**Program Overview**

### Sunday, June 29, 2014

16:00 - 19:00  
**Pre-Registration**  
Convention Hall Lobby (2F)

17:30 - 19:00  
**Welcome Reception**  
Convention Hall Lobby (2F)

### Monday, June 30, 2014

09:00 - 09:20  
**OPENING CEREMONY**  
Room 201-2

09:20 - 10:00  
**KEYNOTE**  
Arend Schwab  
*On Bicycle Dynamics and Rider Control*  
Room 201-2

10:10 - 11:30  
FLX1  
Room 201-2  
VEH1  
Room 203  
OTH1  
Room 204  
ROB1  
Room 206  
MOD1  
Room 207  
ALG1  
Room 208

11:30 - 11:40  
COFFEE BREAK

11:40 - 12:40  
FLX2  
Room 201-2  
VEH2  
Room 203  
OTH2  
Room 204  
ROB2  
Room 206  
OPT1  
Room 208

12:40 - 13:40  
LUNCH

13:40 - 15:00  
FLX3  
Room 201-2  
VEH3  
Room 203  
OTH3  
Room 204  
ROB3  
Room 206  
CON1  
Room 207  
OPT2  
Room 208

15:00 - 15:20  
COFFEE BREAK

15:20 - 16:00  
**KEYNOTE**  
Dan Negrut  
*The Interplay between Frictional Contact and High Performance Computing in Many-Body Dynamics Simulation*  
Room 201-2

16:00 - 16:10  
COFFEE BREAK

16:10 - 17:50  
ROB4  
Room 201-2  
VEH4  
Room 203  
OTH4  
Room 204  
MEC1  
Room 206  
MOD2  
Room 207  
HPC1  
Room 208

18:30 - 20:30  
**Conference Reception - Homers Hotel**

### Tuesday, July 1, 2014

09:00 - 09:40  
**KEYNOTE**  
Javier Cuadrado  
*Challenges in the Use of Multibody Dynamics for the Study of Human Body Motion in Medical Applications*  
Room 201-2

10:00 - 11:20  
FLX4  
Room 201-2  
VEH5  
Room 203  
MEC2  
Room 204  
BIO1  
Room 206  
OPT3  
Room 207

11:20 - 11:40  
COFFEE BREAK

11:40 - 12:40  
FLX5  
Room 201-2  
VEH6  
Room 203  
MEC3  
Room 204  
BIO2  
Room 206  
OPT4  
Room 207  
MOD3  
Room 208

12:40 - 13:40  
LUNCH

13:40 - 15:00  
FLX6  
Room 201-2  
VEH7  
Room 203  
MEC4  
Room 204  
BIO3  
Room 206  
OPT5  
Room 207  
CON2  
Room 208

15:00 - 15:20  
COFFEE BREAK
### Wednesday, July 2, 2014

**Keynote**

**Jinyang Liu**

*Dynamic Modeling and Experiment Investigation of Rigid-flexible Coupling Multibody Systems*

Room 201-2

16:00 - 16:10

**Coffee Break**

16:10 - 17:50

**FLX7**
Room 201-2  
**VEH8**  Room 203  
**EFF1**  Room 204  
**BIO4**  Room 206  
**OPT6**  Room 207  
**MDA1**  Room 208

#### Registration Desk Opens at 8:00 a.m.

**09:00 - 09:40**

**Keynote**

**Ja Kyum Koo**

*Investigation on the Missing Link between Multi-body System Dynamics and NVH*

Room 201-2

#### FLX8
Room 201-2  
#### BEN1
Room 203  
#### CON3
Room 204  
#### TCM1
Room 206  
#### ROT1
Room 207  
#### ROB5
Room 208

10:00 - 11:20

11:20 - 11:40

**Coffee Break**

11:40 - 12:40

**FLX9**
Room 201-2  
**EFF2**  Room 203  
**BIO5**  Room 204  
**TCM2**  Room 206  
**ROT2**  Room 207  
**VEH9**  Room 208

12:40 - 13:40

**Lunch**

14:00 - 18:30

**Excursion - Gyeongju Cultural Heritage Tour**

18:30 - 23:00

**Conference Banquet - Hotel Hyundai Gyeongju**

### Thursday, July 3, 2014

**Keynote**

**Andres Kecskemethy**

*Generation of Minimal Coordinate Formulations in Multibody Applications*

Room 201-2

#### Registration Desk Opens at 8:00 a.m.

**09:00 - 09:40**

**Keynote**

**Yoshiaki Terumichi**

*A Systematic Approach of Numerical Simulation and Experiments Applied for the Study on the Railway Vehicle Dynamics on Large Earthquake*

Room 201-2

#### ALG
Algorithms, Integration Codes, and Software

**BEN**
Benchmark Problems in Multibody System Dynamics

**BIO**
Biomechanics

**CON**
Contact and Impact Problems

**EFF**
Efficient Methods and Real-Time Applications

**FLX**
Flexible Multibody Systems: FLX8 sessions

**HPC**
High Performance Computing

**MDA**
Multidisciplinary Approaches

**MEC**
Control and Mechatronics

**MOD**
Modeling, Formalisms, and DAE Solution Method

**OPT**
Optimization, Sensitivity Analysis and Parameter Identification

**OTH**
Multibody Applications, Experiments and Other Topics

**ROB**
Robotic Systems

**ROT**
Dynamics of Machines and Rotating Structures

**TCM**
Theoretical and Computational Methods

**VEH**
Dynamics of All Vehicles
Monday, June 30, 2014

OPENING CEREMONY
09:00 - 09:20
Room 201-2
Sung-Soo Kim, General Chair IMSD2014-ACMD2014
Peter Eberhard, Chairman IMSD
Hong Hee Yoo, Chairman ACMD

KEYNOTE / Arend Schwab, Delft University of Technology, Netherlands
On Bicycle Dynamics and Rider Control
09:20 - 10:00
Room 201-2
Session Chair: Wan Suk Yoo, Pusan National University

FLX 1 of 9 / Flexible Multibody Systems
10:10 - 11:30
Room 201-2
Session Chair: Aki Mikkola, Lappeenranta University of Technology
Hiroyuki Sugiyama, University of Iowa

Dynamic Analysis of Variable Cross-section Beams using the Absolute Nodal Coordinate Formulation
Chunzhang ZHAO, Haidong YU, Hao WANG, Yong ZHAO

Convergence Characteristics of Thin ANCF Shell Elements in Arbitrary and Initially curved mesh
Per Hyldahl, Aki M. Mikkola, Ole Balling, Jussi T. Sopanen

Comparison of h- and p-refinements in the Absolute Nodal Coordinate Formulation Based Euler-Bernoulli Beam Elements
Antti I. Valkeapää, Marko K. Matikainen, Aki M. Mikkola

A New Construction Method for Dynamics of Rigid-flexible Coupling Multibody Systems Based on Absolute Node Coordinate Formulation
Xiaoshun Zhang, Dingguo Zhang, Jiazhao Hong

VEH 1 of 12 / Dynamics of All Vehicles
10:10 - 11:30
Room 203
Session Chair: Jorge Ambrosio, Instituto Superior Tecnico
Zhuyong Liu, Shanghai Jiao Tong University

Analysis of Wheel Loader Dynamic Characteristic with Working Load
Kwangseok Oh, Hakgu Kim, Kyungheun Ko, Panyoung Kim, Jaho Seo, Kyongsu Yi

Vehicle Dynamic Simulation Considering Suspension Inertia Force
Sang-Do Na, Chang-Gyu Yoon, Dong-Woon Park, Kwang-Suk Kim, Wan-Suk Yoo

Stability Analysis of a Staggered Parallel Two-Wheel Personal Mobility Vehicle
Jeffrey Too Chuan Tan, Ratanachote Ingcanuntavee, Yoshihiro Suda

Study on the Acceleration Pedal Motion Parametersto Determine Sudden Unintended Acceleration
Tae oh Tak, Jun ho An, Ji su Kim

OTH 1 of 8 / Multibody Applications, Experiments and Other Topics
10:10 - 11:30
Room 204
Session Chair: Frank Naets, KU Leuven
Taichi Shibai, Meiji University

Contact Analysis of Rope and Sheave Using ANCF
S. Takehara, M. Kawarada, K. Hase

Dynamic Analysis of a Cable System in Three Dimensions
Xiangqian Zhu, Wan-Suk Yoo

Kink-wave Propagation in Steel Wire Ropes subjected to a Perpendicular Impact in High-speed Applications
Bing Xu, Pengpeng Dong, Junhui Zhang, Song Zhang

Spring Modeling for the Performance Evaluation of a Spring Operating Mechanism in a Gas Insulated Circuit Breaker
Dae-Woo Lee, Jeong-Hyun Sohn, Jae-Yeol Kim, Byung-Tae Bae, Jin-Ho Kim
### ROB 1 of 5 / Robotic Systems
Session Chairs: Subir K. Saha, IIT Delhi  
Alberto Martini, University of Bologna  
Room 206  
10:10 - 11:30

- Development of a Shoulder Joint with a Variable Stiffness Mechanism  
  Yoshikatsu Naito, Koichi Koganezawa
- Geometric Synthesis of Compliant Foot Module of a Lower-Limb Exoskeleton for Rough-Terrain Tasks  
  Man Bok Hong, Ji-Hyeun Wang
- Modeling and Control of Pneumatic Artificial Muscles in an Antagonistic Set-up  
  Joerg Baur, Christoph Schuetz, Julian Pfaff, Heinz Ulbrich
- Haptics Exoskeleton for tele-operation of Industrial Robot  
  Md. Zubair, Bhivraj Suthar, Sachin Kansal, Sudipto Mukherjee

### MOD 1 of 3 / Modeling, Formalisms, and DAE Solution Method
Session Chair: Olivier Bauchau, SJTU-Michigan University  
Room 207  
10:10 - 11:30

- Formulations of Viscoelastic Constitutive Laws for Beams in Flexible Multibody Dynamics  
  Olivier A. Bauchau, Zijing Lao, Mei Lyu, Stefanie Brändle, Joachim Linn
- Review of RecurDyn Integration Methods  
  Graham G. Sanborn, Juhwan Choi, Jin H. Choi
- Variational Time Stepping Method for Analytical System Dynamics Models  
  Claude Lacoursière, Tomas Sjöström
- Symplectic Integration Algorithm based on Time Finite Element Method for Multibody Dynamics System with Holonomic Constraint  
  Haijun Peng, Qiang Gao, Zhigang Wu, Wanxie Zhong

### ALG 1 of 1 / Algorithms, Integration Codes, and Software
Session Chair: Corina Sandu, Virginia Polytechnic Institute and State University  
Room 208  
10:10 - 11:30

- Dynamic Analysis of a Concept Design of an Independent-Wheel Type Ultra-High-Speed Train  
  Jin-Hee Lee, Tae-Won Park, Kyung-Soek Sim, In-Kyoung Hwang, Nam-Po Kim
- Multibody Analysis of an Inverted-pendulum Vehicle and Driver Operation during Acceleration and Deceleration  
  Chihiro Nakagawa, Shunsuke Arakawa, Atsuhiko Shintani, Tomohiro Ito
- A Novel Parallel Algorithm for Flexible Multibody Dynamics Simulation  
  Seundo Heo, Genyong Wu, and Olivier A. Bauchau
- Coupling of a Nonlinear Finite Element Solver in Multibody Dynamics  
  Michael Collingridge, Stephen Riley, Weixing Shen, Hemant Patel

### COFFEE BREAK
11:30 - 11:40

### FLX 2 of 9 / Flexible Multibody Systems
Session Chair: John McPhee, University of Waterloo  
Hong Hee Yoo, Hanyang University  
Room 201-2  
11:40 - 12:40

- Dynamics Analysis of Lateral Vibration of an Axially Translating Flexible Link  
  Heonseop Shin, Sungsoo Rhim
- A Computationally Efficient and Robust Geometrically-Exact Curved Beam Formulation for Multibody Systems  
  Hui Ren
### VEH 2 of 12 / Dynamics of All Vehicles

**Session Chair**: Jose L. Escalona, University of Seville  
**Graham Sanborn, FunctionBay Inc.**  
11:40 - 12:40  
Room 203

- **Evaluation of Motor In-wheel Behavior in Loss-of-contact Scenarios and Analysis of Potential Measures for Performance Improvement**  
  Javier Cuadrado, David Vilela, Alberto Luaces, Adrián Martín, Iñaki Iglesias, Alberto Peña

- **Development of optimization technique for hardness part of vehicle with second-order stiffness characteristic**  
  Changwook Lee, Huije Cho, Seokyong Chae, Dongzhe Zhu, Daesung Bae

- **Cornering Stability Improvement by Gyro Moment in Narrow Tilting Vehicle**  
  Jeffrey Too Chuan Tan, Yitsao Huang, Yoshihiro Suda, Akira Mizuno, Munehisa Horiguchi

### OTH 2 of 8 / Multibody Applications, Experiments and Other Topics

**Session Chair**: Roland Pastorino, KU Leuven  
11:40 - 12:40  
Room 204

- **Braking Performance Study of an Escalator System Using Multibody Dynamics Simulation**  
  Chan Jong Park, Gero Gschwendtner

  Zengming. Feng, Qianshuai. Pu, Yanru. Luo, Yanhui. Jia

- **A 3D Multibody Model for the Investigation of the Chain Drive Derailment between Sprockets**  
  Claudio Autore, Ettore Pennestrì, Pier Paolo Valentini

### ROB 2 of 5 / Robotic Systems

**Session Chair**: Koichi Koganezawa, Tokai University  
**Vadim Chernyshev, Volgograd State Technical University**  
11:40 - 12:40  
Room 206

- **Modeling of the Dynamics of the Walking Machine with the Cyclic Propulsors as System Solids with Elastic and Damping Relations**  
  Vadim V. Chernyshev, Eugeny S. Briskin, Victor V. Zhoga, Alexander V. Maloletov, Nikolay G. Sharonov

- **Dynamics Analysis and Optimization of Spinal Motion for the Galloping of a Quadruped Robot**  
  Byeonghun Na, Jungsu Choi, Sehoon Oh, Kyoungchul Kong, Kyoungduk Park

- **Active Dynamic Balancing of the Redundantly Actuated 2RR Planar Parallel Manipulator**  
  Mario Acevedo

### OPT 1 of 6 / Optimization, Sensitivity Analysis and Parameter Identi-fication

**Session Chair**: Peter Eberhard, University of Stuttgart  
**Anas batou, Universite Paris-Est Marne-la-Vallee**  
11:40 - 12:40  
Room 208

- **The Use of the Adjoint Method for Solving Typical Optimization Problems in Multibody Dynamics**  
  Karin Nachbagauer, Stefan Oberpeilsteiner, Wolfgang Steiner

- **Simultaneous Type and Number Synthesis of Planar Linkage Mechanisms**  
  Suh In Kim, Yoon Young Kim

- **Second Order Sensitivities of the Dynamic Response of Multibody Systems with Penalty Formulations**  
  Daniel Dopico, Yitao Zhu, Adrian Sandu, Corina Sandu

---

**LUNCH**  
12:40 - 13:40
### FLX 3 of 9 / Flexible Multibody Systems
**Session Chair:** Ben Jonker, University of Twente  
**Nobuyuki Kobayashi, Aoyama Gakuin University**  
**Room 201-2**  
**13:40 - 15:00**

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Modeling and Experimental Verification of Flexible Multibody System Undergoing Pre-Defined Angular Motions</td>
<td>Moon K. Kwak, Dong-Ho Yang</td>
</tr>
<tr>
<td>Second-Order Formulation for Three-Dimensional Beam Elements in Large Deflection Multibody Dynamics Problems</td>
<td>J.B. Jonker</td>
</tr>
<tr>
<td>An Analysis of System with Mass and Extremely Flexible Structure by the Use of the System’s Complementarity</td>
<td>Yoshiki Sugawara, Nobuyuki Kobayashi, Taku Chida</td>
</tr>
<tr>
<td>Necessity of Transient-State Unwinding Equation of Motion for an Unwinding Cable</td>
<td>Kun-Woo Kim, Jin-Seok Jang, Jae-Wook Lee, Wan-Suk Yoo</td>
</tr>
</tbody>
</table>

### VEH 3 of 12 / Dynamics of All Vehicles
**Session Chair:** Tae oh Tak, Kangwon National University  
**Olivier Verlinden, University of Mons**  
**Room 203**  
**13:40 - 15:00**

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Development of Multi Body Dynamics Model for Prediction of Shift Effort in Manual Transmission</td>
<td>Woonggi Kim, Wangoo Kim, Junhyung Lee, Daesung Bae</td>
</tr>
<tr>
<td>Multibody Modelling of an Automatic Gearbox: Calculation of Acceleration Performance</td>
<td>G. Kouroussis, P. Dehombreux, O. Verlinden</td>
</tr>
<tr>
<td>Development of the NVH analysis method of the gear train system under the variable driving conditions</td>
<td>Heunghyeok Yim, Wangoo Kim, Huije Cho, Jinkuk Park, Namil Jeon, Zhao Liu, Daesung Bae</td>
</tr>
</tbody>
</table>

### OTH 3 of 8 / Multibody Applications, Experiments and Other Topics
**Session Chair:** Pengxiang Hu, Tsinghua University  
**Francisco Gonzalez, McGill University**  
**Room 204**  
**13:40 - 15:00**

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect of Elasticity and Manufacturing Tolerances on the Kinematic and Dynamic Performances of a Cardan Joint</td>
<td>Ettore Pennestri, Valerio Rossi, Pier Paolo Valentini</td>
</tr>
<tr>
<td>A study about Sprocket Wear of a Tracked Vehicle Undercarriage System</td>
<td>Sung-Ho Baek, Dong-Pil Lim, Young-Sun Yoo, Sang-Min An, Seung-Jin Heo</td>
</tr>
<tr>
<td>Fatigue Analysis of Large Non-linear Finite Element Models using Modal Reduction and Flexible Multibody Theory</td>
<td>Anders Elkjaer, TausWind-Larsen, Klaus Kjølhede, Ole Balling</td>
</tr>
<tr>
<td>Modelling of mechanical ring-tracking in a pushbelt variator for the analysis of the multi-body system dynamics</td>
<td>Grundl, Kilian, Schindler, Thorsten, Rixen, J. Daniel, Ulbrich, Heinz, Tran, Minh-Duc, Velde, v.d. Arie, Yildiz, Semih</td>
</tr>
</tbody>
</table>

### ROB 3 of 5 / Robotic Systems
**Session Chair:** Sungsoo Rhim, Kyung Hee University  
**Abhinandan Jain, Jet Propulsion Laboratory**  
**Room 206**  
**13:40 - 15:00**

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamics Compensation for the Control of Articulated Multi-Limb Robots</td>
<td>Abhinandan Jain, Calvin Kuo, Ivan Sinkarenko</td>
</tr>
<tr>
<td>Implement of Sensor Fusion Algorithm For Stable Grasping</td>
<td>Jae Hyeon Kim, Seung Hoon Shin, J. C. Koo</td>
</tr>
<tr>
<td>Periodic Servo-Constraits for Stabilizing Underactuated Multibody Systems</td>
<td>László Bencsik, László Kovács, Ambrus Zelei</td>
</tr>
</tbody>
</table>
### CON 1 of 4 / Contact and Impact Problems

**Session Chair:** Parviz Nikravesh, University of Arizona
Juhyun Choi, FunctionBay Inc.

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
<th>Presentation Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:40 - 15:00</td>
<td></td>
<td>Room 207</td>
<td>On the Behavior of Solutions to the Problem of Plane Extremal Point Tracking for Smooth Curves</td>
<td>Jochen Damerau, Robert J. Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wear Prediction in Dry Revolute Clearance Joints in Multibody Systems</td>
<td>Paulo Flores</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A Modified Elastic-Plasticity Constitutive Model for the Impact of Two Balls</td>
<td>Daolin Ma, Caishan Liu, Xue Chen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Development of Lateral Impact Tester and Verification of Impact test</td>
<td>Seung-Kyun Jin, Young-Shin Lee, Tae-Ho Yang, Kang-Sic Kim</td>
</tr>
</tbody>
</table>

### OPT 2 of 6 / Optimization, Sensitivity Analysis and Parameter Identification

**Session Chair:** Javier Ros, Public University of Navarre
Olivier Bruls, University of Liège

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
<th>Presentation Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:40 - 15:00</td>
<td></td>
<td>Room 208</td>
<td>A Comparison Study of Chebyshev Inclusion Functions and Polynomial Chaos for Multibody Mechanical System under Uncertainties</td>
<td>Xingxing Feng, Yunqing Zhang, Jinglai Wu, Zeyu Ma</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dimensional Synthesis Based Elastodynamic Performance Optimization of 5R Parallel Mechanism</td>
<td>Belkacem BOUNAB, Yamina NEBIH</td>
</tr>
</tbody>
</table>

### COFFEE BREAK

15:00 - 15:20

### KEYNOTE / Dan Negrut, University of Wisconsin, USA

**The Interplay between Frictional Contact and High Performance Computing in Many-Body Dynamics Simulation**

**Session Chair:** Kurt Anderson, Rensselaer Polytechnic Institute

15:20 - 16:00

### COFFEE BREAK

16:00 - 16:10

### ROB 4 of 5 / Robotic Systems

**Session Chair:** Peter Betsch, Karlsruhe Institute of Technology
Vladim Chernyshev, Volograd State Technical University

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
<th>Presentation Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:10 - 17:50</td>
<td></td>
<td>Room 201-2</td>
<td>Linear Progression Locomotion of a Wheelless Type Snake Robot Using Torque Control</td>
<td>Myoungho Kim, Hocheol Shin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Towards the Elaboration of 3D Dynamic Model for Push/Pull Cable (PPC) Actuation System</td>
<td>Svetlana Grosu, Chris Verheul, Carlos Rodriguez-Guerrero, Bram Vanderborght, Dirk Lefeber</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Design and Control of Tendon-Driven 2-DOF Actuators with Capability of Self-Stress Adjustment</td>
<td>Hyunhwan Jeong, Youngsu Cho, Joono Cheong</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dynamics and Actuating Torque Optimization of Planar Robots</td>
<td>Vinay Gupta, Himanshu Chaudhary, Subir K. Saha</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stopper Assembly of Rear block using Sliding Perturbation Observer based Force Estimation and Interference Fit</td>
<td>Sung Min Yoon, Gyu Ho Byun, Min Cheol Lee</td>
</tr>
<tr>
<td>Session</td>
<td>Title</td>
<td>Authors</td>
<td>Room</td>
<td>Time</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
<td>---------------</td>
</tr>
<tr>
<td>VEH 4</td>
<td>Running Performance Analysis of Steering Bogie using Independently Rotating Wheels with Oblique Axle</td>
<td>K. Ejiri, Y. Michitsuiji, Y. Suda, S. Lin</td>
<td>203</td>
<td>16:10 - 17:50</td>
</tr>
<tr>
<td></td>
<td>On Degenerate Position of a Wheelset and Rail</td>
<td>Behrooz Fallahi, Vahid Bateni</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Study on Steering System to Improve Running Performance of a Railway Vehicle on Curved Track</td>
<td>K. Ejiri, Y. Michitsuiji, Y. Suda, S. Lin</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weighing in Motion of Railway Vehicles: Development of Innovative Systems and Performance Analysis</td>
<td>A. Innocenti, L. Marini, E. Meli, L. Pugi, A. Rindi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dynamic Modeling of Hybrid Electro Power Steering System for Heavy Duty Vehicles to Estimate the Motor Pump Unit Capacity</td>
<td>Ji in Park, Kwangki Jeon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTH 4</td>
<td>A Study on Efficient Motion Generation for Biomimetic Lizard Robot</td>
<td>Bongcheol Seo, Sung-Soo Kim</td>
<td>204</td>
<td>16:10 - 17:50</td>
</tr>
<tr>
<td></td>
<td>Analysis of Obstacle Climbing Manoeuvres for Planetary Exploration Rovers</td>
<td>Bahareh Ghotbi, Eric Karpman, Francisco González, József Kövecses, Jorge Angeles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of Excavator Simulation Model to Predict Slew Bearing Failure</td>
<td>Chao Sun, Daesung Bae, Sulki Seong, Wangoo Kim, Jaehong Kim</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multibody Dynamic Approach for Control Validation of Mass-varying Flexible Rockets</td>
<td>Pengxiang Hu, Yunfei Yang, Zhihua Zhao, Gexue Ren</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dynamic modeling and simulation of dual arm robot</td>
<td>Dong Il Park, Chanhun Park, Hyunmin Do, Taeyong Choi, Jinho Kyung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEC 1</td>
<td>Study on a Driving Velocity estimation without DB for Unmanned Ground Vehicle</td>
<td>Jung Samuel, Wan-Suk Yoo</td>
<td>206</td>
<td>16:10 - 17:50</td>
</tr>
<tr>
<td></td>
<td>Stability Control of Four-Wheel Differentially Driven Mobile Robot with Variable Center of Mass</td>
<td>Seungwoo Jeon, Woootae Jeong, Duckshin Park</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alternative Task Definitions for Path Tracking Control of Underactuated Robots</td>
<td>A. Zelei, L. Bencsik, G. Stépán</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOD 2</td>
<td>Order Reduction in Time Integration caused by Velocity Projection</td>
<td>Martin Arnold, Alberto Cardona, Olivier Brüts</td>
<td>207</td>
<td>16:10 - 17:50</td>
</tr>
<tr>
<td>Title</td>
<td>Authors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonlinear Three-Dimensional Beam Theory for Flexible Multibody Dynamics</td>
<td>Shilei Han, Olivier A. Bauchau</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-Simulation Methods for Solver Coupling with Algebraic Constraints: Semi-Implicit Coupling Techniques</td>
<td>B. Schweizer, D. Lu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Unified Formulation for Perfect and Imperfect Mechanical Joints</td>
<td>Jorge Ambrósio, João Pombo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three-Dimensional Plate Theory for Flexible Multibody Dynamics</td>
<td>Shilei Han, Olivier A. Bauchau</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HPC 1 of 1 / High Performance Computing**

Session Chair: Dan Negrut, University of Wisconsin Madison
Jeong Hyun Sohn, Pukyong National University

16:10 - 17:50
Room 208

- A fluid-solid interaction approach for the simulation of polymer motion in Newtonian fluid
  Arman Pazouki, Radu Serban, Dan Negrut

- Chrono: a parallel multi-physics library for rigid-body, flexible-body, and fluid dynamics
  Alessandro Tasora, Hammad Mazhar, Andrew Seidl, Dan Melanz, Arman Pazouki, Justin, Madsen, Daniel Kaczmarek, Radu Serban, Dan Negrut

- Dynamic Analysis of a Floating Body in the Fluid by Using the Smoothed Particle Hydrodynamics
  Chul Woong, Jun, Jeong Hyun Sohn

- Gauging military vehicle mobility through many-body dynamics simulation
  Daniel Melanz, Hammad Mazhar, Dan Negrut

- Optimization of operating and assembling mass properties of solid elements on heterogeneous platforms using OpenCL framework
  Jihyun Jung, Chulho Lee, Huije Cho, Daesung Bae

**Conference Reception - Homers Hotel**

18:30 - 20:30
**Tuesday, July 1, 2014**

**KEYNOTE / Javier Cuadrado**, University of La Coruna, Spain  
*Challenges in the Use of Multibody Dynamics for the Study of Human Body Motion in Medical Applications*  
Session Chair: John McPhee, University of Waterloo

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chair(s)</th>
</tr>
</thead>
</table>
| 09:00 - 09:40 | Room 201-2| Javier Cuadrado,  
University of La Coruna, Spain  
*Challenges in the Use of Multibody Dynamics for the Study of Human Body Motion in Medical Applications*  
Session Chair: John McPhee, University of Waterloo |

**FLX 4 of 9 / Flexible Multibody Systems**  
Session Chair: Wim Desmet, University of Leuven  
Graham Sanborn, FunctionBay Inc.

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 201-2</th>
<th>Session</th>
<th>Chair(s)</th>
</tr>
</thead>
</table>
| 10:00 - 11:20 | Room 201-2| Numerical Approach for Flexible Body Motion with Large Displacement and Time-Varying Length  
Hiroyuki Hayashi, Shoichiro Takehara, Yoshiaki Terumichi  
New triangular shell element with exact geometry representation in multibody system dynamics  
H.J. Chang, C. Liu, Q. Tian, H.Y. Hu  
Issues in the Reduction of Parametric Elastic Multibody Systems  
Peter Eberhard, Michael Fischer  
A study of three-node higher-order gradient beam elements based on the absolute nodal coordinate formulation  
Marko K. Matikainen, Oleg Dmitrochenko |

**VEH 5 of 12 / Dynamics of All Vehicles**  
Session Chair: Werner Schiehlen, Universität Stuttgart  
Jose L. Escalona, University of Seville

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 203</th>
<th>Session</th>
<th>Chair(s)</th>
</tr>
</thead>
</table>
| 10:00 - 11:20 | Room 203| Modeling of Railway Vehicles with Symbolic Computation and Contact Look-up Tables for Real-Time Simulations  
José L. Escalona, Javier F. Aceituno  
Moving Track Model with Rail Roll Deflection for Curve Negotiation Analysis of Railroad Vehicles  
Toshihisa Nakajima, Yuta Hiramine, Hiroyuki Sugiyama  
Dynamic Characteristics of Double Stack Train with shortest bogie  
Nam-Po Kim, Won-Hee You  
Study on Dynamics of Lightweight Railway Vehicle in Wet Condition  
Shihpin Lin, Yuichiro Takino, Yoshihiro Suda, Masahisa Kageyama, Atsushi Tanimoto, Shinichiro Koga |

**MEC 2 of 4 / Control and Mechatronics**  
Session Chair: Makoto Iwamura, Fukuoka University  
Sigrid Leyendecker, University of Erlangen

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 204</th>
<th>Session</th>
<th>Chair(s)</th>
</tr>
</thead>
</table>
| 10:00 - 11:20 | Room 204| Experimental Studies of Control Concepts for a Parallel Manipulator with Flexible Links  
Markus Burkhardt, Robert Seifried, Peter Eberhard  
A General Purpose Optimal Trajectory Planning Algorithm for Planar Flexible Multibody Systems  
Makoto Iwamura, Shingo Uchikawa, Naruki Hanada  
A DAE stable inversion method for feedforward control of robotic systems with elastic links  
Olivier Bruls, Guaraci Jr. Bastos, Robert Seifried  
Vibration Suppression of a Fuel Rod in Water Using Feedback Linearization and Input Shaping Control  
Van Duong Phan, Umer Hameed Shah, Jae Young Jeon, Keum-Shik Hong |
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 1 of 5 / Biomechanics</td>
<td>Development of a Three-dimensional Multibody Model of the Human Leg and Foot for application in Movement Analysis</td>
<td>Tiago M. Malaquias, Sérgio B. Gonçalves, Miguel T. Silva</td>
<td>10:00 - 11:20</td>
<td>Room 206</td>
</tr>
<tr>
<td></td>
<td>Generation of Optimal Gaits for Impactless Bipedal Walking on Slopes via Genetic Algorithm</td>
<td>Lulu Gong</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A 3D Foot-Ground Model for Walking and Running using Disk Contacts</td>
<td>M. Millard, A. Kecskeméthy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPT 3 of 6 / Optimization, Sensitivity Analysis and Parameter Identification</td>
<td>On the Parameter Estimation for a Simulation Model of a Small Biological Joint</td>
<td>Sebastian Ihrle, Albrecht Eiber, Peter Eberhard</td>
<td>10:00 - 11:20</td>
<td>Room 207</td>
</tr>
<tr>
<td></td>
<td>Optimum Dynamic Balancing of a Planar Five-bar Mechanism Using Genetic Algorithm</td>
<td>Kailash Chaudhary, Himanshu Chaudhary</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A new approach for large antenna mesh reflector form-finding</td>
<td>P. Li, W. Hu, C. Liu, Q. Tian, H.Y. Hu</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application of firefly algorithm in optimization of control system of mechatronic device for gait reeducation</td>
<td>Krzysztof Kawlewski</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COFFEE BREAK</td>
<td></td>
<td></td>
<td>11:20 - 11:40</td>
<td></td>
</tr>
<tr>
<td>FLX 5 of 9 / Flexible Multibody Systems</td>
<td>Strongly Coupled approach for integrating non-linear local Finite Element models in Multibody System Dynamics</td>
<td>Frédéric Cuqnon, Philippe Jetteur, Frédéric Pascon, Tom van Eekelen</td>
<td>11:40 - 12:40</td>
<td>Room 201-2</td>
</tr>
<tr>
<td></td>
<td>Flexible Multi-body Dynamical Simulation of Astromesh Truss Deployment</td>
<td>Yun Peng, Zhihua Zhao, Yanhui Ma, Jungang Yang, Gexue Ren</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-rolling Mesh for A Rolling Finite-Element Tire Model</td>
<td>Omid Kazemi, Adrian P. Ribaric, Parviz E. Nikravesh, Seongho Kim</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEH 6 of 12 / Dynamics of All Vehicles</td>
<td>Evolution of Wheel and Rail Profile Wear: Development of an Innovative Model Designed for Complex Railway Networks</td>
<td>A. Innocenti, L. Marini, E. Meli, G. Pallini, A. Rindi</td>
<td>11:40 - 12:40</td>
<td>Room 203</td>
</tr>
<tr>
<td></td>
<td>Numerical Analysis for Coupled Train Considering 3D Wheel/Rail Contact Geometry</td>
<td>Natsumi Nakano, Yoshiaki Terumichi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study on a Coupled Modeling of Maglev Vehicle and Switch Guideway</td>
<td>Jong-Boo Han, Jin Woo Park, Ki-Jung Kim, Hyung-Suk Han, Jong-Min Lee, Sung-Soo Kim</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### MEC 3 of 4 / Control and Mechatronics

Session Chair: Sungsoo Rhim, Kyung Hee University
Olivier Bruls, University of Liege

<table>
<thead>
<tr>
<th>Time</th>
<th>Venue</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:40 - 12:40</td>
<td>Room 204</td>
<td>New Methodology for Precise Satellite Formation-keeping in the Presence of System Uncertainties</td>
<td>Hancheol Cho, Thanapat Wanichanon, Firdaus E. Udwadia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Controllability of Planar Manipulators with Passive Joints Subject to Servo-Constraints</td>
<td>Wojciech Blajer, Krzysztof Kołodziejczyk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control of Inertially Stabilized Platform Using Disturbance Observer</td>
<td>Kyung-Jun Choi, MoonCheol Won</td>
</tr>
</tbody>
</table>

### BIO 2 of 5 / Biomechanics

Session Chair: Paulo Flores, University of Minho
Joon-Shik Yoon, FunctionBay Inc.

<table>
<thead>
<tr>
<th>Time</th>
<th>Venue</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:40 - 12:40</td>
<td>Room 206</td>
<td>Kinematic Identification of the Spine: a Multibody Approach</td>
<td>Gabriel Abedrabbo, Maxime Raison, Philippe Mahaudensy, Christine Detrembleury, Maryline, Mousny, Olivier Cartiau, Paul Fisette</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dynamic analysis of a patellar tendon reflex induced by tapping motion</td>
<td>Moon Jeong Kang, Young Nam Jo, Hong Hee Yoo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design of Loading Setup for Craniovertebral Junction</td>
<td>Md. Zubair, Sachin Kansal, Sudipto Mukherjee, Deepak Kumar Gupta, Shashank Kale</td>
</tr>
</tbody>
</table>

### OPT 4 of 6 / Optimization, Sensitivity Analysis and Parameter Identification

Session Chair: Martin Arnold, Martin Luther University Halle-Wittenberg
Jinyang Liu, Shanghai Jiao Tong University

<table>
<thead>
<tr>
<th>Time</th>
<th>Venue</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Hysteresis Modeling of a Pneumatic Brake Chamber in a Heavy Commercial Vehicle</td>
<td>Jatheendranathan Moothayil, Srinidhi K., Shankar C. Subramanian</td>
</tr>
</tbody>
</table>

### MOD 3 of 3 / Modeling, Formalisms, and DAE Solution Method

Session Chair: Subir K. Saha, IIT Delhi
Bernhard Schweizer, Institute for Structural Dynamics

<table>
<thead>
<tr>
<th>Time</th>
<th>Venue</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:40 - 12:40</td>
<td>Room 208</td>
<td>Model reduction of geometrically exact structures formulated on the Lie group SE(3)</td>
<td>Valentin Sonneville, Olivier Brüls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A Reduction Method on Natural-coordinate Equivalent Constraints</td>
<td>Kewei Zhang</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Simulation of Multibody Systems of Index 3 and Larger with the Software Package QUALIDAES</td>
<td>Andreas Steinbrecher</td>
</tr>
</tbody>
</table>

LUNCH

12:40 - 13:40
### FLX 6 of 9 / Flexible Multibody Systems

**Session Chair:** Ben Jonker, University of Twente
Alexander A. Olshevskiy, Bryansk State Technical University

**Room 201-2**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 13:40 - 15:00         | Study on the Boundary Conditions considering Unwinding Velocity in Transient Unwinding Equations of Motion  
Jin-Seok Jang, Kun-Woo Kim, Jae-Wook Lee, Wan-Suk Yoo |
|                       | Three-Dimensional Solid Eight-node Element Using Slopes in the Absolute Nodal Coordinate Formulation  
Alexander A. Olshevskiy, Oleg N. Dmitrochenko, Chang-Wan Kim |
|                       | Influence of Deformation on the Rigid Body Motion in Flexible Multibody Dynamics  
Morsli Ferhat, Chettibi Taha and Bounab Belkacem |

### VEH 7 of 12 / Dynamics of All Vehicles

**Session Chair:** Tae Oh Tak, Kangwon National University
Enrico Meli, Florence University

**Room 203**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 13:40 - 15:00         | Study of High-Speed Train Dynamics under Degraded Adhesion Conditions: an Innovative HIL Architecture for Full-Scale Roller-Rigs  
KBenedetto Allotta, Roberto Conti, Enrico Meli, Luca Pugi, Alessandro Ridolfi |
|                       | Analysis of Passive Robot Mechanism for High Speed Driving on Rough Terrain  
Young Jin Kim, Jayoung Kim, Jihong Lee |
|                       | Study on the Improvement of Sign Detection System of Flange-Climb Derailment by MBD Simulation  
Masaya Sakamoto, Shihpin Lin, Yoshihiro Suda, Masahisa Kageyama, Shinichiro Koga, Takashi Kunimi, Tetsuya Kawanabe |

### MEC 4 of 4 / Control and Mechatronics

**Session Chair:** Ja Choon Koo, Sungkyunkwan University
Wojciech Blajer, University of Technology and Humanities in Radom

**Room 204**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 13:40 - 15:00         | Mechatronic Device to Protect Against Falls during Locomotor Rehabilitation  
Sławomir Duda, Grzegorz Gembalczyk, Sławomir Kciuk, Damian Gasiorek |
|                       | Dynamic modeling and analysis of a rescue robot for the real-time analysis  
Tae-Yun Kim, Samuel Jung, Wan-Suk Yoo |
|                       | On Modelling and Simulation of Dielectric Elastomer Actuators via Electrostatic-Elastodynamic Coupling  
T. Schlögl, S. Leyendecker, S. Reitelshöfer, M. Landgraf, I.S. Yoo, J. Franke |
|                       | Swimming Strategy for a Bio-inspired Legged Underwater Robot  
Hee Joong Kim, Bong-Huan Jun, Jihong Lee |

### BIO 3 of 5 / Biomechanics

**Session Chair:** Lulu Gong, Tongji University
Andres Kecskemethy, University of Duisburg-Essen

**Room 206**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 13:40 - 15:00         | Preliminary study on cartilage contact modeling using flexible multibody approach  
Adam Klodowski |
|                       | A Vibration Model of Seated Human Body in which Muscle Models are Employed  
Young Nam Jo, Moon Jeong Kang, Hong Hee Yoo |
|                       | Impact of the Forearm Modeling Refinement on the Upper Limb Joint Kinematics and Dynamics  
Maria Laitenberger, Mickael Begon, Guillaume Gaudet, Delphine Périé, Fabien Dal Maso, Maxime Raison |
## OPT 5 of 6 / Optimization, Sensitivity Analysis and Parameter Identification

Session Chair: Olivier Bruls, University of Liège  
Jeong-han Lee, FunctionBay Inc.  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 13:40 - 15:00 | Parameter Estimation of a 6x6 Autonomous Vehicle  
Yeong-Jin Kim, Samuel Jung, Wan-Suk Yoo |
|            | Fully Symbolic Differentiation of Constrained Multibody Systems: Application to Vehicle Sensitivity Analysis  
A. Poncelet, O. Brüls, P. Fisette |
|            | Damping Matrix Identification using Frequency Response Functions  
Cheon-hong Min, Hyung-woo Kim, Tae-kyeong Yeu, Jong-su Choi, Sup Hong |
|            | Robust Design of a Multibody System of an Automotive Vehicle  
A. Batou, C. K Choi, C. Soize, H. H. Yoo |

## CON 2 of 4 / Contact and Impact Problems

Session Chair: Jeong Hyun Sohn, Pukyong National University  
Jochen Damerau, Bosch Corp  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 13:40 - 15:00 | Study on Contact Algorithm for ANCF on Multibody Dynamic System  
Cheng Yang, Jiawei He, Gexue Ren, Masatsugu Monde, Masataka Kawaguchi, Kensuke Nishiura |
|            | A Non-Linear Parametric Model Order Reduction Technique for Gear Contact Problems in Flexible Multibody Dynamics  
T. Tamarozzi, B. Blockmans, W. Desmet |
|            | The Development of Contact Algorithm for High-Speed Collision Simulation of an Active Protection System  
Jonghwan Won, Chulho Lee, Daesung Bae, Kyunghoon Song, Donghee Bae |
|            | Numerical Simulation of High-Velocity Impacts on Transparent Armor Structures  
Daniel Huber, Arash Ramezan, Hendrik Rothe |

## COFFEE BREAK  
15:00 - 15:20

## KEYNOTE / Jinyang Liu, Shanghai Jiao Tong University, China  
Dynamic Modeling and Experiment Investigation of Rigid-flexible Coupling Multibody Systems  
Session Chair: Ahmed Shabana, Univ. of Illinois at Chicago  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 15:20 - 16:00 | Dynamic Stiffness Improvement of Inspection Robot Frame using Multi-body Dynamic Simulation  
Jun Young Lee, Ji Youn Lim, Chang Hwan Kim, Hong Jae Yim |

## COFFEE BREAK  
16:00 - 16:10

## FLX 7 of 9 / Flexible Multibody Systems

Session Chair: Nobuyuki Kobayashi, Åoyama Gakuin University  
Graham Sanborn, FunctionBay Inc.  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 16:10 - 17:50 | An MBD approach for a simplified yarn model  
Hidetoshi Takeuchi, Nobuyuki Shimizu |
|            | Coupled Analysis between Fluid and Multibody Dynamics for a Two-Dimensional Engine Nozzle  
Wonjong Eun, Jaewon Kim, Junyoung Kwak, SangJoon Shin, Oh-Joon Kwon, Oliver A. Bauchau |
|            | A GPU-based Preconditioned Newton-Krylov Solver for Flexible Multibody Dynamics  
Ang Li, Dan Melanz, Radu Serban, Dan Negrut |
|            | Dynamic Stiffness Improvement of Inspection Robot Frame using Multi-body Dynamic Simulation  
Jun Young Lee, Ji Youn Lim, Chang Hwan Kim, Hong Jae Yim |
### VEH 8 of 12 / Dynamics of All Vehicles

**Session Chair:** Parviz Nikravesh, University of Arizona  
Yoshihiro Suda, University of Tokyo  
**16:10 - 17:50**  
Room 203

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Singular Slip UA Tire Model Development in RecurDyn</td>
<td>Jeong-han Lee, Jin-hwan Choi, Wan-suk Yoo</td>
</tr>
<tr>
<td>Sample based Reliability Design of a Flexible Multibody System having Arbitrary Distributed Parameters</td>
<td>C. K. Choi, A. Batou, C. Soize, Hong Hee Yoo</td>
</tr>
<tr>
<td>Development of an Analytical Model of a UTV with Consideration of the Chassis Static Stiffness, and Analysis of Driving Characteristics</td>
<td>Sangcheol Park, Younmin. Song, Kyunghun. Shin, Seongkyu. Choi, Jungwon. Park</td>
</tr>
<tr>
<td>Responses of tire over several kinds of roads</td>
<td>Chang-Gyu Yoon, Sang-Do Na, Dong-Woon Park, Kwang-Suk Kim, Wan-Suk Yoo</td>
</tr>
<tr>
<td>An Electrical Vehicle Virtual Platform with Multibody Vehicle Model</td>
<td>Sunwoo Kim, Sung-Soo Kim</td>
</tr>
</tbody>
</table>

### EFF 1 of 4 / Efficient Methods and Real-Time Applications

**Session Chair:** Roland Pastorino, KU Leuven  
**16:10 - 17:50**  
Room 204

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Efficient Dynamics Analysis Method for Cylinder Driving Mechanical Arm System with multi-DOFs</td>
<td>Bing Xu, Maoke Liu, Junhui Zhang, Pengpeng Dong</td>
</tr>
<tr>
<td>A generalized component mode synthesis approach for global modal parameterization in flexible multibody dynamics</td>
<td>A. Humer, F. Naets, W. Desmet, J. Gerstmayr</td>
</tr>
<tr>
<td>A partitioning method for parallelization of large systems in realtime</td>
<td>Claude Lacoursière, Fredrik Nordfeldth, Mattias Linde</td>
</tr>
<tr>
<td>A Parallel Algorithm For Multi-rigid Body System Dynamics Based On The Hamilton's Canonical Equations</td>
<td>Paweł Malczyk, Janusz Fra, czeł, Krzysztof Chadał</td>
</tr>
</tbody>
</table>

### BIO 4 of 5 / Biomechanics

**Session Chair:** Paul Fisette, University catholique de Louvain  
Yoshio Inoue, Kochi University of Technology  
**16:10 - 17:50**  
Room 206

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Study on Coupling an Active Middle Ear Implant to the Round Window Membrane of the Cochlea</td>
<td>P. Ziegler, P.Wahl, P.Eberhard</td>
</tr>
<tr>
<td>In Vivo Determination of the Moment of Inertia of Limb Segments using a Dynamometer</td>
<td>Jongsang Son, Youngho Kim</td>
</tr>
<tr>
<td>An EMG Driven Forward Dynamic Simulation of Sit-to-Stand</td>
<td>Valerie T. Norman-Gerum, John J. McPhee</td>
</tr>
</tbody>
</table>
**OPT 6 of 6 / Optimization, Sensitivity Analysis and Parameter Identification**
Session Chair: Javier Ros, Public University of Navarre
Jinyang Liu, Shanghai Jiao Tong University
16:10 - 17:50  
Room 207

1. Dynamic Responses Optimization of Vacuum Circuit Breaker using Taguchi Method  
   Jun Yeon Jo, Kil Young Ahn, Sung Tae Kim, Hong Ik Yang, Kyu Jung Kim

2. Application of Extended Kalman Filter (EKF) Methodology for Parameter Identification in Structural Analysis of Three-Blade Wind Turbine  
   Fabio F. Real, Thiago G. Ritto

3. Identification of Dynamic Parameters of an Industrial Manipulator  
   Vishal Abhishek, Abdullah Aamir Hayat, Arun Dayal Udai, Subir Kumar Saha

**MDA 1 of 1 / Multidisciplinary Approaches**
Session Chair: Hiroyuki Sugiyama, University of Iowa  
Dae Sung Bae, Hanyang University  
16:10 - 17:50  
Room 208

1. A Study on the Arrangement of Buoyancy Module for Stability of Marine Flexible Riser of a Deep-Seabed Mining System  
   Jae-won Oh, Cheon-hong Min, Hyung-woo Kim, Minuk Lee, Chang-ho Lee, Sup Hong, Dae-sung Bae

2. Dynamic analysis of a mini loader system coupled a hydraulic mechanism by using FMI  
   Joonhyun Lim, Daesung Bae, Huije Cho, Kirang Kang, Younghwan Yoon

3. Analysis of Wind Turbine Drivetrain Dynamics under Wind Load and Axial Misalignment Uncertainties  
   Huaxia Li, Hiroyuki Sugiyama, Nicholas Gaul, KK Choi

4. Dynamic simulation and vibration control of solar cell substrate handling robot including FEM analysis  
   Dong Il Park, Cheolhoon Park, Doohyung Kim
Wednesday, July 2, 2014

KEYNOTE / Ja Kyum Koo, NVH-Korea, Korea
*Investigation on the Missing Link between Multi-body System Dynamics and NVH*

Session Chair: Sung-Soo Kim, Chungnam National University

---

**FLX 8 of 9 / Flexible Multibody Systems**
Session Chair: Dan Negrut, University of Wisconsin Madison
Hiroyuki Sugiyama, University of Iowa

10:00 - 11:20
Room 201-2

**Description of a Sliding Joint Between Flexible Bodies in the Floating Frame of Reference Formulation**
Sophie Zorn, Martin Jochmann, Ines Gubsch, Christian Schubert

**Analysis of Impact Phenomena in a Vacuum Interrupter Considering Dynamic Material Properties**
Woo-Jin Park, Sung-Tae Kim, Kil-Young Ahn, Jong-Ho Lee

**Frequency Analysis of Coilable Deployable Mast Based on Multibody Dynamic Approach**
Luning Li, Yongpeng Gu, Lihong Liu, Gexue Ren

**Development of Structural Integrity Evaluation Analysis Model of Brake Caliper in considering Brake Conditions**
Kyunghun Shin, Jungwon Park, Sangcheol Park, Younmin Song, Seongkyu Choi

---

**BEN 1 of 2 / Benchmark Problems in Multibody System Dynamics**
Session Chair: Javier Cuadrado, University of La Coruna
John McPhee, University of Waterloo

10:00 - 11:20
Room 203

**A Comparison of DAE Integrators in the Context of Benchmark Problems for Flexible Multibody Dynamics**
Peter Betsch, Christian Becker, Marlon Franke, Yinping Yang

**Validation of Flexible Multibody Dynamics Beam Formulations using Benchmark Problems**
Olivier A. Bauchau, Genyong Wu, Peter Betsch, Alberto Cardona, Johannes Gerstmayr, Ben Jonker, Pierangelo Masarati, Valentin Sonneville

**An Update on the Web-based Library of Computational Benchmark Problems for Multibody Dynamics**
Ramin Masoudi, Thomas Uchida, David Vilela, Alberto Luaces, Javier Cuadrado, John McPhee

**A Comparative Study on Effective Dynamic Modeling Methods for Flexible Pipe**
Chang-Ho Lee, Sup Hong, Hyung-Woo Kim, Jae-Won Oh, Hong-Seon Yun, Sung-Soo Kim

---

**CON 3 of 4 / Contact and Impact Problems**
Session Chair: Martin Arnold, Martin Luther University Halle-Wittenberg
Taewon Park, Ajou University

10:00 - 11:20
Room 204

**A cylinder Intruder Colliding Against Granular Matter**
Yong Pang, Caishan Liu, Wenting Kang

**Application of 3D DEM Model to Lunar regolith Drilling Research**
Tianxi Liu, Cheng Wei, Liang Ma, Yang Zhao

**Dynamic Simulation of Flexible Gear Pairs using a Contact Modelling between Superelements**
Geoffrey Virlez, Olivier Bruls, Emmanuel Tromme, Pierre Duysinx, Michel Géradin

**Multi-Variable Method for Impact Dynamics of Flexible Multibody System**
Zhuoyong Liu, Jiazheng Hong, Jianyao Wang
<table>
<thead>
<tr>
<th>TCM 1 of 3 / Theoretical and Computational Methods</th>
<th>10:00 - 11:20</th>
<th>Room 206</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session Chair:</strong> Caishan Liu, Peking University</td>
<td><strong>Wojciech Blajer, University of Technology and Humanities in Ra-dom</strong></td>
<td></td>
</tr>
<tr>
<td>Numerical Investigation of Laminar Flow Over an Oscillating Circular Cylinder by an Unstructured-mesh ALE Finite-volume Method</td>
<td>Xiaohui Su, Yao Cao, Zhao Yong</td>
<td></td>
</tr>
<tr>
<td>FMM-based Pairwise Force Computation for Multibody-based Coarse-grain Molecular Simulations</td>
<td>Jeremy J. Laflin, Kurt S. Anderson</td>
<td></td>
</tr>
<tr>
<td>Numerical Integration of a Set of ODEs of Motion for Multibody Systems</td>
<td>Sotirios Natsiavas, Elias Paraskevopoulos, Nikolaos Potosakis, Georgia Georgiou</td>
<td></td>
</tr>
<tr>
<td>Optimal Control of Multibody Systems in terms of a Structure-Preserving Transcription Scheme</td>
<td>C. Becker, P. Betsch</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROT 1 of 3 / Dynamics of Machines and Rotating Structures</th>
<th>10:00 - 11:20</th>
<th>Room 207</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session Chair:</strong> Nobuyuki Shimizu, Iwaki Meisei University</td>
<td><strong>Feng Zengming, Jilin University</strong></td>
<td></td>
</tr>
<tr>
<td>The Blade Interaction Model Suitable for Nonlinear Simulations of Bladed Disks</td>
<td>Michal Hajžman, Drahomír Rychecký</td>
<td></td>
</tr>
<tr>
<td>Synchronization Configurations of Two Coupled Double Pendula</td>
<td>Piotr Koluda, Przemyslaw Perlikowski, Krzysztof Czołczynski, Tomasz Kapitaniak</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROB 5 of 6 / Robotic Systems</th>
<th>10:00 - 11:20</th>
<th>Room 208</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session Chair:</strong> Koichi Koganezawa, Tokai University</td>
<td><strong>Alberto Martini, University of Bologna</strong></td>
<td></td>
</tr>
<tr>
<td>Multi-Joint Gripper with Differential Gear Chain</td>
<td>T. Tamamoto, K. Sayama, K. Koganezawa</td>
<td></td>
</tr>
<tr>
<td>Multibody Model and Simulation of a Statically Balanced Parallel Kinematics Machine</td>
<td>A. Martini, M. Troncossi, M. Carricato, A. Rivola</td>
<td></td>
</tr>
<tr>
<td>Inverse Kinematic Solution of a 6-DOF(3-RPRS) Parallel Spatial Manipulator</td>
<td>Vinoth Venkatesan, Yogesh Singh, Santhakumar Mohan</td>
<td></td>
</tr>
<tr>
<td>Evaluation of Safety Index of 7-DOF Manipulator Considering Collision Safety</td>
<td>Ki Hong Kim, In Jun Park, Sungsoo Rhim</td>
<td></td>
</tr>
</tbody>
</table>

| COFFEE BREAK | 11:20 - 11:40 |

<table>
<thead>
<tr>
<th>FLX 9 of 9 / Flexible Multibody Systems</th>
<th>11:40 - 12:40</th>
<th>Room 201-2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session Chair:</strong> Aki Mikkola, Lappeenranta University of Technology</td>
<td><strong>Hong Hee Yoo, Hanyang University</strong></td>
<td></td>
</tr>
<tr>
<td>Flexible Multibody Simulation using Hybrid Integration Scheme</td>
<td>Gibin Gil, Parviz E. Nikravesh</td>
<td></td>
</tr>
<tr>
<td>Dynamics of Closed-Loop Rigid-Flexible Multibody Systems Using DeNOC Matrices</td>
<td>Paramanand V. Nandiwal, Subir K. Saha, Olivier A. Bauchau</td>
<td></td>
</tr>
<tr>
<td>On a Consistent Derivation of a Set of ODEs of Motion for Multibody Dynamics</td>
<td>Sotirios Natsiavas, Elias Paraskevopoulos</td>
<td></td>
</tr>
</tbody>
</table>
### EFF 2 of 4 / Efficient Methods and Real-Time Applications
**Session Chair:** Taichi Shiiba, Meiji University  
**Kurt Anderson, Rensselaer Polytechnic Institute**  
**Time:** 11:40 - 12:40  
**Room:** 203

1. **Implementation Issues of an on Board Real-Time Multibody Model**  
   Emilio Sanjurjo, Roland Pastorino, Pasquale Gallo, Miguel A. Naya

   KyungHoon Lee, Hyungjeen Choi, Seungyeol Yoon, Dongseob Song

3. **Real-Time Simulation of Rigid Body System Driven by Linear Elements**  
   Kei Morita, Etsujiro Imanishi, Takao Nanjo, Takeshi Fujikawa

### BIO 5 of 5 / Biomechanics
**Session Chair:** Josep Font-Llagunes, Universitat Politecnica de Catalunya  
**Sungsoo Rhim, Kyung Hee University**  
**Time:** 11:40 - 12:40  
**Room:** 204

1. **Forward Dynamics of Human Gait based on Control Techniques**  
   Rosa Pàmies-Vilà, Josep M. Font-Llagunes, Urbano Luغربس، Javier Cuadrado

2. **The Effect of Swing Pattern on the Release Point and the Club Head Speed**  
   Zhiwei Li, Shunta Kodama, Yoshio Inoue, Kyoko Shibata

3. **The Comparative Study of Cognitive and non-cognitive Loads on Muscles in the Multi-body Model for the Analysis of Whiplash**  
   Younghak Lee, Kijung Kim, Young-Wook Kim, Seok-Chan Kim, Seok-Jo Yang

### TCM 2 of 3 / Theoretical and Computational Methods
**Session Chair:** Olivier Bruls, University of Liège  
**Nobuyuki Kobayashi, Aoyama Gakuin University**  
**Time:** 11:40 - 12:40  
**Room:** 206

1. **On the Role of Quadrature Rules and System Dimensions in Variational Multirate Integrators**  
   Tobias Gail, Sigrid Leyendecker, Sina Ober-Blöbaum

2. **Multibody System Description by a Symbolic Language**  
   Oleq N. Dimitrochenko, Marko K. Matikainen, Aki M. Mikkola

3. **Reduction of System Matrices of Plate in Absolute Nodal Coordinate Formulation by Component Mode Synthesis Method**  
   Naoto WATANABE, Yuya OKAZAWA, Nobuyuki KOBAYASHI, Yoshiki SUGAWARA, Ayako TORISAKA

### ROT 2 of 3 / Dynamics of Machines and Rotating Structures
**Session Chair:** Nobuyuki Shimizu, Iwaki Meisei University  
**Feng Zengming, Jilin University**  
**Time:** 11:40 - 12:40  
**Room:** 207

1. **Two Approaches to the Dynamics of Bladed Disks**  
   Pavel Polach, Michal Hajžman

2. **Dynamic Analysis of a Rotating Axially Functionally Graded Tapered Beam Mounted on a Rigid Hub**  
   Liang Li, Dingguo Zhang, Jianshi Fang

3. **Dynamic Simulation of Control Rod Drive Actuator in the SMART Nuclear Reactor**  
   Myounggyu D. Noh, Myung Ju Gi, Myounggon Kim, Young-Woo Park, Jaeseon Leey, Jong-Wook Kim
### VEH 9 of 12 / Dynamics of All Vehicles

**Session Chair:** Werner Schiehlen, Universität Stuttgart  
Hiroyuki Sugiyama, University of Iowa

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
</table>
| 11:40 - 12:40 | Critical Speed Change of Railway Vehicle by Using MR Damper for Secondary Suspension with Skyhook Control  
Wonhee You, Yujeong Shin, Hyunmoo Hur, Nampo Kim |
|            | The Review of the Method of the Running Safety Assessment for the High-Speed Railway  
Sang-Soo Kim, Sanghyun Ryu, Hongsik Jo, Heemin Noh, Choonsoo Park |
| 12:40 - 13:40 | LUNCH                                                   |
| 14:00 - 18:30 | Excursion - Gyeongju Cultural Heritage Tour           |
| 18:30 - 23:00 | Conference Banquet - Hotel Hyundai Gyeongju          |
### Thursday, July 3, 2014

#### KEYNOTE / Andres Kecskemethy, University of Duisburg-Essen, Germany
*Generation of Minimal Coordinate Formulations in Multibody Applications*

Session Chair: Peter Eberhard, University of Stuttgart

### BEN 2 of 2 / Benchmark Problems in Multibody System Dynamics
**Session Chair**: Jin Hwan Choi, Kyung Hee University
Javier Cuadrado, University of La Coruna

10:00 - 11:20
Room 201-2

- **Benchmark Problems for Contact Dynamics in Multibody Systems**
  Ramin Masoudi, Paulo Flores, John McPhee

- **A Bouncing Ball Benchmark Problem and Solution of An Ellipsoid-to-Plane Contact**
  Jan Špička, Michal Hajžman, Luděk Hynčík, Pavel Polach

- **Dynamic Analysis of Benchmark Problems Using the DeNOC Matrices**
  Anil Kumar Sharma, Suril V. Shah, Subir Kumar Saha

- **Benchmark Problems from Vehicle Dynamics**
  Werner Schiehlen

### TCM 3 of 3 / Theoretical and Computational Methods
**Session Chair**: Nobuyuki Kobayashi, Aoyama Gakuin University
Caishan Liu, Peking University

10:00 - 11:20
Room 203

- **Minimal Extension for Mechanical Systems with Control Contraints**
  Robert Altmann, Peter Betsch, Yinping Yang

- **Structural Dynamic Response Analysis of Spar Floating Offshore Wind Turbine subject to Wave-Induced Excitation by Semi-Analytical Numerical Approach**
  Jin-Rae Cho, Bo-Sung Kim, Eun-Ho. Choi, Shi-Bok Lee, O-Kaung Lim

- **Convergence of Generalized-a Time Integration for Nonlinear Systems with Stiff Potential Forces**
  Markus A. Köbis, Martin Arnold

### VEH 10 of 12 / Dynamics of All Vehicles
**Session Chair**: Yoshihiro Suda, University of Tokyo
Zhuyong Liu, Shanghai Jiao Tong University

10:00 - 11:20
Room 204

- **Physically-Oriented Modeling and Simulation of the Omni Vehicle Dynamics**
  Ivan I. Kosenko, Kirill V. Gerasimov

- **An Investigation on Tractor Pitch Resonance : Simulations and Tests**
  Jungkyum Yu, Kwangseok Oh, Donghoon Shin, Jiwon Yoon, Kyongsu Yi

- **Torque Distribution of the Three-Wheeled Vehicle with Rear-Wheel Steering and Skid Steering**
  Jaehoon Sim, Myungju Ryu, Youngjin Park
### OTH 5 of 8 / Multibody Applications, Experiments and Other Topics
**Session Chair:** Etsujiro Imanishi, KOBE STEEL, LTD.
Ja Choon Koo, Sungkyunkwan University
**Room:** 206
**Time:** 10:00 - 11:20

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Validation of Friction Force for the Spring Operating Mechanism in a Circuit Breaker</td>
<td>Hyunwoo Kim, Byungtae Bae, Sungho Lee, Jooeon Park, Jaeyeol Kim, Jinho Kim</td>
</tr>
<tr>
<td>Hammering beneath the surface of Mars - Forensic engineering of failures in the HP3-Mole by applying multibody dynamics simulation</td>
<td>Roy Lichtenheldt, Bernd Schäfer, Olaf Krömern, Tim van Zoest</td>
</tr>
<tr>
<td>Modeling and Dynamics Analysis of a Rotary Compressor</td>
<td>Seungmin Kwon, Hong Hee Yoo, Youngbo So, Janghun Ha</td>
</tr>
</tbody>
</table>

### OTH 6 of 8 / Multibody Applications, Experiments and Other Topics
**Session Chair:** Aki Mikkola, Lappeenranta University of Technology
Jinyang Liu, Shanghai Jiao Tong University
**Room:** 207
**Time:** 10:00 - 11:20

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Study on the Dynamic Characteristics of Ultra High Speed VCB using Electro Magnetic Actuator</td>
<td>Dong Sik Lee, Hyun Wook Lee, Hong Ik Yang, Kil Young Ahn, Jhong Ho Lee</td>
</tr>
<tr>
<td>Dynamic Analysis of a Washing Machine with a Rapid Decrease of Unbalanced Mass during Hydration Process</td>
<td>Min Hyung Cho, Jin Seok Jang, Jae Hoon Jin, Wan Suk Yoo, Gyung Hun Nho, Jin Hong Park, Bo Sun Chung, Youn Su Jung</td>
</tr>
<tr>
<td>Multibody Dynamics as a Historical Tool: Study of an 18th Century Piano Action of Andreas Stein</td>
<td>Baudouin Bokiauy, Anne-Emmanuelle Ceulemans, Paul Fisette</td>
</tr>
<tr>
<td>Effective 2D Roll-to-Roll System Analysis Method using Approximated Winding Length Estimation Algorithm</td>
<td>Sungham Hong, Juhwan Choi, Jin Hwan Choi</td>
</tr>
</tbody>
</table>

### EFF 3 of 4 / Efficient Methods and Real-Time Applications
**Session Chair:** Kurt Anderson, Rensselaer Polytechnic Institute
Frank Naets, KU Leuven
**Room:** 208
**Time:** 10:00 - 11:20

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel Processing with the Subsystem Synthesis Method for Efficient Vehicle Analysis</td>
<td>HeeChan Kang, Sung-Soo Kim</td>
</tr>
<tr>
<td>Towards Real-time Multibody Simulations using ARM-based Embedded Systems</td>
<td>Roland Pastorino, Francesco Cosco, Frank Naets, Javier Cuadrado, Wim Desmet</td>
</tr>
<tr>
<td>Real-time Vehicle Dynamics Analysis by the Generalized-a Scheme with Fixed Iteration Matrix</td>
<td>Taichi Shiiba, Takumi Motosugi</td>
</tr>
</tbody>
</table>

### VEH 12 of 12 / Dynamics of All Vehicles
**Session Chair:** Hyung-Suk Han, Korea Institute of Machinery and Materials
Parviz Nikravesh, University of Arizona
**Room:** 201-2
**Time:** 11:40 - 12:40

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Path Analysis with OPAX and OTPA in a Dummy Car</td>
<td>Jong Sik Kim, Sang Kwon Lee</td>
</tr>
<tr>
<td>Vibration Characteristics Analysis of an Agricultural Tractor and Development of Performance Evaluation Method</td>
<td>Chanho Choi, Ji Won Yoon, Jai Yoon Shin, Kyung sook Min, Kyongsu Yi</td>
</tr>
<tr>
<td>Session</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>ROT 3 of 3</td>
<td>Dynamics of Machines and Rotating Structures</td>
</tr>
<tr>
<td></td>
<td>Nonlinear Multi-body Dynamics of a Wind Turbine System</td>
</tr>
<tr>
<td></td>
<td>Estimation of the Vibration Fields of a Reciprocal Compressor using Advanced Modal Expansion Method</td>
</tr>
<tr>
<td></td>
<td>Dynamic Modeling and Stability Analysis of a Rotating Internal Cantilever Beam with Tip-Mass</td>
</tr>
<tr>
<td>VEH 11 of 12</td>
<td>Dynamics of All Vehicles</td>
</tr>
<tr>
<td></td>
<td>Nonlinear Multi-body Dynamics of a Wind Turbine System</td>
</tr>
<tr>
<td></td>
<td>Estimation of the Vibration Fields of a Reciprocal Compressor using Advanced Modal Expansion Method</td>
</tr>
<tr>
<td></td>
<td>Dynamic Modeling and Stability Analysis of a Rotating Internal Cantilever Beam with Tip-Mass</td>
</tr>
<tr>
<td>OTH 7 of 8</td>
<td>Multibody Applications, Experiments and Other Topics</td>
</tr>
<tr>
<td></td>
<td>Unified Mechanism Synthesis of Planar Four-bar Linkage Mechanism using 3 Bushing Points Model</td>
</tr>
<tr>
<td></td>
<td>Multibody Dynamics Simulation for Occiput Impact during Falling Backward in Judo</td>
</tr>
<tr>
<td></td>
<td>Robust Design Methodology for the System Subject to the Shooting</td>
</tr>
<tr>
<td>OTH 8 of 8</td>
<td>Multibody Applications, Experiments and Other Topics</td>
</tr>
<tr>
<td></td>
<td>Estimation Method for the Design of a Driving System of 4-High Mill using Multivariate Interpolation Method</td>
</tr>
<tr>
<td></td>
<td>A Method for Modelling Normal Reaction Forces between Wheel and Soft Terrain for Planetary Exploration Rovers</td>
</tr>
</tbody>
</table>
## EFF 4 of 4 / Efficient Methods and Real-Time Applications

**Session Chair:** Kurt Anderson, Rensselaer Polytechnic Institute  
Joon-Shik Yoon, FunctionBay Inc.  
11:40 - 12:40  
Room 208

<table>
<thead>
<tr>
<th>Presentation Title</th>
<th>Authors</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Towards Benchmarking of State Estimators for Multibody Dynamics</td>
<td>José-Luis Torres, José-Luis Blanco, Emilio Sanjurjo, Miguel-Ángel Naya, Antonio Giménez</td>
<td>208</td>
</tr>
<tr>
<td>Logarithmic Complexity Large Deformation Formulation using Absolute Nodal Coordinate Beam and Plate Elements</td>
<td>Imad M. Khan, Kurt S. Anderson</td>
<td></td>
</tr>
<tr>
<td>Experimental Input Force Estimation using Large-Deformation Flexible Multibody Simulation</td>
<td>F. Naets, F. Cosco, T. Tamarozzi, W. Desmet</td>
<td></td>
</tr>
</tbody>
</table>

**LUNCH**  
12:40 - 13:40

**KEYNOTE / Yoshiaki Terumichi,** Sophia University, Japan  
A Systematic Approach of Numerical Simulation and Experiments Applied for the Study on the Railway Vehicle Dynamics on Large Earthquake  
13:40 - 14:20  
Room 201-2  
Session Chair: Olivier Bauchau, University of Michigan-Shanghai Jiao Tong University Joint Institute

**CLOSING CEREMONY**  
14:20 - 15:00  
Room 201-2