Forest Operations (Tuesday, 9:00-10:20 am)

Moderator – Daniel Guimier, Vice President, FPInnovations – FERIC Division

Finding the ‘Sweet-Spot’ of Mechanised Felling Machines
Rien Visser¹*, Raffaele Spinelli², Jacob Saathof³ and Simon Fairbrother⁴
Director¹, Student³, and Assistant Lecturer⁴, Forest Engineering, University of Canterbury, Christchurch, New Zealand, and ²Head of Forest Operations Research, CNR, Sesto-Fiorentino, Italy

Do Synthetic Ropes Change the Design Principles of Standing Skylines?
Ewald Pertlik
Department of Forest and Soil Sciences, Institute of Forest Engineering, University of Natural Resources and Applied Life Sciences, Vienna, Austria

Development of a New Operation System With Carriages for Turn Back Yarding System
Kazuhiro Aruga¹*, Toshiaki Tasaka¹, Akira Nishikawa², and Toshihiko Yamasaki³
¹Utsunomiya University, Utsunomiya, Japan, ²Kawasaki Machine Company, Kochi, Japan, ³Kochi Forest Technique Center, Kochi, Japan

Efficiency and Ergonomic Benefits of Using Radio Controlled Chokers in Cable Yarding
Karl Stampfer¹, Thomas Leitner², Rien Visser³ *
¹Head of School, and ²graduate student, Forestry Faculty, University of Agriculture and Life Sciences, Vienna, Austria, ³Director of Forest Engineering, Canterbury University, Christchurch New Zealand

The Human Factor (Tuesday, 10:40 am – 11:40)

Moderator – Tetsuhiko Yoshimura, Shimane University, Matsue, Japan

Understanding the Hazards of Thrown Objects: Incidents, Research and Resolutions
John J. Garland, PE¹* and Robert Rummer²
¹Consulting Forest Engineer, Garland & Associates, Corvallis, OR, ²Project Leader, Forest Operations Research, USDA Forest Service, Auburn, AL

Identifying Loggers’ Reactions and Priorities in an Increasingly Fragmented Landscape
Matthew C. Moldenhauer¹ and M. Chad Bolding²*
¹Graduate Student, Department of Forestry and Natural Resources, Clemson University, Clemson, SC and ²Assistant Professor of Forest Operations/Engineering, Virginia Tech, Department of Forestry, Blacksburg, VA
Developing Managerial Behaviors and the Indispensable Information to Do So: a Double Challenge for Small Logging Entrepreneurs
Steve Drolet1* and Luc LeBel
1Ph.D. Candidate and 2Professor, Department of Forest and Wood Sciences, Laval University, Québec, Canada

Biomass & Fuel Reduction I (Tuesday, 1:30-3:20 pm)
Moderator – Han-Sup Han, Associate Professor of Forest Operations and Engineering, Humboldt State University

Potential Impacts of Biomass Harvesting on Forest Resource Sustainability
Scott M. Barrett1*, W. Michael Aust2, and M. Chad Bolding3
1Extension Associate, VA SHARP Logger Program Coordinator, 2Professor of Forestry, 3Assistant Professor of Forest Operations/Engineering, Virginia Tech, Department of Forestry, Blacksburg, VA

Developing a Decision Support System to Optimize Spatial and Temporal Fuel Treatments at a Landscape Scale
Woodam Chung1*, Greg Jones2, Janet Sullivan2, and Pablo Aracena1
1Department of Forest Management, College of Forestry and Conservation, The University of Montana, Missoula, 2USDA Forest Service, Rocky Mountain Research Station, Missoula, MT

Harvesting and Transportation of Logging Residue Logs Accumulated Along Road Side for Woody Biomass Plant in a Local Community
Yasushi Suzuki1*, Youko Hatano2, Shinpei Murakami1, Tomoe Okazawa1, Shouji Sagayama3, Jun’ichi Gotou1, Takashi Ichihara4 and Kazuhiro Miyoshi4
1Faculty of Agriculture, Kochi University, Nanoku, Kochi, Japan 2The MIIKE Inc., 3Graduate School of Agriculture, Kochi University, and 4Kochi Prefectural Forest Technology Center

Optimizing the Use of a John Deere Bundling Unit in a Southern Logging System
Steven Meadows1* and Tom Gallagher2
1Graduate Research Assistant and 2Assistant Professor, Forest Operations, School of Forestry and Wildlife Sciences, Auburn University, AL

Combining Slash Bundling With In-Woods Grinding Operations
Hunter Harrill1*, Han-Sup Han2 and Fei Pan3
1Graduate Research Assistant, 2Associate Professor of Forest Operations and Engineering, and 3Research Associate, Department of Forestry and Wildland Resources, College of Natural Resources & Sciences, Humboldt State University, Arcata, CA

Integrating Biomass Recovery Operations into Commercial Timber Harvesting: the New Zealand Situation
Rien Visser1*, Raffaele Spinelli2, Karl Stampfer3
1Director of Forest Engineering, Canterbury University, Christchurch New Zealand 2Head of Forest Operations Research, CNR, Sesto-Fiorentino, Italy 3Head of Department, Department for Forest and Soil Sciences, University of Natural Resources and Applied Life Sciences, Vienna, Austria

* presenting author
Biomass & Fuel Reduction II (Tuesday, 3:40-5:10 pm)
Moderator – Elizabeth Dodson, Assistant Professor, Forest Management, University of Montana

Estimating the Amount of Available Forest Biomass Using System Dynamics
Tetsuhiko Yoshimura\(^1\)\(^a\) and Mitsuhiro Nose\(^2\)
\(^1\)Education and Research Center for Biological Resources, Shimane University, Matsue, Japan, \(^2\)Research Institute for Humanity and Nature, Kyoto, Japan

Stump Harvesting
Dana Mitchell
Research Engineer, USDA Forest Service, Southern Research Station, Auburn, AL,

Masticators for Fuel Reduction Treatment: Equipment Options, Effectiveness, Costs and Environmental Impacts
Brian Vitorelo\(^1\)\(^a\), Han-Sup Han\(^2\) and J. Morgan Varner III\(^3\)
\(^1\)Graduate Research Assistant, \(^2\)Associate Professor of Forest Operations and Engineering, and \(^3\)Assistant Professor of Wildland Fire Management, Department of Forestry and Wildland Resources, College of Natural Resources & Sciences, Humboldt State University, Arcata, CA

The Benefits and Consequences of a Vibrant Wood-to-Energy Market
Joseph L. Conrad IV\(^1\)\(^a\) and M. Chad Bolding\(^2\)
\(^1\)Graduate Research Assistant and \(^2\)Assistant Professor of Forest Operations/Engineering, Virginia Tech, Department of Forestry, Blacksburg, VA

Production for a Biomass Harvesting System in Pine
Brandon O’Neal\(^1\) and Tom Gallagher\(^2\)
\(^1\)Graduate Research Assistant and \(^2\)Assistant Professor of Forest Operations, School of Forestry and Wildlife Sciences, Auburn University, AL

Environmental Impacts (Thursday, 8:00-9:40 am)
Moderator – Mathew Smidt, Extension Specialist and Associate Professor, Auburn University

Effects of Soil Compaction on Individual Tree Growth In the Central Appalachian Hardwood Forest Region
Jingxin Wang\(^1\)\(^a\) Chris LeDoux\(^2\) and William Goff\(^3\)
\(^1\)Associate Professor, \(^2\)Forest Conservation Technician, West Virginia University, Division of Forestry and Natural Resources, Morgantown, WV, and \(^3\)Research Industrial Engineer, USDA Forest Service, Northern Research Station, Morgantown, WV

Influence of Regeneration Method on Soil Strength in a Sierra Nevada Mixed Conifer Forest
Robert A. York\(^1\)\(^a\), Gary Nakamura\(^2\) and John J. Battles\(^3\)
\(^1\)Center for Forestry, University of California, Berkeley, CA, \(^2\)University of California Extension, and \(^3\)Center for Forestry and Environmental Science, Policy, and Management, University of California, Berkeley, CA

* presenting author
Soil Damage After Skidding: Results of a Meta-analysis
E. Ampoorter$^1$, K. Verheyen$^1$ and M. Hermy$^2$
$^1$Laboratory of Forestry, Ghent University, Melle-Gontrode, Belgium, and $^2$Division of
Forest, Nature and Landscape Research, K.U. Leuven, Heverlee, Belgium

A Methodology for Implementing Best Management Practices using WEPP: Road
Erosion Modeling and a Simulated Annealing Algorithm
James (Andy) Efta$^1$ and Woodam Chung$^2$
$^1$Graduate Research Assistant and $^2$Assistant Professor, Department of Forest Management,
College of Forestry and Conservation, The University of Montana, Missoula, MT

The Estimation of Carbon Emissions from Harvested Wood Products in Japan –
Application of a New Approach for Appropriate Forestry
Mitsuhiro Nose
Research Institute for Humanity and Nature, Kyoto, Japan

Roads, Trails & Transport (Thursday, 10:00-11:15 am)
Moderator – Awatif Hassan, Professor Emeritus, North Carolina State University

Designing Skid-Trail Networks to Simultaneously Minimize Skidding Costs and Soil
Disturbances
Marco Contreras$^*$ and Woodam Chung
Department of Forest Management, College of Forestry and Conservation, The University of
Montana, Missoula, MT

Forest Road Pavement Design in New Zealand
Simon Fairbrother$^1$, Rien Visser$^2$* and Robert McGregor$^3$
$^1$Assistant Lecturer, $^2$Director, and $^3$Honours Student, Forest Engineering, Canterbury
University, Christchurch, New Zealand

Application of Hook-lift Trucks in Centralized Slash Grinding Operations
Hunter Harrill$^1$, Han-Sup Han$^2$ and Fei Pan$^3$
$^1$Graduate Research Assistant, $^2$Associate Professor of Forest Operations and Engineering,
and $^3$Research Associate, Department of Forestry and Wildland Resources,
College of Natural Resources & Sciences, Humboldt State University, Arcata, CA

Transportation of Woody Biomass Using Roll-Off Containers
Beth Dodson
Department of Forest Management, College of Forestry and Conservation, The University of
Montana, Missoula, MT

* presenting author
**Poster Session (Thursday, 11:15-noon)**

**Forest Landscape Changes After Clear-Cutting in a Subalpine Coniferous Forest Estimated by Remote Sensing Data**  
Akemi Itaya¹* and Fumiaki Akahori²  
¹Graduate School of Bioresourses, Mie University, Tsu-city, Mie-Pref., JAPAN and  
²Faculty of Bioresourses, Mie University

**Forest Road Network Planning by Using GIS**  
JiYoung Son *, Sooil Suk, Rin Sakurai, Toshio Nitami, and Hideo Sakai  
Graduate School of Agricultural and Life Sciences, The University of Tokyo, Japan

**Relationships between GPS positional errors and stand conditions**  
Tetsuhiko Yoshimura¹*, Mitsuhiro Nose², Hisashi Hasegawa³ and Tetsuro Sakai⁴  
¹Education and Research Center for Biological Resources, Shimane University, Matsue, Japan, ²Center for Environmental Management, Kyoto, Japan, ³Field Science Education and Research Center, Kyoto University, Kyoto, Japan, ⁴Graduate School of Informatics, Kyoto University, Kyoto, Japan

**The Role of Soil Hydrophobicity in Soil Evaporation in Sandy Soils**  
Sangjun Im *, Sujung Ahn, Sang-ho Lee and Dong Yeob Kim  
*Associate Professor, Dept. of Forest Sciences, Seoul National University, Gwanak-gu, Korea

**Soil Erosion Following Five Bladed Skid Trail Closure Techniques**  
C.R. Wade¹, B.C. Sawyers², M.C. Bolding³*, W.M. Aust⁴, and E.T. Roberts⁵  
¹Graduate Research Assistant, ²Forestry Research Manager, ³Assistant Professor, Forest Operations/Engineering, ⁴Professor, Forest Soils/Hydrology, ⁵Harvesting Research Technician, Virginia Tech Department of Forestry, Blacksburg, VA

**The Study of the Automatic Forest Road Design Technique Considering Shallow Landslides With LiDAR Data of the Funyu Experimental Forest**  
Masashi Saito, Masahiro Goshima, Kazuhiro Aruga *, Keigo Matsue, Yasuhiro Shuin, and Toshiaki Tasaka  
Utsunomiya University, Utsunomiya, Japan

**The Use of Roll-Off Bins and a Hook-lift Equipped Harwarder and Truck for Forest Biomass Utilization**  
Elizabeth M. Dodson¹*, and Aaron E. Kash²  
¹Assistant Professor of Integrated Natural Resource Planning, ²Graduate Research Assistant and M.S. Candidate, College of Forestry and Conservation, The University of Montana, Missoula, MT

* presenting author
Maximizing Value (Thursday, 1:00-3:10 pm)

Moderator – Ewald Pertlik, Institute of Forest Engineering, University of Natural Resources and Applied Life Sciences, Vienna, Austria

FPInnovations - Maximizing Value From the Forest
Daniel Guimier\(^1\)\(^*\) and Jean Favreau\(^2\)
\(^1\)Vice President and \(^2\)Program Leader, FPInnovations – FERIC Division, Pointe-Claire, Québec, Canada

Determining Radiata Pine Tree Value and Log Product Yields Using Terrestrial LiDAR and Optimal Bucking in South Australia
Mauricio Acuna\(^1\)*, Glen Murphy\(^2\) and Jan Rombouts\(^3\)
\(^1\)CRC Forestry – University of Tasmania, Hobart, Australia, Hobart, TAS, Australia, \(^2\)Oregon State University, College of Forestry, Forest Engineering Department, and \(^3\)Forestry SA, Mt. Gambier, Australia

Developments in Log-making in New Zealand
Dallas C. Hemphill, PE
Consultant Logging Engineer, Eugene, OR

Product Sorting Impacts on Cost and Productivity of Tree-length Logging Operations
Shawn Baker\(^*\), Randy Cass and Dale Greene
Center for Forest Business, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA

Financial Feasibility of a Log Sort Yard Handling Small-diameter Logs
Han-Sup Han\(^1\)*, Ted Bilek\(^2\), Rusty Dramm\(^2\), Dan Loeffler\(^3\) and David Calkin\(^3\)
\(^1\)Humboldt State University, Arcata, CA, \(^2\)USDA Forest Products Laboratory, Madison, WI, and \(^3\)USDA Forest Service, Rocky Mountain Research Station, Missoula, MT

Assessment of the Potential for Log Sort Yards to Facilitate Forest Health Restoration and Fuel Reduction Treatments
Tyron J. Venn\(^1\)*, Woodam Chung\(^1\), Daniel R. Loeffler\(^2\), J. Greg Jones\(^3\), Han-Sup Han\(^4\), and David E. Calkin\(^3\)
\(^1\)Assistant Professor and \(^2\)Research Manager, College of Forestry and Conservation, The University of Montana, Missoula, MT, \(^3\)Research Forester, US Forest Service, Rocky Mountain Research Station, Missoula, MT, \(^4\)Associate Professor, Department of Forestry and Wildland Resources, Humboldt State University, Arcata, CA

Using Acoustic Technology as a Means for Improving the Economics of Fuel Reduction Operations through an Integrated Value-Adding Approach
Dzhamael Y. Amishev\(^1\)* and Glen E. Murphy\(^2\)
\(^1\)Research Scientist, Scion (A Crown Research Institute), Rotorua, New Zealand, and \(^2\)Professor, FERM Department, Oregon State University, Corvallis, OR, USA

* presenting author
Production & Cost Analysis (Thursday, 3:30-5:00 pm)
Moderator – Woodam Chung, Department of Forest Management,
College of Forestry and Conservation, University of Montana

Machine Cost Analysis Using the Traditional Machine-Rate Method and ChargeOut!
E.M. (Ted) Bilek
Economist, USDA Forest Service, Forest Products Laboratory, Madison, WI

Stump to Mill Logging Cost Program (STOMP)
Mathew Smidt*, Robert Tufts and Tom Gallagher
School of Forestry and Wildlife Sciences, Auburn University, Auburn, AL

Western Biomass – A Spreadsheet –based Production and Cost Prediction Model for Integrated Biomass Harvesting
Fei Pan†*, William J. Elliot‡, Leonard R. Johnson§, Han-Sup Han¶, Christopher J. Williams**,
and Harry W. Lee***
†Graduate Research Assistant, ‡Professor Emeritus and ***Assistant Professor, Department of Forest Products, University of Idaho, Moscow, ID, ¶Team Leader, USDA Forest Service, Rocky Mountain Research Station, Moscow, ID, §Associate Professor, Department of Forestry and Wildland Resources, Humboldt State University, Arcata, CA, and **Professor, Department of Statistics, University of Idaho, Moscow, ID

Updating FRCS, the Fuel Reduction Cost Simulator, for National Biomass Assessments
Dennis Dykstra†*, Bruce Hartsough‡, and Bryce Stokes§
†Research Scientist, PNW Research Station, USDA Forest Service, Portland, OR, ‡Professor, Biological and Agricultural Engineering, University of California, Davis, and §Senior Advisor, Golden Field Office, Department of Energy, Golden, Colorado