
  - Per Kristian Ekeberg, Norconsult AS (Norway)

- **A Timber Bridge Across Lake Mjøsa in Norway (ID-93)**
  - Per Meaas, Aas-Jakobsen (Norway)
  - Svein Erik Jakobsen, Aas-Jakobsen (Norway)*
  - Yngve Artun, PLAN arkitekter AS (Norway)

- **100 Kilometers of Timber Bridge Development (ID-92)**
  - Yngve Artun, PLAN arkitekter AS (Norway)*
  - Trond Arne Stensby, Norwegian Public Roads Administration (Norway)
  - Rune Abrahamson, Sweco (Norway)
  - Yngve Artun, PLAN arkitekter AS (Norway)

- **On Development of Network Arch Bridges in Norway (ID-101)**
  - Kjell Malo, Norwegian University of Science and Technology (Norway)*
  - Rune Barli, Norwegian University of Science and Technology (Norway)
  - Idun Hakvåg, Norwegian University of Science and Technology (Norway)

1:00 – 2:20 p.m.

**Technical Session 11 – Field Monitoring**

Moderator – Brian Brashaw, NRRI – University of Minnesota Duluth (USA)

- **Assessment & Monitoring of Moisture Content of Timber Bridges (ID-116)**
  - Bettina Franke, Bern University of Applied Sciences (Switzerland)
  - Andreas Mueller, Bern University of Applied Sciences (Switzerland)
  - Thomas Tannert, University of British Columbia (Canada)
  - Robert Widman, EMPA (Switzerland)*

- **Älvsbacka Bridge – A Timber Bridge in Cold Climate (ID-134)**
  - Niclas Björgmim, Luleå University of Technology (Sweden)*
  - Alice Wang, Luleå University of Technology (Sweden)
  - Ole Hagman, Luleå University of Technology (Sweden)

- **Cable-Stayed Timber Footbridge with Two Towers (ID-137)**
  - Pedro Gutemberg de Alcântara Segundinho, Federal University ES (Brazil)
  - Francisco Antonio Rocco Lahr, University of São Paulo (Brazil)
  - Carlos Cali Junior, University of São Paulo (Brazil)*
  - Antonio Alves Dias, University of São Paulo (Brazil)

- **Short-term Monitoring of a Cable-Stayed Timber Footbridge (ID-66)**
  - Ethan Saracoglu, SP Technical Research Institute of Sweden (Sweden)*
  - Anders Gustafsson, SP Technical Research Institute of Sweden (Sweden)
  - Per-Anders Fjellstrom, SP Technical Research Institute of Sweden (Sweden)

**Technical Session 12 – Wood Composites**

Moderator – Otto Kleppe, Norwegian Public Roads Administration (Norway)

- **Fiberglass Composite Bridges (ID-87)**
  - Crawford Dewar, Guardian Bridge Rapid Construction Inc. (Canada)*
  - Josh Dewar, Guardian Bridge Rapid Construction Inc. (Canada)
  - Ben Dewar, Guardian Bridge Rapid Construction Inc. (Canada)

- **Case Study: Design of pedestrian timber bridges in an AE Studio (ID-120)**
  - Mikhail Gershfeld, California Polytechnic State University (USA)*
  - Judith Sheine, University of Oregon (USA)

- **Combination of Timber, CFRP and GFRP for the Design and Construction of a Bowstring Arch Bridge (ID-118)**
  - Robert Widman*, EMPA (Switzerland)
  - Rolf Broennimann, Urs Meier, EMPA (Switzerland)

- **Mile Long Boardwalk Enhances Estuary Restoration (ID-155)**
  - Paul Gilham, Western Wood Structures Inc. (USA)*

**Technical Session 10 – Bridge Durability**

Moderator – Vijaya Gopu, Louisiana Transportation Research Center and University of New Orleans (USA)

- **Contribution to Structural Details on Timber Bridges (ID-79)**
  - Otto Kleppe, Norwegian Public Roads Administration (Norway)*
  - Hauke Keppe, Norwegian Public Roads Administration (Norway)
  - Tormod Dyken, Norwegian Public Roads Administration (Norway)

- **Glulam Beams & Columns After 5 Years Exposure to Outdoor Climate (ID-103)**
  - Anna Pousette, SP Technical Research Institute of Sweden (Sweden)*
  - Karin Sanderg, SP Technical Research Institute of Sweden (Sweden)

- **Wood Preservative Solutions for Creative and Sustainable Bridge Design and Construction (ID-122)**
  - Ted LaDoux, Western Wood Preservers Institute (USA)*

- **Timber Abutment Piling and Back Wall Rehabilitation & Repair (ID-130)**
  - Justin Dahlberg, Iowa State University (USA)*
  - Brent Phares, F. Wayne Klaiber, Iowa State University (USA)
This timber bridge, designed by Western Wood Structures, and fabricated in our shop, will provide passage over the Placer River into the Chugach National Forest in Alaska.
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Structural Engineering Institute of ASCE

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