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Schedule

Sunday, September 18, 2011

3:00 pm – 7:00 pm	Registration T. White, R. Melendy, H. Wimmer-McClanahan	*Latham Foyer*
3:00 pm – 7:00 pm	Board of Directors meeting	Room: *Solitude*
7:00 pm – 10:00 pm	Ice breaker reception Jazz by *Prestige Collective*	Room: *Latham CDEF*

Monday, September 19, 2011

7:00 am – 8:00 am	Breakfast	Room: *Latham AB*
7:00 am – 5:00 pm	Registration T. White, R. Melendy, H. Wimmer-McClanahan	*Latham Foyer*
8:00 am – 8:15 am	ISTVS 2011 Opening Remarks, Prof. Corina Sandu	
8:15 am – 8:25 am	ISTVS Current President Remarks, Prof. Kazuyoshi Tateyama	
8:25 am – 8:45 am	ISTVS Website/Newsletter/Member service, Dr. L. Richter and Ms. J. Dixon	
8:45 am – 9:05 am	Journal of Terramechanics update, Dr. George Mason	
9:05 am – 9:25 am	Virginia Tech College of Engineering Dean Welcome, Assoc. Dean Jack Lesko	
9:25 am – 9:45 am	Coffee break and snacks	
9:45 am – 10:20 am	Bekker-Reece-Radforth Award Presentation, Dr. J. Y. Wong	
10:20 am – 11:25 am	St. Christopher Lecture Presentation, Dr. K. Tateyama	
11:25 am – 12:40 pm	Lunch with Presenter Prof. Dennis Hong (RoMeLa)	Room: *Latham DEF*
12:40 pm – 2:40 pm	**50th Anniversary Session** (part 1), Drs. Shoop, Kiss, Watanabe 1. Prof. Itzhak "Shmilo" Shmulevich: 50th anniversary terramechanics R&D activity in Israel 2. Prof. Keiji Watanabe: ISTVS in the Asia-Pacific Area, and special update on Intelligent vehicle proved in nuclear accident through Great East Japan Earthquake Disaster occurred in March 11 2011. 3. Prof. Zoltan Janosi: Early days of the ISTVS and the Land Locomotion Lab	
2:40 pm – 3:00 pm	Coffee break and snacks	
3:00 pm – 5:00 pm	**50th Anniversary Session** (part 2), Drs. Shoop, Kiss, Watanabe 4. General (Ret) Guenter Hohl: a. 1984 European conference held in Vienna; b. History of terrain vehicle from ancient times to today 5. Dr. George Mason: WES Mobility Systems and ISTVS interactions past, present, and future 6. Mr. Henry Hodges: Why mobility is even more relevant now 7. Optional Panel Discussion – TBD	
5:00 pm – 5:30 pm	Free time. Prepare for Mountain Lake	
5:30 pm – 6:00 pm	Drive to Mountain Lake (by buses)	
6:00 pm – 7:00 pm	Dirty Dancing Tour	
7:00 pm – 10:00 pm	Dinner and entertainment Oktoberfest style with The Sauerkraut Band	
10:00 pm – 10:30 pm	Return to Hotels (by buses)	

Tuesday, September 20, 2011

7:00 am – 8:00 am	Breakfast	Room: *Latham AB*
7:00 am – 8:00 am	Registration T. White, R. Melendy, H. Wimmer-McClanahan	*Latham Foyer*
8:00 am – 10:30 am	Travel for Technical Tour to Virginia International Performance and Engineering Research (VIPER); (movie #1 on the bus)	
10:30 am – 10:45 am	Break	
10:30 am – 11:45 am	Tour VIPER, Host: Prof. Steve Southward	
11:45 am – 12:00 pm	Drive to Virginia International Raceway (VIR)	
12:00 pm – 1:00 pm	Lunch at VIR	
1:00 pm – 3:30 pm	Tour VIR, Host: Ms. Terrie Lantor	
3:30 pm – 3:45 pm	Break	
3:45 pm	Depart for Martinsville; snacks on the bus; (movie #2 on the bus)	
5:00 pm – 5:45 pm	Visit Martinsville Speedway, Host: Mr. Michael Smith	
5:45 pm – 7:00 pm	Return to Blacksburg if not going to Chateau Morrisette	
5:45 pm – 9:00 pm	Optional wine tasting/dinner/shopping at Chateau Morrisette ($40), Host: Ms. Mechelle O'Neal	
9:00 pm – 10:00 pm	Return to Blacksburg if going to Chateau Morrisette	

Wednesday, September 21, 2011

7:00 am – 8:00 am	Breakfast	Room: *Latham AB*
7:00 am – 8:00 am	Registration	*Latham Foyer*
8:00 am – 4:00 pm	Poster set-up and Exhibitors	Room: *Latham DEF*
8:00 am – 8:15 am	Morning Announcements (one per room) Drs. Sandu, Richter	
8:15 am – 10:15 am	Concurrent Sessions	

Track 1. Session 1/2 **Room: *Latham C***

Soil and terrain modeling and characterization *(20 min/paper)*

Chair: Mr. Randolph Jones; Co-chair: Dr. Kyeong Uk Kim

1. "Direct Shear Behaviour of Dry, Granular Soils Subject to Low Normal Stresses", by C. Senatore and K. Iagnemma *(paper, presentation, poster) /*
2. "Effect of Tire Inflation Pressure on Soil Strength Estimated Using Wheel Sinkage", by J. S. Nam and K. U. Kim *(presentation, poster) L-?*
3. "Modeling of Soil Displacement and Soil Strain Distribution Calculation Under the Traveling Wheel", by K. Saengprachatanarug, M. Ueno, E. Taira, and T. Okayasu *(paper, presentation) /0*
4. "Development of a Dynamic Visco-Elastic Vehicle-Soil Interaction Model for Rut Depth, Energy and Power Determinations", by P. Ayers, G. Bozdech, J. Freeman, A. Reid, and J. O'kins *(presentation) L-?*
5. "The Effect of the Lateral Distance of the Shallow Tines on the Energy Utilization Efficiency of the Subsoiler", by S. Aday *(presentation) L-?*
6. "Sophisticated Improvement of the Soil Compaction State Evaluation", by P. Prikner and R. Kodešová *(paper, presentation) 03*

Poster only: "Reconfigurable Vegetated Soil Strength Instrument for Mobility Measurements", by K. MacDonald, B. Coutermarsh, and S. A. Shoop *(abstract) L-?*

Poster only: "Soil Strength as a Function of Soil and Ground Cover Types", by S. Shoop, R. Affleck, C. Smith, K. Gagnon, and R. Stone *(abstract) L-?*

Track 2. Session 1/4 **Room: *Assembly Hall***

Planetary rovers and mobile robotics *(20 min/paper)*

Chair: Dr. Lutz Richter; Co-chair: Dr. James Lever

1. "Conceptual Study of Small Excavation Systems for Future Lunar Exploration", by T. Yokoyama and K. Tateyama *(paper, presentation) 13*
2. "Advantageous Bucket-Wheel Configuration for Lightweight Planetary Excavators", by K. Skonieczny, S. J. Moreland, D. S. Wettergreen, and W. L. Whittaker *(paper, presentation) 17*
3. "Mobile Payload Element: Concept Study for a Sample Fetching Rover for the Esa Lunar Lander Mission", by L. Richter, M. Apfelbeck, F. Claasen, R. Haarmann, P. Hofmann, S. Klinkner, and J. Schwendner *(presentation) L-?*
4. "Report from the 2011 Summer Series of Workshops on "xTerramechanics", B. Trease, R. Lindemann, J. Andrade, K. Iagnemma, I. Vlahinić *(presentation) L-?*
5. "Soil Motion Analysis System for Examining Wheel-Soil Shearing", by S. Moreland, K. Skonieczny, D. Wettergreen, C. Creager, and V. Asnani *(paper, presentation) 27*
6. "Microscopic Study on Dynamic Behavior of Lunar Regolith under Driving Wheel in Micro-Gravity Circumstance", by Z. Meng, J. Jian-qiao, and L. Guo-min *(paper, presentation) 35*

Poster only: "Terramechanics Simulation for Mobility Planning of the Mars Exploration Rovers", B. Trease, R. Arvidson, K. Bennett, F. Zhou, R. Lindemann, K. Iagnemma, C. Senatore, and L. Van Dyke *(abstract) L-?*

10:15 am – 10:30 am Coffee break and snacks

10:30 am – 12:30 pm Concurrent Sessions

Track 3. Session 1/1 **Room: *Latham C***

Running gear characterization and modeling *(20 min/paper)*

Chair: Dr. Paul Ayers; Co-Chair: Dr. Pieter Schalk Els

1. "A Review of the Tractive Performance of Wheeled Tractors and Soil Management in Lowland Intensive Rice Production", by A. Keen, N. W. Hall, P. Soni, M. D. Gholkar, S. E. Cooper, and J. Ferdous *(paper, presentation, poster) 41*
2. "Validation of Military Vehicle Terrain Impact Models at Multiple Locations", by D. J. Koch, P. D. Ayers, H. R. Howard, and A. B. Anderson *(paper, presentation) 61*
3. "Numerical Investigation of Gross Traction Generated at Grouser-Soil Interface by DEM", by H. Nakashima, X. L. Wang, T. Yoshida, H. Shimizu, J. Miyasaka, and K. Ohdoi *(paper, presentation, poster) 73*
4. "Modal Analysis on a Large Off-Road Tyre using Scanning Laser Vibrometry", by C. M. Becker and P. S. Els *(paper, presentation) / . /*
5. "Characterisation and Modelling of Off-Road Tyres", by P. S. Els and C. M. Becker *(paper, presentation) / . 2*
6. "Off-Road Soft Soil Tire Model Development and Proposed Experimental Testing", by C. Sandu, E. Pinto, S. Naranjo, P. Jayakumar, A. Andonian, D. Hubbell, and B. Ross *(paper, presentation, poster) / / .*

Written paper only: "A Non-Linear Model for a Turning Wheel on Deformable Surfaces", by J. Pytka and P. Tarkowski /03

Track 4. Session 1/1 **Room: *Assembly Hall***

Agricultural and earth moving equipment *(20 min/paper)*

Chair: Dr. Antonino Bonanno; Co-chair: Mr. Jody Priddy

1. "Fundamentals of Driveline and Traction Control Systems Fusion for Improving Traction of a 4x4 Single Bucket Loader", by M. Patterson, J. P. Gray, D. Holmes, G. Bortolin, and V. Vantsevich *(paper, presentation) /10*
2. "Modification and Performance Evaluation of Tractor Drawn Improved Till Plant Machine under Vertisol", by A. K. Shrivastava and S. Jha *(paper, presentation) /23*
3. "Axle Torque Distribution in Four-Wheel Drive Tractors", by I. J. Guy, D. A. Crolla, R. J. Godwin, and D. R. White *(paper, presentation) /34*
4. "Vehicle Dynamic Simulation for Efficiency Improvement in Agricultural Tractors", by A. Bonanno and R. Paoluzzi *(paper, presentation) /47*
5. "Prediction of the Draft Force and the Energy Utilization Efficiency of Longitudinally Arranged Double Tines Subsoiler", by S. Aday *(paper, presentation) /6.*
6. "The Control of Tractor 3 Point Linkage Control Systems", by J. Ward, D. A. Crolla, D. R. White, and R. J. Godwin *(paper, presentation) /75*

Written paper only: "Consideration on Supporting Force for Lunar Exploration Rovers using Piles to Traverse Loose Soil with Steep Slope", by K. Iizuka, H. Komatsu, and T. Sasaki 0//

Written paper only: "Heat Exchanger Study and Optimization Approach for Engine Efficiency Improvement", L. Benini, A. Bonanno, and R. Paoluzzi 0/5

12:30 pm – 1:30 pm Lunch with Presentation Room: *Latham AB*

Prof. Kenneth Ball, (Department Head of the Mechanical Engineering Department)

1:30 pm – 3:30 pm Concurrent Sessions

Track 5. Session 1/2 **Room: *Latham C***

Operation on snow and ice *(20 min/paper)*

Chair: Dr. Sally Shoop; Co-Chair: Dr. Jonah Lee

1. "Statistical Experimental Studies of a Vehicle Interacting with Natural Snowy Terrain for Combined Longitudinal and Lateral Slip", by J. Lee, D. Huang, and T. Johnson *(paper, presentation) 004*
2. "High-Efficiency Fuel Sleds for Polar Traverses", by J. Lever and J. Weale *(paper, presentation) 014*
3. "Measuring Vehicle Impacts on Snow Roads", by S. Shoop, M. Knuth, W. Wieder, R. Affleck, and M. Preston *(paper, presentation, poster) 023*
4. "Development of Processed Snow Roads in Antarctica", by R. Alger, S. Shoop, M. Knuth, and G. Blaisdell *(paper, presentation) 04/*
5. "Maintenance on Snow Roads in Antarctica", by K. Gervais, M. Knuth, S. Shoop, and T. Melendy, Jr. *(presentation, poster) L-?*
6. "Impact of Snow Road Maintenance on Road Strength at McMurdo Station, Antarctica", by T. D. Melendy, Jr., S. A Shoop, and M. A. Knuth *(paper, presentation, poster) 047*

Track 6. Session 1/2 **Room: *Assembly Hall***

Vehicle dynamics, mobility, and safety *(20 min/paper)*

Chair: Dr. Peter Kiss; Co-chair: Prof. Iwan Wästerlund

1. "On and Off Road Mobility Performance Evaluation in DGA ANGERS", by M. Grima *(paper, presentation, poster) 055*
2. "Fuzzy Logic Traction Control System for a Golf Cart", by A. Rahman, A. Mohiuddin, A. Hossain, Z. Alam, and M. Rashid *(paper, presentation) 061*
3. "Computation of Vehicle Run-Off-The-Road Velocity", by L. Laib, L. Máthé, and P. Kiss *(paper, presentation) 067*
4. "Determination of Vehicle Speed from Terrain Tracks in Forensic Investigation", by L. Máthé and L. Laib *(paper, presentation) 073*
5. "Investigation and Parameter Study of a Completely Semi-Active Suspension System for Full Spring Mounted Tractors", by J. Krueger, S. Hammes, and H. Meyer *(paper, presentation) 1.3*
6. "Investigation of Simulation Based Vehicle Control Training", by M. Parker, B. Coutermarsh, and D. Taylor *(paper, presentation) 1//*

3:30 pm – 3:45 pm Coffee break and snacks

3:45 pm – 5:05 pm Concurrent Sessions

Track 7. Session 1/2 **Room: *Latham C***

Terramechanics *(20 min/paper)*

Chair: Dr. George Mason; Co-Chair: Dr. Peter Kiss

1. "Multipass Coefficients for Terrain Impacts Based on Military Vehicle Type, Size and Dynamic Operating Properties", by J. Kane, P. Ayers, H. Howard, A. Anderson, and D. Koch *(paper, presentation) 1/6*
2. "Vehicle Recovery Resistance Force Results in Soft-Soils", by A. M. Effinger, G. L. Mason, and B. W. Towne *(paper, presentation) 113*
3. "Modeling the Energetics of Tire-Soil Interaction", by G. Pillinger and P. Kiss *(paper, presentation) 125*
4. "Soil-Wheel Interaction Analysis with ALE Finite Element Method", by J. Yamakawa *(paper, presentation, poster) 130*

Track 2. Session 2/4 **Room: *Assembly Hall***

Planetary rovers and mobile robotics *(20 min/paper)*

Chair: Dr. Lutz Richter; Co-chair: Dr. James Lever

1. "A Comparison of Scuff Tests from the Martian Rover, Opportunity, and a Discrete Element Method Model", by M. A. Knuth and M. Hopkins *(paper, presentation) 14.*
2. "3D Simulation in Pressure-Sinkage Characteristics of Martian Soil Simulant by Discrete Element Method", by R. Zhang, G. Chen, G. Zhou, S. Xu, and J. Li *(paper, presentation) 146*
3. "Research on the Relationship Between Ruts of Lunar Rover Wheel and the Mechanical Properties of Lunar Soil Simulant", by L. Jianqiao, F. Wenfeng, H. Ling, Z. Meng, L. Linlin, L. Hao *(paper, presentation) 152*
4. "Study on the Cone Index and Bulk Density of Lunar Soil Simulant under Different Deposit Statuses", by J. Li, H. Li, L. He, Y. Wang, W. Fan, and L. Liu *(paper, presentation) 162*

5:05 pm – 6:25 pm	Poster session	Room: *Latham DEF*
6:25 pm – 7:00 pm	Free time. Prepare for the banquet at The Inn at Virginia Tech	
7:00 pm – 10:00 pm	Dinner Banquet at The Inn at Virginia Tech Music by *Le Trio*	Room: *Latham AB*
	Awards Ceremony	
	2012 ISTVS Conference Venue	
	Current President/New President Dr. Tateyama/Dr. Shoop	

Thursday, September 22, 2011

7:00 am – 8:00 am	Breakfast	Room: *Latham AB*
7:00 am – 8:00 am	Registration	*Latham Foyer*
8:00 am – 3:30 pm	Poster set-up and Exhibitors	Room: *Latham DEF*
8:00 am – 8:15 am	Morning Announcements (one per room) Drs. Sandu/Richter	

8:15 am – 9:55 am Concurrent Sessions

Track 1. Session 2/2 **Room: *Latham C***

Soil and terrain modeling and characterization *(20 min/paper)*

Chair: Mr. Randolph Jones; Co-chair: Ms. Patricia Sullivan

1. "Automatic Microsurface Terrain Acquisition and Modeling System", by S. Sandomirsky, E. A. Baylot, E. Keung, M. Naumov, and V. Khizhnichenko *(paper, presentation) 175*
2. "Managing Field Operations for the Protection of Buried Archaeological Artifacts", A. P. Dain-Owens, M. Kibblewhite, R. J. Godwin, and M. J. Hann *(presentation) N/A*
3. "GIS for Operative Support", by G. Bygdén *(paper, presentation) 2/1*
4. "Investigation of Excavation Behavior via Model Experiment and Distinct Element Method (DEM) Simulation using Irregularly Shaped Particles", by S. S. Wakabayashi, Y. Kawamoto, K. Nagato, S. Muto, A. Okada, M. Nakao, and T. Hamaguchi *(paper, presentation) 2/6*
5. "Review of Current Military Training and Landcare Operations Relative to Subsurface Pressure Transfer and Protection of Subsurface Soil Condition", A. Dain-Owens, H. Howard, D. Koch, M. Kibblewhite, and R. Godwin *(paper, presentation) 205*

Track 2. Session 3/4 **Room: *Assembly Hall***

Planetary rovers and mobile robotics *(20 min/paper)*

Chair: Dr. Lutz Richter; Co-chair: Ms. Margaret Knuth

1. "Development of a Real and Simulation Testbed for Legged Robot Soil Interaction", by M. Ahmed, L. Quack, M. Römmermann, and Y.-H. Yoo *(paper, presentation, poster) 221*
2. "Modeling of Leg Soil Interaction using Genetic Algorithms", by M. Römmermann, M. Ahmed, L. Quack, and Y. Kassahun *(paper, presentation) 23.*
3. "Evaluation of Influence of Surface Shape of Wheel on Traveling Performance of Planetary Rovers over Slope", by M. Sutoh, K. Nagatani, and K. Yoshida *(paper, presentation) 235*
4. "Toward Establishing a Comprehensive Pressure-Sinkage Model for Small Diameter Wheels on Deformable Terrains", by G. N. Meirion-Griffith and M. Spenko *(paper, presentation) 242*
5. "Flexible Planetary Rover Tire Model with Volumetric Wheel/Soil Interface", by W. Petersen, C. P. Vyasarayani, and J. McPhee *(paper, presentation) 251*

9:55 am – 10:10 am Coffee break and snacks

10:10 am – 12:10 am Concurrent Sessions

Room: *Latham C*

Track 5. Session 2/2 Operation on snow and ice
and
Track 7. Session 2/2 Terramechanics *(20 min/paper)*

Chair: Dr. Wendell Gray; Co-chair: Dr. George Mason

1. "A Method of Using a Snow Micro Penetrometer to Obtain Mechanical Properties of Snow", by D. Huang and J. Lee *(paper, presentation) 26/*
2. "Using Acoustic Sounding to Measure Bulk Density and Depth of Snow", by J. Lee, K. Gard, and D. Misra *(paper, presentation) 27.*
3. "On the Necessity of Terramechanics Science and a Prospective Vision", by G. Korlath *(presentation) L-?*

Track 6. Session 2/2 **Room: *Assembly Hall***

Vehicle dynamics, mobility, and safety *(20 min/paper)*

Chair: Mr. Jody Priddy; Co-chair: Dr. Pieter Schalk Els

1. "Slow Active Suspension Control for Rollover Prevention", by S. F. van der Westhuizen and P. S. Els *(paper, presentation) 277*
2. "GPS-Based, Mission Specific Mobility Power/Energy Analysis of Military Vehicles", by G. Bozdech and P. Ayers *(paper, presentation) 3.4*
3. "Increased Harvesting Operation using Adapted Ground Pressure to Soil Conditions", by I. Wästerlund, and E. Andersson *(paper, presentation, poster) 30/*
4. "Off-Highway Vehicle Braking and Sign Recognition Study", by M. Osborne, R. Alger, E. Eubanks, and D. Meadows *(paper, presentation) 306*
5. "Application of the Smart Tire for Vehicle Chassis Control", by M. A. Arat and S. Taheri *(presentation) L-?*
6. "Leaf Spring Modelling", by C.-J. Kat and P. S. Els *(paper, presentation) 32/*

12:10 am – 1:30 pm	Lunch with Presentation Mayor Ron Rordam	Room: *Latham AB*
1:30 pm – 2:50 pm	Session	

Track 2. Session 4/4 **Room: *Assembly Hall***

Planetary rovers and mobile robotics *(20 min/paper)*

Chair: Dr. Lutz Richter; Co-chair: Dr. James Lever

1. "Terrain Classification using Machine Learning and Proprioceptive Sensors", by D. A. Dumond, L. Ray, M. Bajracharya, and M. Turmon *(paper, presentation) 325*
2. "A Novel Method for Prediction of Mobile Robot Maneuvering Spaces", by P. N. Currier and A. L. Wicks *(paper, presentation) 333*
3. "High Speed Autonomous Off-Road Vehicle Steering", by T. R. Botha and P. S. Els *(paper, presentation) 341*
4. "Load Distribution Control of a Six-Wheeled Robotic Vehicle in Rough Terrain", by T. Kobayashi, G. Ishigami, K. Nagatani, and K. Tateyama *(paper, presentation) 35/*

2:50 pm – 3:05 pm	Coffee break and snacks	
3:05 pm – 4:00 pm	Poster session and posters pick-up	Room: *Latham DEF*
4:00 pm – 4:30 pm	Closing Session Drs. Sandu, Shoop	Room: *Latham C*
4:30 pm – 5:00 pm	Free time. Prepare for optional CVeSS tour	
5:00 pm – 6:30 pm	Optional Tour of the Center for Vehicle Systems and Safety (CVeSS) Host: Prof. C. Sandu, (Director AVDL)	