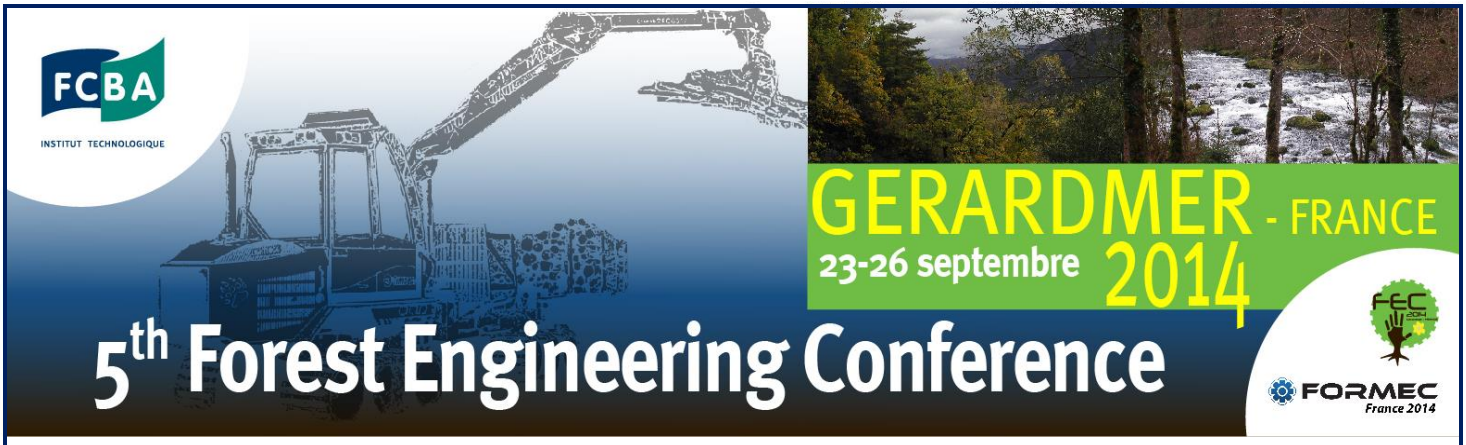

Final program

5th Forest Engineering Conference

together with the

47th International Symposium on Forestry Mechanisation

"Forest engineering: propelling the forest value chain"

September 23-26, 2014 in Gerardmer, France

FEC – FORMEC – 2014 Final program

5th Forest Engineering Conference

together with the

47th International Symposium on Forestry Mechanisation

"**Forest engineering: propelling the forest value chain"**

September 23-26, 2014

VENUE

Centre des Congrès - Espace L.A.C.

17 Faubourg de Ramberchamp

F - 88400 Gérardmer

FEC – FORMEC – 2014 Final program

FCBA, the French technology institute for forestry, cellulose, wood construction and furniture, is hosting the **5th Forest Engineering Conference (FEC)** together with the **47th International Symposium on Forestry Mechanisation (FORMEC).**

The conference is taking place on **September 23-26, 2014 in Gerardmer, France** under the general theme "**Forest engineering: propelling the forest value chain".**

Inspired by successful FEC and FORMEC past editions, this major international event grants forest researchers and practitioners one of the best opportunities to meet, and share for 3 full days their experience, knowledge and emerging ideas.

Two days of indoor technical sessions are completed with a full day of field demonstrations in the local mixed sub-mountainous forests.

Tuesday September 23.	Wednesday September 24.	Thursday September 25.	Friday September 26.
		Start at 07:30	
	Start at 08:00		**Start at 08:00**
	Welcome & Keynotes (K1 & K2)		Welcome again & Keynotes (K3 & K4)
	break		Break & POSTER session n°2
* 30' time slots	3 Parallel sessions (A) 10:00-12:00		3 Parallel sessions (D) 10:30 - 12:30
	Lunch	Field trip (lunch included)	Lunch
From 14:30	3 Parallel sessions (B) 13:00 - 15:00		3 Parallel sessions (E) 13:30 - 15:30
Registration whenever you arrive…	Break & POSTER session n°1		Break
Pre-conference event INFRES Workshop 16:00 - 18:00	3 Parallel sessions (C) 16:30 - 18:30		3 Parallel sessions (F) 16:00 - 18:00
Ice-breaking reception			wrap up and conclusions
			End at 19:00
	Conference dinner (from 19:00)	GALA Dinner (from 19:00)	
free evening			

FEC – FORMEC – 2014 Final program

Contributions from the international forest engineering community

The call for paper announced six major themes for the 5th Forest Engineering Conference. The answers from the international community of researchers and practitioners brough the organisation committee to elaborate the program with 18 parallel sessions for oral presentations (A to C on Wednesday and D to F on Friday) completed with 2 poster sessions: P1 on Wednesday and P2 on Friday.

Parallel sessions for oral presentations are organised in two hours slots on the principle that each contribution is presented for **15 minutes (max) by the author and then discussed for 5 minutes (max) through the questions raised by the audience**.

	Session ID	
	Oral	Poster
Theme 1. Managing interactions between logging operations and forest ecosystems services		
▪ *Trafficability practices and understanding of forest soil characteristics*	B & D	P2
▪ *Forest operations: environmental concerns and natural hazards*	A	P2
▪ *Forest roads and environment*	E	P2
Theme 2. Answering specific challenges in harvesting technologies and working methods		
▪ *Innovation-driven developments in harvesters and forwarders*	A & D	P1
▪ *Logging in steep terrain*	C	P1
▪ *From traditional to automated work studies*	C	P1
▪ *Harvesting technics and working methods for biomass mobilization*	C	P1
▪ *Fuelwood quality and moisture content management*	E	P2
Theme 3. Being innovative in transportation solutions and logistics		
▪ *Measuring and tagging logs along the supply chain*	A	-
▪ *Wood supply chain management and decision support tools*	B	P1
Theme 4. Better working conditions and educational programs		
▪ *Workforce training and skills developments*	F	P2
▪ *Contractors and durable business*	E	P2
▪ *Ergonomics and Man-Machine co-developments*	B	P1
Theme 5. Organisational innovations and other strategies for a better planning and monitoring of forest operations in specific contexts		
▪ *Looking for efficient bioenergy supply chains*	D & F	P2
Theme 6. Implementing Precision Forestry concepts for improved wood-supply-chains		
▪ *Operational uses of remote sensing technologies for logging operation*	F	P2

Keynote adresses

Four keynote presentations are programmed during the plenary sessions of the conference.

K1 **"Prospects and Challenges for Forest Harvesting technologies in Europe"**

Magnus Thor, Skogforsk, Sweden

On Wednesday 24. during the morning plenary

Forest harvesting technology advanced with major leaps during the decades of mechanization. As a result, modern harvesting systems represent mature technology. The context in which the technology and systems have evolved has changed over time. This presentation will address key issues that have been successfully tackled by means of forest harvesting technology, but also open problems that remain to be solved. Further development of forest harvesting technology is one important means to meet the challenges that forestry and forest industry are facing. One key element is to be able to respond to changing requirements and possibilities inside and outside the forest sector. Cooperation between actors in the innovation system/value chains is of crucial importance, as is cross-sectorial relations. The fast development in e.g. ICT and Lidar opens windows of opportunity for innovation. Political pressure on bio-economic, socio-economic and environmental/climate issues calls for increasing focus on 'environgentleness' and operator comfort. But in the end, without sufficient productivity and competitiveness forestry risks to lose the grip of the opportunities that the bio-economy scenario provides. Consequently, securing value-adding, productivity and 'environgentleness' in all kinds of forest harvesting technology development is imperative. There is still room for significant improvement of today's technology and systems, which in turn will enable next leap for forest harvesting technology.

K2 "**Collaborative logistics: improving business relationships and supply chain visibility to propel the forest value chain**"

Nathalie Fabbe-Costes, CRET-LOG, France

On Wednesday 24. during the morning plenary

Considering the growing complexity of value chains and of their environment (in particular fierce competition, market dynamicity, sourcing uncertainties, regulation and compliance pressures, and increasing environmental risks), it is acknowledged that local optimisations and isolated efforts cannot succeed in improving value chains performance and success.

Considering the structural changes of value chains in most industries, competition has shifted from "company vs. company" to "supply chain vs. supply chain". Therefore, a supply chain management (SCM) approach is needed to improve operational performance of value chains, as well as their responsiveness, flexibility, agility, robustness and resilience.

It is thus necessary to switch from a single intra-organisational approach to a more holistic (systemic) inter-organisational perspective to (re)design logistics (a core strategic SCM process) innovatively and efficiently. Most research works and practical experiences highlight the need to improve logistics collaboration among supply chain partners. However, they also report that achieving "collaborative logistics" is not easy!

Our purpose is to make a synthesis of previous research and business experiences to provide a comprehensive framework of collaborative logistics, antecedents and outcomes. The objective is particularly to clarify the meaning of logistics collaboration, to highlight the importance of business relationships and supply chain visibility, and to provide a structured list of factors that facilitate or inhibit collaborative logistics in value chains.

Collaborative logistics is sometimes considered as mythic, and its achievement as an endless journey. Consequently, we also want to identify practices and principles that could help the forest sector to developing realistic and successful collaborative logistics.

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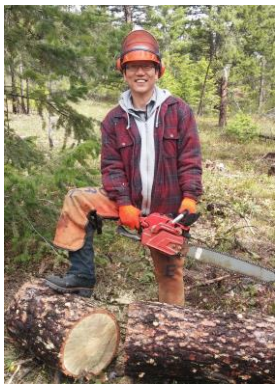
K3 "**Forest Ecosystem Management Issues and Opportunities in the United States**"

Woodam Chung, Oregon State University, United States of America

On Friday 26. during the morning plenary



United States forest management provides diverse goods and services unique to its ecosystem. To ensure a continuous supply of these forest benefits managers need practices that maintain the long-term health of forested ecosystems. Current US forests face major biologic, economic and social challenges. These challenges are a result of America's changing demands for forest goods and services, past forest practices and a changing climate. This presentation briefly identifies some of these challenges, such as catastrophic wildfire, water conservation, and insect outbreaks. It also highlights management opportunities and the roles for forest researchers, practitioners and engineering technology in dealing with these challenges.

The author will also offer his vision and plans as the new Division 3 Coordinator of the International Union of Forest Research Organizations (IUFRO).

K4 "**Insights on the changes operated in forest value-chain management in South America**"

Marcos Wichert, FIBRIA Pulp - Forestry Operations, Brazil

On Friday 26. during the morning plenary

Parallel session **A: 10:00 – 12:00**

Innovation-driven developments in harvesters and forwarders (1/2) Moderotor: *R. Cavalli (Univ. of Padova)* Mérelle (4 presentations)	**Measuring and tagging logs along the supply chain** Moderator: *J. Fryk (Skogforsk)* Haut-Fer (5 presentations)	**Forest operations: environmental concerns and natural hazards** Moderator: *J. Erler (TU Dresden)* Horloge (6 presentations)
Evaluation of a prototype harvester head for rough delimbing and compression in early energy wood thinning *F. Di Fulvio and D. Bergström (SLU)* Harvesting Machines for crooked trees *N. Perriguey, Z. E. Chebab, C. Devemy, G. Dargnat, B. Hatton, D. Goubet, J-C Fauroux, V. Gagnol, B-C Bouzgarrou, G. Gogu (IFMA)* Directing the development of mechanised forest operations to meet changes in Polish forestry *P. S. Mederski, M. Bembenek, Z. Karaszewski & M. Gierszewska (Poznań University of Life Sciences)* Estimating the harvester head's position - a missing link to the future's precision forestry *O. Lindroos, O. Ringdahl, P. La Hera, P. Hohnloser and T. Hellström (SLU)*	Development of an automated system for counting, measuring and tracking export logs arriving on trucks and railway wagons *G. Murphy, R. Valkenburg and D. Ganley (GE Murphy & Associates)* Influence of Region, Seasonality, and Species on Weight to Volume Relationships of Commercial Sawlogs in Idaho *J. Saralecos, R. F. Keefe, R. H. Brooks and L. R. Johnson (University of Idaho)* Improved wood delivery by new scaling methods of log piles. *M. Opferkuch and D. Jaeger (University of Freiburg)* The impact of mechanical log surface damage on fibre loss and chip quality when processing Eucalyptus pulpwood using a single-grip harvester *J-P van der Merwe, R. E. Pulkki, P. A. Ackerman and D. Längin (Stellenbosch University)* Comparative analysis of four estimation methods of stand volume and different staged measurement and analysis of sub-compartment output volume in Eucalyptus stump area *X. Ge, L. Wang, Z. Bao and T. Sun (Northeast Forestry University)*	Tree damage in mechanized uneven-aged selection cuttings *M. Sirén, J. Hyvönen and H. Surakka (METLA)* Method of investigation towards better forest fires risk management due to the improved forest biomass utilization *V. Corbic, R. Klvac, D. Stojnic (Mendel University)* Application of fertilizer spreaders for wood ash utilization *C. Huber, G. Bohrn and K.Stampfer (BOKU)* HCT vehicles for timber transport in Sweden - Results from the ETTdemo project *J. Widinghoff; V. Asmoarp, N. Fogdestam, C. Löfroth (Skogforsk)* Spatial prediction of slope failure in the Caspian forest using an adaptive neuro-fuzzy inference system and GIS *A. Jaafari and A. Najafi (Technical University in Zvolen & Tarbiat Modares University)* Environmental effects of forest operations on a suburban forest landscape – a forest engineering approach V. Drosos (Democritus University of Thrace)

Parallel session **B: 13:00 – 15:00**

Wood supply chain management and decision support tools Moderator: *B. Dahlin (Univ. of Helsinki)* Mérelle (6 presentations)	**Ergonomics and Man-Machine co-developments** Moderator: *P. Ackerman (Stellenbosch Univ.)* Haut-Fer (5 presentations)	**Trafficability practices and understanding of forest soil characteristics (1/2)** Moderator: *E. Cacot (FCBA)* Horloge (5 presentations)
West Virginia Logger Travel Distance and Wood Supply Zone Opportunities *B. Spong and S. Grushecky (West Virginia University)*	Analysis of human generated crane motion patterns – towards the automation of forestry manipulators *P. La Hera, D. Ortiz Morales, S. Westerberg, O. Lindroos (SLU)*	Possibilities to predict moisture content of peat soil at the moment of harvest operation *J. Uusitalo, H. Lindeman and J. Ala-Ilomäki (METLA)*
Wood transport qualification to anticipate regulatory constraints *T. Carrette and C. Ginet (FCBA)*	An evaluation on whole-body vibration affecting tractor and truck operators *K. Melemez, M. Tunay Metin and T.Emir (University of Bartin)*	Soil compaction on two sensitive sites in north-eastern France and natural or assisted recovery processes *N. Goutal-Pousse, P. Bonnaud, J. Demaison, G. Nourrisson, P. George and J. Ranger (ONF R&D department)*
Optimized scheduling of harvesting teams *M. Frisk, M. Rönnqvist, P. Flisberg and G. Andersson (Skogforsk)*	Using a harvester simulator to evaluate work methods in thinning *Ö. Grönlund, M. Iwarsson Wide and M. Englund (Skogforsk)*	Innovative concept of a forwarding system for considerate treatment of forest soil and improved efficiency *C. Knobloch and C. Jacobs (TU Dresden)*
Optimising Harvesting and Processing Operations within the Value Chain *R. Visser and A. Tolan (University of Canterbury)*	A comparison of OWAS and REBA observational techniques for assessing postural loads in tree felling and processing *N. Manavakun (Kasetsart University)*	Flexible extra wheel-attachment to decrease ground pressure of a harvester. *M. Öhman, U. Bergsten, T. Nordfjell and A. Ågren (SLU)*
Integrated transportation tools to optimise timber and biomass supply logistics *M. Acuna (University of the Sunshine Coast)*	Eye-tracking as a research tool to analyse work conducted by harvester operators *C. Häggström, M. Englund, O. Lindroos and G. Lidestav (SLU)*	Nutrient concentration on skid trails under brush-mats - Is a redistribution of nutrients possible? *H. Borchert and K. Goettlein (Bavarian State Institute of Forestry)*
Forest Transportation Planning by using GIS-based Decision Support System *A. Akay and A. Azad Haji Kakol (Kahramanmaras Sutcu Imam University)*		

Parallel session **C: 16:30 – 18:30**

Harvesting technics and working methods for biomass mobilization Moderator: *O. Lindroos (SLU)* Mérelle (6 presentations)	**From traditionnal to automated work studies** Moderator: *R. Klavc (Mendel Univ. in Brno)* Haut-Fer (6 presentations)	**Logging in steep terrain** Moderator: *K. Stampfer (BOKU)* Horloge (5 presentations)
A new machine for the extraction of SRC stumps for biomass production *G. Picchi, R. Spinelli and G. Ragaglini (CNR-IVALSA)* Productivity of multi-tree cutting in thinnings and clear cuttings of downy birch (Betula pubescens) in the integrated harvesting of pulpwood and energywood *J. Laitila, K. Väätäinen and P. Niemistö (METLA)* Mechanized harvesting of big broadleaves crowns. *P. Ruch, E. Ulrich, D. Pischedda, and X. Montagny (FCBA & ONF)* Effects of sieve size on chipper productivity, fuel consumption and chip size distribution for open drum chippers *L. Eliasson, H. von Hofsten, R. Spinelli and T. Johannesson (Skogforsk)* Case study: Comparation of two harvesting methods for bioenergy under Mediterranean conditions. *V. Lerma, J. Oliver-Villanueva and G Segura (AIDIMA UPV)* Determining the impact of felling method and time of the year on coppice regeneration *T. Gallagher, D. P. Leite de Souza, M. Smidt, T. McDonald, D. Mitchell & J. Wright (Auburn School of Forestry and Wildlife Sciences)*	Monitoring long-term forwarder productivity using onboard computer data *M. Strandgard, and R. Mitchell, Rick (University of the Sunshine Coast)* Forest work studies: who, why, how *B. Kosir and R. Spinelli (University of Ljubljana)* Time studies based on automatic data collection *J. Arlinger and J. Möller (Skogforsk)* Analyzing forwarder operation by consumer-grade GPS in mountainous conditions *S. Grigolato, A. Poje, M. Pellegrini, I. Potocnik and R. Cavalli (University of Padova)* Forwarding work study with automatic data recording *J. Manner, L. Palmroth, O. Lindroos and T. Nordfjell (SLU)* Estimating the Time Consumption and Productivity of Round Wood Skidding in Group Shelterwood Cuttings – A Case Study in a Mixed Stand Located in Reduced Accessibility Conditions *S. A. Borz, B. Popa, G. Ignea and G. Sparchez (Transilvania University of Brasov)*	New Developments in Fully Mechanising Steep Terrain Harvesting Operations *R. Visser, K. Raymond, Keith and H. Harrill (University of Canterbury)* Small and simple technology cable system for logging *F. Vélez (Independent professional in Colombia)* Productivity and Systems Analysis of an Excavator Based Running Skyline in Two Alternative Working Configurations in Norway *B. Talbot, G. Aalmo, K. Stampfer (NFLI)* Benefits of varying cable yarding technologies with respect to specific timber harvesting and extraction needs in Southern China *S. Hoffmann, S. Schoenherr, D. Jaeger and B. Engler (University of Freiburg)* Cable yarding potential and its current share in turkish logging *A. Altunel, T. Altunel, K. Enez and B. Aricak (Kastamonu University)*

Parallel session **D: 10:30 – 12:30**

Looking for efficient bioenergy supply chains (1/2) Moderator: *D. Jaeger (Univ. of Freiburg)* Mérelle (6 presentations)	**Trafficability practices and understanding of forest soil characteristics (2/2)** Moderator: J. Uusitalo (METLA) Haut-Fer (5 presentations)	**Innovation-driven developments in harvesters and forwarders (2/2)** Moderator: P.S. Mederski (Poznan Univ. of Life Sciences) Horloge (5 presentations)
The logistics of wood chips in Estonian conditions - a case study *M. Irdla, A. Padari, P. Muiste and M. Irdla (Estonian University of Life Sciences)*	Review and application of analytical models of forest soil bearing capacity *A. Pirnazarov, U. Sellgren and B. Löfgren (KTH)*	The technical evolution and market of forwarders in Sweden *T. Nordfjell (SLU)*
Establishment of transportation system of low value wood biomass for the early stage of energy supply *M. Yoshida and S. Hideo (The University of Tokyo)*	Estimating soil displacement in skid train construction using stereo-photogrammetry and LIDAR *M. Pierzchała, B. Talbot and R. Astrup (NFLI)*	A concept study of a four-wheeled forestry machine with active pendulum axels operating on soft and rough soils *A. Ismoilov, U. Sellgren and K. Andersson (KTH)*
Life Cycle Assessment of woody biomass from energy crops *C. Cornillier and P. Ruch (FCBA)*	Productibity and cost analysis of a wheeled skidder in chestnut coppice forests in the north of Spain. Preliminary evaluation of the soil compaction of forest road. *E. Canga, S. Sánchez-García, E. Prado and J. Majada (CETEMAS)*	Active brake-link for faster and safer forwarding *M. Öhman, C. Häggström and T. Nordfjell (SLU)*
TCS – An operational system for control and optimization of forest biomass logistics *T. Mustonen and M. Tuukkanen (ECOMOND)*		Answering future specific challenges in harvesting – Views of design students *U. Bergsten and M. Hedblom (SLU)*
The effect of implementing innovative harvesting and handling technologies for young dense thinning on the cost and energy efficiency of supply systems *D. Bergström, F. Di Fulvio (SLU)*	Possibilities to reduce rut formation in logging operations on unfrozen peatland *H. Lindeman, Ala-Ilomäki and J. Uusitalo (METLA)*	Determination and optimization of delimbing forces on hardwood harvesting heads *C. Devemy, G. Dargnat, Benjamin HATTON, D. Goubet, N. Perriguey, Z. E. Chebab, J-C Fauroux, V. Gagnol, B-C Bouzgarrou, G. Gogu (IFMA)*
Improved BioMass Market Efficiency and Price Discovery from Online Auctions *T.Turkmengil, E. Jessup and M. Dees (University of Freiburg)*	Non-durable use wood motor roads . *M. Bicevskis and I. Kalmuks (Latvia`s state forest)*	

Parallel session **E: 13:30 – 15:30**

Forest roads and environment Moderator: *J.F. Gingras (FPInnovations)* Mérelle (5 presentations)	**Contractors and durable business** Moderator: *M. Bigot (ONF)* Haut-Fer (6 presentations)	**Fuelwood quality and moisture content management** Moderator: *R. Spinelli (Ivalsa CNR)* Horloge (6 presentations)
Achieving successful road performance and reducing the environmental impact of resource roads in wetland environments *M. Partington and C. Gillies (FPInnovations)* Secondary opening of sloped terrain forests – a GIS study for timber skidding *T. Pentek , H. Nevečerel, T. Poršinsky, M. Šporčić, K. Lepoglavec, I. Papa and Ž. Tomašić (Forestry Faculty of Zagreb University)* Evaluation of the Effect of Lime-Stabilized Subgrade on the Performance of an Experimental Road Pavement *J. Péterfalvi; P. Primusz; Markó and Kosztka (University of West Hungary)* Machine utilization rates and environmental performance of forest road construction and maintenance in Romanian mountain forests *A. Enache, K. Stampfer, B. Talbot and J. Bjerketvedt (BOKU)* Subgrade Strength Recovery in Forest Roads in Oregon. *K. Boston (Oregon State University)*	Importance of Internal and External Factors for Forest Contractors in Norway - The Manager's View *B. Vennesland, E. Skagestad and E. Nybakk (NFLI)* UGA Logging Cost Index: A Measure of Southern US Timber Harvesting Costs *S. Baker and D. Greene (University of Georgia)* Consequences of Varying Industrial Contexts on Procurement and Management of Logging Services: Comparisons Between two Swedish Forest Companies *E. Erlandsson, G. Lidestav and D. Fjeld (SLU)* Influence of Prescribed Method of Roundwood Scaling on Forwarder Efficiency *A. Đuka, T. Poršinsky, T. Pentek and M. Šporčić (Faculty of Forestry Zagreb)* The communication process between contactors and clients *M. Sääf and R. Björheden (Skogforsk)* Logging Cost Indices for the United States *E. Dodson, D. Greene, S. Baker and S. Hayes (University of Montana)*	Fuelwood moisture content management through meteorological data based modelling *G. Erber (BOKU*) Precision Measurement of Forest Harvesting Residue Moisture Change and Dry Matter Losses by Constant Weight Monitoring *J. Routa and L. Sikanen (METLA)* An accurate and fast method for moisture content determination. *L. Fridh and L. Eliasson (Skogforsk)* Energy efficient production of high quality wood chips using energy round wood instead of forest residues *D. Kuptz and H. Hartmann (Technologie- und Förderzentrum TFZ)* Wood chip quality. *E. Nordhagen, S. Gjølsjø and E. Nordhagen (NFLI)* BioGas Woodchip Drying Innovation for Reduced Bioenergy Production Cost *E. Jessup, J. Walkiewicz and M. Dees (University of Freiburg)*

Parallel session **F: 16:00 – 18:00**

Operational uses of remote sensing technologies for logging operation Moderator: *G. Murphy (GE Murphy & Assoc.)* Mérelle (5 presentations)	**Workforce training and skills developments** Moderator: *R. Visser (Univ. of Canterbury)* Haut-Fer (5 presentations)	**Looking for efficient bioenergy supply chains (2/2)** Moderator: *B. Talbot (NFLI)* Horloge (5 presentations)
LiDAR Mapping as an Aid to Partial Cutting in Heterogeneous Stands. *P. Meek and J-M Lussier (FPInnovations)*	The Limiting Factor in North American Forest Operations: A Skilled Workforce *J. Garland (Consulting Forest Engineer)*	Logistics optimization of a biomass supply chain *A. Bouvet and B. Penz (FCBA)*
How to Effectively Set up Cable Yarding Corridors: A Case Study of Central Turkish Example *B. Aricak, H. Acar, A. Altunel, A. Kurtipek and K. Enez (Kastamonu University)*	Development and Implementation of Innovations in Croatian Forestry *M. Šporčić, S. Posavec, M. Landekić, T. Pentek and T. Poršinsky (Forestry Faculty of Zagreb University)*	Biomass harvesting resimurphyue supply chain optimisation and verifying the effect of major parameters affecting the supply chain cost in Western Australia *M. R. Ghaffariyan, M. Acuna and M. Brown (AFORA, University of the Sunshine Coast)*
Variable extraction cost modelling on high resolution terrain models *N. Søvde, B. Talbot, J. Bjerketvedt and M. Pierzchala (NFLI)*	University training for industrial wood supply *D. Fjeld, Erikson, Frisk, Lemieux, Marrier, M. Rönnqvist (SLU)*	Success factors for larger forest fuel terminals *D. Athanassiadis, J. Enström, M. Öhman and Ö. Grönlund (SLU)*
A case study on the prediction of detailed product recovery from individual stem profiles based on airborne laser scanning and models for predicting wood and fibre properties and forest residues *L. Wilhelmsson, A. Barth, J.J Möller, J. Arlinger, R. Hedberg and U. Söderman (Skogforsk)*	Successful training strategies for introducing cable yarding technologies in China *S. Schoenherr, S. Hoffmann, D. Jaeger and B. Engler (University of Freiburg)*	Optimizing Bioenergy Supply Chain Configurations for the Northeastern United States *J. Wang and D. Hartley (West Virginia University)*
Applications of multi-transmitter GPS-VHF in forest engineering *R. Keefe (University of Idaho)*	An assessment of wage and skill level among logging equipment operators in the USA *M. Smidt, Xu and Zhang (Auburn University)*	Improving the efficiency of forest biomass supply chains in Canada. *D. Roser (FPInnovations)*

Poster sessions: organisation

2 collective poster sessions are included in the program, with time and space arrangements to guarantee the posters' visibility and accessibility for all congressists.

The posters will be organised in relevant groups in order to bring additional light on the conference themes, as complement and in parallel to the oral presentations. The posters are heredown listed according to the day of their presentation and the major theme they relate to.

NB: Authors from the 1st session (P1) are expected to install their poster before the session begins and to bring them down at the end of the day so that authors from the 2nd session (P2) can display their contribution instead.

P1
1st poster session on Wednesday (September 24.) from 15:00 to 16:30

Theme n° 2. Answering specific challenges in harvesting technologies and working methods

- *Innovation-driven developments in harvesters and forwarders*
- *From traditional to automated work studies*
- *Logging in steep terrain*
- *Harvesting technics and working methods for biomass mobilization*

ID	Title of the poster	Authors	Affiliation
22	Optimum combination of animal and farm tractor skidding systems in log removing	N. Gilanipour, A. Najafi & M. Seyed Heshmatolvaezin	Tech. University in Zvolen Tarbiat Modares University
90	Harvesting of heart stumps from Poplar and Maritime Pine forest in South West France	R. Emeyriat, S. Cloarec, H. Husson, J-R Liarçou & J.Moreau	FORET LOGISTIQUE CONSEIL
147	Time structure of working day while performing wood harvesting – economic view	T. Nurek	Warsaw University of Life Sciences
150	Scrutiny of factors affecting extraction distances of forwarders	O. Lindroos & E. Wadbro	SLU
179	Mathematical Time Prediction Models of Loader HSM 904 Using Multiple Linear Regressions (MLR) and Adaptive Neuro Fuzzy Inference System (ANFIS)	I. Ghajar, R. Naghdi, M. Nikooy & S. Yousefifard	University of Guilan
6	The cutting productivity in integrated harvesting of pulpwood and delimbed energy wood with a forestry-equipped peat harvesting tractor	J. Laitila & K. Väätäinen	METLA
20	Ground disturbance and diameters of roots at breakage points after stump harvesting	S. Berg, T. Nordfjell & J. Nurmi	SLU
141	Comparing CTL with WT harvesting in the thinning of Mediterranean pine plantations	N. Magagnotti, C. Lombardini & R. Spinelli	CNR - IVALSAR

ID	Title of the poster	Authors	Affiliation
166	Biomass production from mallee agroforestry plantations in Western Australia	R. Spinelli, M. Brown, R. Giles, D. Huxtable, R.R. Laina & N. Magagnotti.	CNR - IVALSAR
33	Comparison of harvester time consumption and productivity in Eucalyptus globulus planted and second rotation coppiced plantations in south west Western Australia	R. Mitchell & M. Strandgard	University of the Sunshine Coast
59	Efficient chip supply systems improve chipper utilisation	L. Eliasson, C. Lombardini & J. Widinghoff	Skogforsk
76	Forest management systems for increased harvest of small trees for energy purposes.	J. Sonesson, S. Jacobson, L. Eliasson, L. Wilhelmsson & J. Arlinger	Skogforsk
159	Survey of forest roadside wood chipping operations in Bavaria	F. Schulmeyer & K. Hüttl	Bavarian State Institute of Forestry
193	A harvesting system for agricultural woody crops at plantation removal	P. Gianni, G. Aminti & R. Spinelli	CNR-IVALSA
81	Simulated Productivity of Conceptual, Multi-Headed Tree Planting Devices	T. B. Ersson, L. Jundén, M. Lindh & U. Bergsten	SLU
124	Morphological analysis of chainsaws – useful decision making tool	M. Zorić, D. Horvat, M. Šušnjar, Z. Pandur & J. Galović	Forestry Faculty of Zagreb University
101	Using systematic innovation to develop a new hardwood harvesting tool	M. Chakroun & E. Cacot	FCBA
220	Analyzing different machines for mechanized harvesting of hardwoods in Italy	J. Schweier, R. Spinelli & G. Becker	Albert-Ludwigs-Universität Freiburg
14	A Chute System Integrated with Mobile Winch and Synthetic Rope to Extract Logs in Mountainous Regions	A. E. Akay, N. Gulci & S. Gulci	Kahramanmaras Sutcu Imam University
48	Productivity analysis of current cable yarding operations in the French Alps	P. Magaud	FCBA
121	Recovery of logging residues from final harvest in steep terrain	Nordhagen, Gjølsjø, Belbo & Kjøstelsen	NFLI
173	Project SLOPE: introducing new technologies in mountain forest operations	G. Picchi, S. Huurinainen, J. Gort-Oromi, E. Nolan, E. Keane, M. Kuhmaier & R. De Amicis	CNR-IVALSA
224	Mechanical tools for site preparation in forest plantation: networks of field sites for evaluating and promoting innovative methods	C. Collet, G. Gibaud, J. Piat, C. Richter, Q.Girard, E. Ulrich, L. Wehrlen, F. Duez, M. Dassot, J-Y. Fraysse, A.Berthelot, L.Cotten, C. Sedilot-Gasmi, R. Koller, M. Bakker & L. Augusto	INRA

(P1 continued)

Theme n°3. Being innovative in transportation solutions and logistics

- *Wood supply chain management and decision support tools*

ID	Title of the poster	Authors	Affiliation
2	Monitoring forest supply chains in remote areas using FPInnovations' FPSuite platform	J-F. Gingras, M. Castonguay & J. Favreau	FPInnovations
8	Assessing Systematical Framework in Forest Products Supply Chain to Sustain Forest Industry	A. M. Abdolahian Sohi	Islamic Azad University
46	Development and Implementation of a Sustainability Performance Improvement Model on Transport and Logistics Chains in the French Forest Based Sector	F. Müller	FCBA
77	An information platform for forest harvesting technologies and working methods as decision support system for practitioners	F. Brodbeck & U. H. Sauter	Forest Research Institute of Baden-Wuerttemberg
170	Life cycle analysis for technology selection in timber harvesting	M. Eker & Y. E. Önal	Süleyman Demirel University
182	Building models with the simulation software Witness.	C. Förster	TU Dresden
192	Development and Validation of a Physically Based Forest Operations Model	L. Grayson & R. Keefe	University of Idaho
302	Improved trucking logistics in Canada: Great savings but limited uptake	J. Favreau	FPInnovations

Theme n°4. Better working conditions and educational programs

- *Ergonomics and Man-Machine co-developments*

ID	Title of the poster	Authors	Affiliation
72	Automatic clearcut obstacle identification using a time-of-flight camera	H. Lideskog & M. Karlberg	Luleå University of Technology
180	Terrestrial real-time navigation for harvesting machines	U. H. Sauter & J. Foeller	Forest Research Institute Baden-Wuerttemberg

P2
2nd poster session on Friday (September 26.) from 9:00 to 10:30

Theme n°1. Managing interactions between logging operations and forest ecosystems services

- *Forest roads and environment*
- *Trafficability practices and understanding of forest soil characteristics*
- *Forest operations: environmental concerns and natural hazards*

ID	Title of the poster	Authors	Affiliation
184	Forest Road Standard Registration	J. Bjerketvedt	NFLI
188	Analysis of existing road network in order to plan and configure a rationally managed one in Greek mountainous area	V. C. Drosos	Democritus University of Thrace
191	Design of the phase two portable rail project track: a new system to minimize site disturbance in specialized forest operations and recreational applications	R. Keefe	University of Idaho
15	Reconstruction of the forest road network model in the conversion of the coppice companies to high forest enterprises	E. Dursun, H. H.i Acar & Ö. Göksu	Blacksea Technical University
19	Spatial Multi Criteria Decision Making for Estimating Environmental Costs of Road Management Activities	S. Ezzati & A. Najafi	Tech. University in Zvolen Tarbiat Modares University
26	Planning of Forest Roads with Plateia Software	Y. Turk, S. Gumus, T. Ural & R. Eker	Duzce University
27	Construction Method of Forest Roads in Turkey	Y. Turk	Duzce University
107	Mistake and their results to positioning and sizes of drainage structures at forest roads	T. Ozturk	Istanbul University
136	A Methodological Approach to the Determination of Forest Roads' Technical Competence	C. Ozer, B. Aricak, A. O. Altunel & K. Enez	Kastamonu University
137	Using 3D Real Time Cad Applications in New Road Planning and Reengineering Applications	M. Akgul	Istanbul University
171	GIS Based Strategy on Timber Transportation System in Mountainous Forest Regions	H. O. Çoban & M. Eker	Süleyman Demirel University
149	LoggingMap – concept for better planning of logging trail network in rough terrain conditions	S. Lamminen, K. Väätäinen, J. Ala-Ilomäki, M. Sirén & A. Asikainen	METLA
70	Environmental Factors Affecting Technical Efficiency in Norwegian Steep Terrain	G. Ottaviani Aalmo & S. Baardsen	NFLI
181	Reducing land damages using optimization for efficient logging planning	K. Westlund, P. Jönsson, G. Andersson, P. Flisberg & M. Rönnqvist	Skogforsk
51	Skidding tracks as forest infrastructure – promoting natural regeneration processes with regard to economic and ecological issues	H.C. Fründ, A. Averdiek, C. Kohn, M. Müller-Inkmann, O. Hemker, H. von Dressler & T.Gaertig	Hochschule Osnabrück
123	Influence of wheel load and wheel slip on rutting in forest operations	S. Pasemann, H. Jacke & J. Hittenbeck	ThüringenForst
149	LoggingMap – concept for better planning of logging trail network in rough terrain conditions	S. Lamminen, K. Väätäinen, J. Ala-Ilomäki, M. Sirén & A. Asikainen	METLA
197	Wet and dryned forest site regeneration by mounding in Latvia	D. Lazdina A. Lazdins	LSFRI Silava

(P2 continued)

Theme n°2. Answering specific challenges in harvesting technologies and working methods

- *Fuelwood quality and moisture content management*

ID	Title of the poster	Authors	Affiliation
118	Wood chips characterization for small boiler in the Italy	S. Grigolato, A. Sgarbossa, M. Zanetti, G. Cosola & R. Cavalli	University of Padova
25	Evapo-transpiration as an accelerating tool for seasoning – A case study	R. Klvac Radomir, M. Kleibl, P. Tsioras & T. Cesek	Mendel University in Brno
128	Long term performance of industrial chipping operations	R. Spinelli & N. Magagnotti	CNR - IVALSAR

Theme n°5. Organisational innovations and other strategies for a better planning and monitoring of forest operations in specific contexts

- *Looking for efficient bioenergy supply chains*

ID	Title of the poster	Authors	Affiliation
11	Creation of geodatabase using geographical information system (GIS): its integration in forest road network and application in calculating biomass supply chain costs – case study from northern Spain	S. Sánchez-García, C. Prendes, E. Canga & J. Majada	CETEMAS
78	Biomass potential from young-dense stands in Sweden and road hauling to industries	R. Fernandez-Lacruz, F. Di Fulvio, D. Athanassiadis, D. Bergström & T. Nordfjell	SLU
82	Systems comparison of 10 supply chains for whole tree chips.	H. Belbo & B. Talbot	NFLI
89	Simulation of forest energy chips provision chain from the stand to the heating plant – Characterisation of the energy efficiency and minerals exportation.	N. Bilot, M. Fournier, H. Wernsdörfer & Y. Rogaume	INRA
153	Evaluation of terminal strategies by flow optimization	V. Asmoarp	Skogforsk
206	Feasibility of Adapting Existing Forestry Practices for Improved Biomass Production	M. Dees & E. Jessup	Albert-Ludwigs-Universität Freiburg

Theme n°6. Implementing Precision Forestry concepts for improved wood-supply-chains

- *Operational uses of remote sensing technologies for logging operation*

ID	Title of the poster	Authors	Affiliation
28	The Effectiveness of Topographic Earth Representations in Forest Engineering	A. O. Altunel, O. Emre Sakici, B. Aricak & C. Ozer	Kastamonu University
30	The Comparison of different GPS devices in Turkish forestry practices	R. Erdem, A. O. Altunel & K. Erdin	Kastamonu University
163	Modeling the landslide susceptibility of a mountainous forest using Artificial Neural Network	R. Naghdi, I. Ghajar & A. Abasian	University of Guilan

(P2 continued)

Theme n°4. Better working conditions and educational programs

- *Workforce training and skills developments*
- *Contractors and durable business*

ID	Title of the poster	Authors	Affiliation
61	Logging Capacity Impacts to the US South, 2006-2012	S. Baker & D. Greene	University of Georgia
207	ExploTIC: a progressive implementation through training & collective dialogue	V. Morillon & M. Bonnemazou	FCBA
202	Why does not increase the level of forest mechanization in Turkey? Problems, Solutions and Opportunities	M. Demir	Istanbul University

Pre-conference event

On Tuesday 23rd, a special pre-conference event is hosted at the conference center from 16:00 to 18:00 just before the FEC-FORMEC ice-breaking reception.

The INFRES Workshop "**Adaptation of forestry practices and business innovations for Bioenergy supply**" is open to all and free of charge. Contact workshop@infres.eu

Partners from the INFRES consortium will give the following presentations:

INFRES – Competitiveness for forest energy through technology, logistics, fuel quality and energy product portfolio. *A. Asikainen & J. Routa (METLA)*

Forest management systems for increased harvest of small trees for energy purposes. *J. Sonesson, S. Jacobson, L. Eliasson, L. Wilhelmsson, J. Arlinger (Skogforsk)*

BioGas Woodchip Drying Innovation for Reduced Bioenergy Production Cost. *E. Jessup, J. Walkiewicz, M. Dees (Albert-Ludwigs-Universität Freiburg)*

Improved BioMass Market Efficiency and Price Discovery from Online Auctions. *T. Turkmengil, E. Jessup, M.Dees (Albert-Ludwigs-Universität Freiburg)*

Feasibility of Adapting Existing Forestry Practices for Improved Biomass Production. *M. Dees, E. Jessup (Albert-Ludwigs-Universität Freiburg)*

TCS – An operational system for control and optimization of forest biomass logistics. *T. Mustonen & M. Tuukkanen (ECOMOND)*

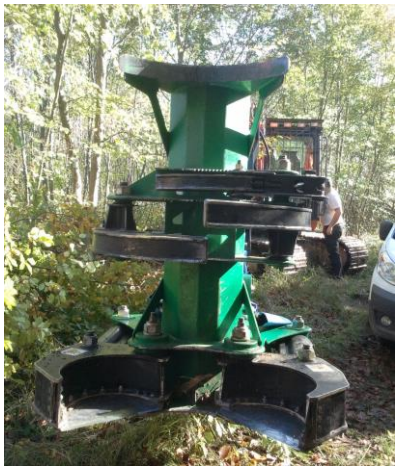
FEC – FORMEC – 2014 Final program

Field trip

Congressists are invited to attend the field demonstrations in connection with the conference themes on Thursday 25.

There will be two separate excursions, a energy-focused one in the PLAIN and a steeper one in VOSGES MOUNTAINS to the east. The two circuits will provide different illustrations of the local forest engineering conditions, challenges and operational practices to overcome them.

PLAIN



Themes and visits on the “Plain” tour:

- Collaborative biomass supply chain in practice with Forêts & Bois de l’Est and ONFE
- First thinnings in broadleaves stands on sensitive soils : a modern challenge for mechanization
- Hardwood assortements: the right logs for the right value chain
- Wagons and trucks all meet on the logistics platform of the “Green Valley” where NorskeSkog Golbey and Pavatex will open their gates for the visitors

Industrial partners on the “Plain” tour:

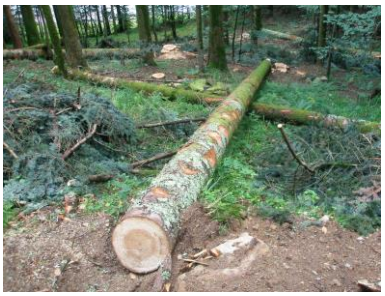
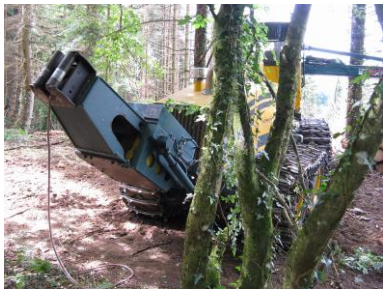
Office National des Forêts

Forets & Bois de l'Est

Norske Skog Golbey

pavatex

VOSGES MOUNTAINS


Themes and visits on the “Vosges Mountains” tour:

- Ready for Vosgian slopes with innovative material and working methods
- Mechanized and motor-manual logging operations: appropriate combinations for each local conditions
- Mobilizing and processing large diameter softwoods: local know-how and value creation at the family-owned sawmill Matthieu
- Transport: modern practices for material and information flows

Industrial partners on the “Vosges Mountains” tour:

Office National des Forêts

S.A.S. Jean Mathieu SCIERIE RABOTERIE

Gala dinner

On Thursday 25., after the field trip, all groups will gather at the LIDO on Gerarder’s lake side for the gala dinner.

Venue : LIDO, 138 Chemin du Tour du Lac, F- 88400 Gérardmer

NB: Participants will arrive directly at the LIDO after the field trip. Bus will not stop in the city center or at any hotel. There is therefore no other dress code than “safe and confortable forest engineering clothing”.

FEC – FORMEC – 2014 Final program

FEC-FORMEC 2014 technical committee

Maryse Bigot, ONF, France.

Karl Stampfer, BOKU, Austria

Pierre Ackerman, Stellenbosch Univ., South Africa

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Mark Brown, USC and AFORA, Australia

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Partners

FCBA is proud to count on its professional partners, Office National des Forêts (ONF), Norske Skog Golbey (NSG) and the forest cooperative Forêt et Bois de l'Est (FBE) for the organization of the conference.

The conference benefits from a fruitful partnership with the two major scientific journals in the domain of forest engineering. Authors selected for oral presentation at FEC-FORMEC-2014 were able to propose their paper to be peer-reviewed and published in either the Croatian Journal of Forest Engineering (CROJFE) or the International Journal of Forest Engineering (IJFE).

The conference is also organised in partnership with the International Union of Forest Research Organisations (IUFRO) and its Division 3 (Forest Operations Engineering and Management).

Financial partners

FCBA is thankful for the support of the conference's financial partners, namely the French ministry for agriculture and forestry (MAAF), the French Environment and Energy Management Agency (ADEME), the commissariat de Massif des Vosges, the Conseil Général des Vosges (CG88), the Conseil Régional de Lorraine and the association of French Pulp and Paper Industries (COPACEL)

The conference is also supported by a grant overseen by the French National Research Agency (ANR) as part of the "Investissements d'Avenir" program (ANR-11-LABX-0002-01, Lab of Excellence ARBRE)

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Tuesday September 23.	Wednesday September 24.	Thursday September 25.	Friday September 26.
	Start at 08:00	**Start at 07:30**	**Start at 08:00**
* 30' time slots	Welcome & Keynotes (K1 & K2)	Field trip (lunch included)	Welcome again & Keynotes (K3 & K4)
	break		Break & POSTER session n°2
	3 Parallel sessions (A) 10:00-12:00		3 Parallel sessions (D) 10:30 - 12:30
	Lunch		Lunch
	3 Parallel sessions (B) 13:00 - 15:00		3 Parallel sessions (E) 13:30 - 15:30
	Break & POSTER session n°1		Break
	3 Parallel sessions (C) 16:30 - 18:30		3 Parallel sessions (F) 16:00 - 18:00
From 14:30			wrap up and conclusions
Registration whenever you arrive…			**End at 19:00**
Pre-conference event INFRES Workshop 16:00 - 18:00			
Ice-breaking reception	Conference dinner (from 19:00)	GALA Dinner (from 19:00)	
free evening			