

Program for the Third International Conference on Discrete Element Methods

September 22 - 25, 2002 at the La Fonda Hotel, Santa Fe, NM, USA

Sunday, September 22, 2002

Welcome Reception and Address: 5:00 - 7:00

La Terraza Room

Speaker: Peter Davies and Larry Costin

Topic: **Overview of National Laboratories and Their DEM Research**

Monday, September 23, 2002

Continental Breakfast: 7:00 - 8:00

South Ballroom

Keynote Address 1: 8:00 - 9:00

South Ballroom

Speaker: **Peter A. Cundall**

Paper Title: **A Discontinuous Future for Numerical Modeling in Soil and Rock**

Keynote Address 2: 9:00 - 10:00

South Ballroom

Speaker: **John R. Williams**

Paper Title: **Contact Detection Algorithms**

Break: 10:00 - 10:20

Parallel Paper Session 1: Monday, Sept. 23, 2002, 10:20 - 11:35

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Large-Scale and Industrial Applications**

Session Chair: Francois Heuzé

Session Title: **Particle Modeling Methods:
Theory and Algorithms**

Session Chair: Larry Costin

Paper 1: **Comparative Study of DEM and
Experimental Results of Flow Patterns in a
Ploughshare Mixer** by B. F. C. Laurent and P. W. Cleary

Paper 1: **Errors of Scale in Discrete Element
Computations** by John F. Peters and David A. Horner

Paper 2: Discrete Element Analysis of the Flow of Ore Materials in Underground Mining Ore Passes by Graham G.W. Mustoe	Paper 2: An Algorithm for Improving 2-D and 3-D Spherical Element Behavior During Formation of Muck Piles Resulting from Rock Blasting by Dale S. Preece and Stephen H. Chung
Paper 3: Simulations of Underground Structures Subjected to Dynamic Loading using the Distinct Element Method by J.P. Morris, L.A. Glenn, F.E. Heuzé, and S.C. Blair	Paper 3: Contact Resolution for General Level Surfaces using Automatic Differentiation by E. Tijsskens, H. Ramon, and J. De Baerdemaeker

Lunch Break: 11:35 - 1:15

Parallel Paper Session 2: Monday, Sept. 23, 2002, 1:15 - 2:55

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Particle Modeling Methods: Theory and Algorithms**

Session Title: **Fundamental Investigations and Applications: Cohesive Materials, Powders, and Soils**

Session Chair: David Potyondy

Session Chair: Michael Plesha

Paper 1: Modeling a Particle Metering Device Using the Finite Wall Method by J.F. Favier and M. Kremmer	Paper 1: Comparison of DEM Simulations and Physical Experiments for Direct Measurement of Strongly Attractive Particle-Particle Interactions by J. Lechman, G.G.W. Mustoe, K.T. Miller, Ning Lu, and K. Eccleston
Paper 2: Energy Based Corner-to-Corner Contact Algorithm by Y.T. Feng and D.R.J. Owen	Paper 2: Evaporation-induced Self-assembly of Colloidal Particles into Two-dimensional Array during Drying by Hiroyuki Nishikawa, Shinya Maenosono, Yukio Yamaguchi, and Tatsuya Okubo
Paper 3: Discrete Element Modeling Based on Mathematical Morphology by Mark A. Hopkins	Paper 3: Effects of Particle Shape and Size Distribution on Stemming Performance in Blasting by Stephen H. Chung and Graham G. W. Mustoe
Paper 4: Procedure to Detect the Contact of Three-dimensional Blocks using Penetration Edges Method by Cheng Yung-ming, Chen Wensheng, and Ge Xiurun	Paper 4: Discrete Element Method for Sand-Structure Interaction by Morched Zeghal, Tuncer B. Edil, and Michael E. Plesha

Break: 2:55 - 3:15

Parallel Paper Session 3: Monday, Sept. 23, 2002, 3:15 - 5:20

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Experimental Validation**

Session Title: **Fundamental Investigations and Applications: Powders, Soils, and Rock**

Session Chair: Graham Mustoe

Session Chair: Masami Nakagawa

Paper 1: Three-Dimensional Validation of DEM Using a Laboratory Ball Mill by Andrew McBride, Indresan Govender, Malcolm Powell, and Victor Balden	Paper 1: The Use of Static Discrete Element Method to Simulate Biaxial Compression Test by Erfan G. Nezami and Youssef M. A. Hashash
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Paper 2: Inverse Analysis of Stress Developed in a Granular Assemblage Under Trap-door Conditions and Its Validation Using the Discrete Element Method by Takashi Murakami, Akira Murakami, Muneo Hori, and Hide Sakaguchi	Paper 2: Rough-surface Model and Its Application to DEM Simulation of Compression Test of Particles by Katsuaki Odagi, Toshitsugu Tanaka, and Kenji Yamane
Paper 3: 3-D DEM Validation using Steel Balls with Regular Packing Arrangements by C. O'Sullivan, J.D. Bray, and M.F. Riemer	Paper 3: 3D DEM Simulations of Powder Compaction by Y. Sheng, C. J. Lawrence, B. J. Briscoe, and C. Thornton
Paper 4: An Experimental and Theoretical Study of Ball-Wall Impact for DEM Modeling of Tumbling Mills by R. S. Sarracino, H-J. Dong, and M. H. Moys	Paper 4: PFC Model of Wedge Penetration into Oil Sands by Dwayne D. Tannant and Caigen Wang
Paper 5: Experimental Examination of the Arching Mechanism on the Micro Level by Samuel G. Paikowsky and Hsienjen S. Tien	Paper 5: Thin Rock Support Liners Modeled with Particle Flow Code by Dwayne D. Tannant and Caigen Wang

Tuesday, September 24, 2002

Continental Breakfast: 7:00 - 8:00

South Ballroom

Keynote Address 3: 8:00 - 9:00

South Ballroom

Speaker: **D.R.J. Owen**

Paper Title: **Discrete/Finite Element Modelling of Industrial Applications with Multi-fracturing and Particulate Phenomena**

Keynote Address 4: 9:00 - 10:00

South Ballroom

Speaker: **Ante Munjiza**

Paper Title: **Computational Challenge of Large Scale Discontinua Analysis**

Break: 10:00 - 10:20

Parallel Paper Session 4: Tuesday, Sept. 24, 2002, 10:20 - 12:00

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Large-Scale and Industrial Applications**

Session Title: **Particle Modeling Methods: Simulation Environments**

Session Chair: Toshitsugu Tanaka

Session Chair: Bruce Trent

Paper 1: Applications of DEM to Petroleum Exploration and Production Problems by H. H. Hardy, A. Malthe-Sorensen, T. Walmann, J. Feder, T. Jossang, and Geri Wagner	Paper 1: Discrete Element Modeling for the Development of a Real-Time Soil Model in a Virtual Reality Environment by Youssef M. A. Hashash and Jamshid Ghaboussi
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Paper 2: Using DEM to Model Arctic Sea Ice by Mark A. Hopkins	Paper 2: Utilization of Java and Database Technology in the Development of a Combined Discrete and Finite Element Multibody Dynamics Simulator by Petros I. Komodromos and John R. Williams
Paper 3: Bulk Material Belt-Conveyor Transfer Point Design for Material Flow, Application of DEM by Grzegorz Dewicki and Graham G. W. Mustoe	Paper 3: A Java-based Graphical User Interface for a 2-D Discrete Element Program by S. Masala, D. Chan, H. Lu, and R. Chalaturnyk
Paper 4: Mixing and Segregation of Particles in Rotating Drums using the Discrete Element Method by B. K. Mishra, T. N. Patra, and C.V.R. Murty	

Lunch Break: 12:00 - 1:30

Parallel Paper Session 5: Tuesday, Sept. 24, 2002, 1:30 - 3:10

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Coupled Modeling Methods: Fluid and DEM**

Session Title: **Fundamental Investigations and Applications: Granular Mechanics**

Session Chair: Mike Bruno

Session Chair: Dale Preece

Paper 1: Numerical Simulation of Granular Particles Moving in Fluid Flow by Siwa Tiphavonnukul and Dave Chan	Paper 1: Homogenization for Particle Assemblies by Gian Antonio D'Addetta, Ekkehard Ramm, Stefan Diebels, and Wolfgang Ehlers
Paper 2: Simulation of Flow of Cohesive Powder in a Gas-fluidised Bed by a Combined Continuum and Discrete Model by Bao H. Xu, Richard A. Williams, and Ai-Bing Yu	Paper 2: Regimes of Granular Shear Flows by Hayley H. Shen
Paper 3: Micro-mechanical Simulations of Water Flow Through Granular Soils by Mourad Zeghal, Usama El Shamy, Ricardo Dobry, Jacob Fish, Mark Shephard, and Tarek Abdoun	Paper 3: Effects of Particle Interaction History in Dense and Slow Granular Flows by Duan Z. Zhang
Paper 4: A New Numerical Model for Stokes Flow and Permeability Estimation by Xin-She Yang and B. Zhou	

Break: 3:10 - 3:30

Parallel Paper Session 6: Tuesday, Sept. 24, 2002, 3:30 - 4:45

Room 1: New Mexico Room

Room 1: New Mexico Room

Session Title: **Particle Modeling Methods: Model Generation**

Session Title: **Fundamental Investigations and Applications: Rock**

Session Chair: Colin Thornton

Session Chair: Stephen Chung

Paper 1: The Role of Particle Packing in Modeling Rock Mechanical Behavior using Discrete Elements by David Boutt and Brian McPherson	Paper 1: Modeling Rock Failure Around a Circular Opening by Ahmad Ali Fakhimi and Joseph F. Labuz
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Paper 2: An Advancing Front Packing of Polygons, Ellipses and Sphere by Y.T. Feng, K. Han, and D.R.J. Owen	Paper 2: Discrete Element Analysis of an Underground Opening in Blocky Rock: An Investigation of the Differences Between UDEC and DDA Results by Mary M. MacLaughlin and Kathryn K. Clapp
Paper 3: Formation of Packing Structures in Discrete Element Modeling with Disks by Scott Johnson and John Williams	Paper 3: DEM Study of Wave Propagation in Weak Sandstone by Jon Olson, R. Narayanasamy, Jon Holder, Alan Rauch, and B. Comacho

Poster Session: 5:30 - 7:00 in La Terraza

Dinner Banquet: 7:00 - 9:00 in La Terraza

Wednesday, September 25, 2002

Continental Breakfast: 7:00 - 8:00

New Mexico Room

Keynote Address 5: 8:00 - 9:00

New Mexico Room

Speaker: **Ai-Bing Yu**

Paper Title: **DEM – An Effective Method for Particle Scale Research of Particulate Matter**

Keynote Address 6: 9:00 - 10:00

New Mexico Room

Speaker: **Paul Cleary**

Paper Title: **Large-Scale DEM Applications**

Break: 10:00 - 10:20

Parallel Paper Session 7: Wednesday, Sept. 25, 2002, 10:20 - 12:00

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Large-scale and Industrial Applications**

Session Title: **Coupled Modeling Methods: Fluid and DEM**

Session Chair: Mathew Kuhn

Session Chair: Richard Jensen

Paper 1: Application of DEM to Simulate Gravity Flow of Bulk Solid Materials in Mines by H. Nazeri and G.G.W. Mustoe	Paper 1: A Coupled DEM-LB Model for the Simulation of Particle-Fluid Systems by Benjamin K. Cook, David R. Noble, and John R. Williams
Paper 2: Two- and Three-dimensional Simulation of Ball and Rock Charge Motion in Large Tumbling Mills by R. K. Rajamani, B. K. Mishra, A. Joshi, and J. Park	Paper 2: DEM Simulation of 2-D Fluidized Bed using Similarity Model by Toshihiro Kawaguchi, Satoshi Kajiyama, Toshitsugu Tanaka, and Yutaka Tsuji

Paper 3: Three-Dimensional DEM Simulation of Conveying Granular Materials by Horizontal Screw by Yoshiyuki Shimizu	Paper 3: 3D DEM Simulations of Gas-Solid Fluidised Beds by Colin Thornton and David Kafui
	Paper 4: Liquefaction Analysis of River Dike with Discrete Element Method by Hiroshi Mori, Yoshimi Ogawa, and Guoqiang Cao

Lunch Break: 12:00 - 1:30

Parallel Paper Session 8: Wednesday, Sept. 25, 2002, 1:30 - 3:10

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Coupled Modeling Methods: Solid Continuum and DEM**
 Session Chair: Dale Preece

Session Title: **Particle Modeling Methods: Theory and Algorithms**
 Session Chair: Yoshiyuki Shimizu

Paper 1: A Computationally Efficient Beam Element for FEM/DEM Simulations of Structural Failure and Collapse by T. Bangash and A. Munjiza	Paper 1: A Torus Primitive for Particle Shapes with the Discrete Element Method by Matthew R. Kuhn
Paper 2: On the Simulation of Deformable Bodies Using Combined Discrete and Finite Element Methods by Petros I. Komodromos and John R. Williams	Paper 2: Hydrostatic Boundaries in Discrete Element Methods by Tang-Tat Ng
Paper 3: Discrete Element Method (DEM) for Modeling Solid and Particulate Media by Federico A. Tavarez, Michael E. Plesha, and Lawrence C. Bank	Paper 3: Discrete-Finite Element Modelling of Pharmaceutical Powder Compaction: A Two-Stage Contact Detection Algorithm for Non-Spherical Particles by X. S. Yang, R. W. Lewis, D. T. Gethin, R. S. Ransing, and R. C. Rowe
Paper 4: Numerical Model for the Implementation of Discontinuous Deformation Analysis in Finite Element Mesh by M. Reza Salami and Farshad Amini	

Break: 3:10 - 3:30

Parallel Paper Session 9: Wednesday, Sept. 25, 2002, 3:30 - 4:20

Room 1: New Mexico Room

Room 2: Santa Fe Room

Session Title: **Fundamental Investigations and Applications: Soils and Rock**
 Session Chair: Tang-Tat (Percy) Ng

Session Title: **Particle Modeling Methods: Model Generation**
 Session Chair: Raj Rajamani

Paper 1: A Bonded-Disk Model for Rock: Relating Microproperties and Macroproperties by David Potyondy	Paper 1: Initial Packing in Discrete Element Modeling by Hide Sakaguchi and Akira Murakami
Paper 2: The Modelling of Soil Plasticity by Y.P. Cheng, M.D. Bolton, and Y. Nakata	Paper 2: Use of Digital Images to Enhance Discrete Element Modeling by Morched Zeghal and Mark Lowery