

**U.S. National Committee for Rock Mechanics
Rock Mechanics Award Recipients**

2000

Applied Research

Bezalel C. Haimson and Insun Song, *“Borehole Breakouts in Berea Sandstone: Two Porosity-Dependent Distinct Shapes and Mechanisms of Formation”*

Basic Research

Leonid Germanovich, *“Thermal Spalling of Rock”*

Case History (Group award for 3 papers)

Zissis A. Moschovidis, Ronald P. Steiger, Xiaowei Weng, Matt Frankl, Ahmed Abou-Sayed, Carole Fleming, Stephen L. Wolhart, Buddy McDaniel, Allen Sinor, Steinar Ottesen, Terry Hebert, Christopher A. Wright, Norman R. Warpinski, Reid Beecher, John Dudley, Richard J. Zinno, and Oktay Akhmedov, *“The Mounds Drill Cuttings Injection Field Experiment”*

Norman R. Warpinski, Paul T. Branagan, Kenneth D. Mahrer, Stephen L. Wolhart, and Zissis A. Moschovidis, *“Microseismic Monitoring of the Mounds Drill Cuttings Injection Tests”*

Larry G. Griffin, Christopher A. Wright, Eric J. Davis, Leen Weijers, and Zissis A. Moschovidis, *“Tiltmeter Mapping to Monitor Drill Cuttings Disposal”*

M.S. Thesis Award

Thomas Richard (University of Minnesota, 1999) *“Determination of Rock Strength from Cutting Tests”*

Neville G.W. Cook Ph.D. Award

Seiji Nakagawa (University of California at Berkeley, 1998) *“Acoustic Resonance Characteristics of Rock and Concrete Containing Fractures”*

1999

Applied Research Award

Frank D. Hansen and Ernest H. Ahrens, *“Large-Scale Dynamic Compaction of Natural Salt;”* **Nancy S. Brodsky, Frank D. Hansen, and Tom W. Pfeifle**, *“Properties of Dynamically Compacted WIPP Salt;”* and **Gary D. Callahan, Marc C. Loken, L. Diane Hurtado, and Frank D. Hansen**, *“Evaluation of Constitutive Models for Crushed Salt”*

Basic Research Award

Alexander H-D. Cheng, “(1) *Material Coefficients of Anisotropic Poroelasticity*,” and (2) “*On Generalized Plane Strain Poroelasticity*,” *Department of Civil and Environmental Engineering, University of Delaware*

Dr. Neville G.W. Cook Award for the Outstanding Doctoral Dissertation

Ilya Berchenko, “*Thermal Loading of a Saturated Rock Mass: Field Experiment and Modeling using Thermo-poroelastic Singular Solutions*,” *submitted to the Department of Civil Engineering, University of Minnesota*

1998

Case History Award

Francois E. Heuze (LLNL), Robert P. Swift (LANL), Leslie R. Hill (SNL), and William H. Barrett (SNL), “*Behavior of a Steel Liner-and-Bolts System Under Very High Thermal and Mechancial Loading*”

Dr. N.G.W. Cook Award for the Outstanding Doctoral Dissertation

Xiaolin Wu, “*Theoretical Analysis of Bump and Airblast Events Associated with Coal Mining Under Strong Roofs*,” *Department of Mining and Minerals Engineering, Virginia Polytechnic Institute and State University*

1997

M.S. Thesis Award

José Ignacio Adachi, “*Frictional Contact in Rock Cutting with Blunt Tools*,” *Department of Civil Engineering, University of Minnesota*

Ph.D. Thesis Award

Roberto S. Carbonell, “*Self-Similar Solution of a Fluid-Driven Fracture*” *Department of Civil Engineering, University of Minnesota*

1996

Applied Research Award

Deno M. Pappas and Christopher Mark, “*R1 9458 — Behavior of Simulated Longwall Gob Material*,” *U.S. Bureau of Mines, Pittsburgh, Pennsylvania*

M.S. Thesis Award

Leo J. Gilbride, “*Blast-Induced Rock Movement Modelling for Bench Blasting in Nevada Open-pit Mines*,” *University of Nevada, Reno*

Ph.D. Thesis Award

Lizheng Cui, "*Poroelasticity with Application to Rock Mechanics*," University of Delaware

1995

M.S. Thesis Award

Khay Kok Lee, ""

Ph.D. Thesis Award

Ruben Alberto Mazariegos Alfaro, "*Mechanical Modeling of the Growth of Salt Structures*," Texas A&M University

1994

Applied Research Award

Moo Y. Lee and Bezalel C. Haimson, "Laboratory Study of Borehole Breakouts in Lac du Bonnet Granite: A Case of Extensile Failure Mechanism," Int. J. Rock Mech. Min. Sci., 1993

Basic Research Award

Emmanuel Detournay and Alexander Cheng, "Plane Strain Analysis of a Stationary Hydraulic Fracture in a Poroelastic Medium," Int. J. Solids Structures, 1991

Case Histories Award

J. David Rogers, "Reassessment of the St. Francis Dam Failure," Special Publication No.4, Ass. Eng. Geologists

1993

Applied Research Award

Chengho Lee, ITASCA Consulting Group, Inc., and **Raymond L. Sterling**, University of Minnesota, "Identifying probable failure modes for underground openings using a neural network," Int. J. Rock Mech, vol 29

Basic Research Award

Priscilla P. Nelson, University of Texas at Austin, and **Steven Glaser**, National Institute of Standards and Technology, "Acoustic emissions produced by discrete fracture in rock, Part 1 - Source location and orientation effects" and "Acoustic emissions produced by discrete fracture in rock, Part 2 - Kinematics of crack growth during controlled Mode I and Mode II loading of rock," Int. J. Rock Mech, vol 29

Case Histories Award

Lawrence W. Teufel, Sandia National Laboratories, **Douglas W. Rhett**, Phillips Petroleum Company, and **Helen E. Farrell**, Phillips Petroleum Co., "Effect of reservoir depletion and pore pressure drawdown on *in situ* stress and deformation in the Ekofisk Field, North Sea," Proc 32nd US Rock Mech Symp

M.S. Thesis Award

Maria A. Vieira, "Numerical Model for the Study of Deformable, Naturally Fractured Reservoirs"

Ph.D. Thesis Award

Kurt T. Nihei, University of California, Berkeley, "Micromechanics of seismic wave propagation in granular rocks"

1992

Applied Research Award

Steven L. Crouch, Professor and Head, Department of Civil and Mineral Engineering, University of Minnesota, Minneapolis, and **Mark G. Mack**, Senior Development Engineer, Dowell Schlumberger Inc., "Mining Applications of an Elastodynamics Boundary Element Method"

Case Histories Award

Gregg A. Scott, Civil Engineer/Principal Designer, U.S. Bureau of Reclamation, "Deformation of Rock Foundations Under Dams"

M.S. Thesis Award

James M. Bridell, Department of Civil and Mineral Engineering, University of Minnesota, Minneapolis, "Reducing Frictional Constraint in Compression Testing Through Lubrication"

Ph.D. Thesis Award

John C. Stormont, Senior Member of Technical Staff, Sandia National Laboratories, "Gas Permeability Changes in Rock Salt During Deformation"

1991

Applied Research Award

Thomas J. Boone, Esso Resources Canada Ltd., **Anthony R. Ingraffea**, School of Civil and Environmental Engineering, Cornell University, and **Jean-Claude Roegiers**, School of Petroleum and Geological Engineering, University of Oklahoma, Norman, "Simulation of Hydraulic Fracture Propagation in Poroelastic Rock with Application to Stress Measurement Techniques"

Basic Research Award

Neville G.W. Cook, Department of Materials Science and Mineral Engineering, University of California, Berkeley, **Larry R. Myer**, Staff Scientist, Earth Sciences Division, Lawrence Berkeley Laboratory, and **Laura Pyrak-Nolte**, Visiting Assistant Professor, Civil Engineering Building, Purdue University, "Transmission of Seismic Waves Across Single Natural Fractures"

Case Histories Award

Steven Jones, Cyprus Plateau Mining Corporation, and **Stephen Signer**, Spokane Research Center, U.S. Bureau of Mines, "Case Study on the Use of Grouted Support in a Two-Entry Gate Road"

Ph.D. Thesis Award

Thomas J. Boone, Esso Resources Canada Ltd., "Simulation and Visualization of Hydraulic Fracture Propagation in Poroelastic Rock"

Ph.D. Thesis Award

Russell T. Ewy, Exxon Production and Research Company, "Deformation and Fracture Around Cylindrical Openings in Rock"

1990

Applied Research Award

Michael R. Wells, Drilling, Mechanics, and Hydraulics, Amoco Production and Research Company, Tulsa Oklahoma. "*Dynamics of Rock Chip Removal by Turbulent Jetting*," published in SPE Drilling Engineering Journal, June 1989

Basic Research Award

William L. Power, Terry E. Tullis, and John D. Weeks, Brown University, Providence, Rhode Island. "*Roughness and Wear During Brittle Faulting*," published in the Journal of Geophys. Research, vol 93, 1988

Case Histories Award

Ronald P. Steiger and **Peter K. Leung**, Production Operation Division, Drilling, Fluid, and Stimulation Section, Exxon Production Research, Houston, Texas. "*Quantitative Determination of the Mechanical Properties of Shales*," published in the Proceedings of the 63rd Annual Technical Conference and Exhibition of the SPE, Houston, October 1988

Ph.D. Thesis Award

Colleen A. Barton, Post-doctoral student, Department of Geophysics, Stanford University, Stanford, California. "*Development of In-Situ Stress Measurement Techniques for Deep Drillholes*"

USNC/RM Awards (prior to 1990)

		<u>Student</u>
1969		None?
1970	Daemen, J.J.K.	"The Effect of Protective Pillars on the Deformation of Mine Shafts" (U. Minn.)
1971	Cornet, F.	"The Influence of the Pore Fluid on the Mechanical Behavior of Rock" (U. Minn.)
1972	Swolfes, H.J.	"Chemical Effects of Pore Fluids on Rock Properties" (Texas A&M)
1973	Schatz, J.F., (& G. Simons)	"Method of Simultaneous Measurement of Radioactive and Lattice Thermal Conductivity" & "Thermal Conductivity of Earth Materials at High Temperatures" (MIT)
1974	Agapito, J.F.T.	"Rock Mechanics Applications to the Design of Oil Shale Pillars," Mng. Engrg., May 1974 (1973 Thesis) Colo. Mns.
1975	Barbor, D.	"A Photoelastic Study of the Effects of Surface Geometry on Fault Movements" (Texas A&M)
1976	Board, M.	"Mine Planning to Control Rockbursts in Cut & Fill Excavations," 16th Symp., (U. Minn)
1976	Kalkani, E.	"The Rock Slope Stability Problem and the Application of 2-D F.E.A. to Rock Slope Stability and Comparison with Actual Failure," Ph.D. (Purdue)
1977	Korbin, G.	"A Model Study of Spilling Reinforcement in Underground Openings," Ph.D. & Corp. Eng. 4/75 (UC Berkeley)
1978	Couples, G.	"Stress & Shear Fracture (Fault) Patterns Resulting from a Suite of Complicated Boundary Conditions with Applications to the Wind River Mountains," Pure & Appl. GP, V. 115, 1977 (MS)

1978	Sindaram, P.N.	"Water Pressure and Resistivity Changes During Stick-Slip and Stable Sliding in Direct Shear of Rock Surfaces," Ph.D.
1978	Ingraffea, A.R.	"An Analysis of Discrete Fracture Propagation in Rock Loaded in Compression," 18th Symp., Ph.D.
1979	Teufel, L.	"Effect of Displacement Rate on the Real Area of Contact and Temperatures Generated During the Sliding of Tennessee Sandstone," Pure & Appl. Geophysics, V. 116, N. 4/5, 1978 (Texas A&M)
1980		?
1981		?
1982		?
1983	Stevens, G. (& B. Voight)	"Hydraulic Fracturing Theory for Conditions of Thermal Stress" (Penn State)
1984	de Lemos, Jose A.S.V.	"A Hybrid Distinct Element--Boundary Element Computational Model for the Half-Plane" (U. Minn)
1985		None
1986	Ewart, Jr., J.A.	"Elastic Models of Krafla Volcano, North Iceland: 1976-1982" (Penn State)
1987	Piggott, A.R.	"A Numerical Procedure for the Analysis of Steady State Fluid Flow in Systems of Finite Discontinuities" (U. Toronto)
1988		None?
1989		None?

Applied Research

1969	Healy, J.W., W.W. Ruben, D.T. Griggs, C.B. Raleigh,	"Denver Earthquakes," Science
1970	Kruse, G.H., K.L. Zerneck, J.B. Scott, W.S. Johnson, J.S. Nelson,	"Approach to Classifying Rock for Tunnel Design," 11th Symp. R.M.

1971	Wallace, G.B., E.J. Slebir, F.A. Anderson, "Foundation Testing for Auburn Dam," 11th Symp. R.M.
1972	Blake, W. "Rock Burst Mechanics," Qtly. Colo. Sch. Mines, V.6, No. 1, Jan. 1972
1973	Thirumalai, K., R.L. Fisher, "Development and Potentials of Moire Methods of Strain Analysis for Rock Testing"
1974	Raleigh, C.B., J.H. Healy, J.D. Bancroft, "Faulting and Crustal Stresses at Rangely, Colo.," AGU Monograph 16, 1972
1975	Londe, Pierre "Analysis of the Stability of Rock Slopes," Qtly. J1. Eng. Geol., V. 6, No. 1, 1973
1976	None
1977	None
1978	Banks, D.C., W.E. Strohm, Jr., R.J. Sutton, M. De Angelo, "Engineering Analyses of Slides and Strength Properties of Clay Shales Along the Gaillard Cut," WES Tech Rept. W-70-9, 6/75.
1979	Zavodni, Z. "Slope Failure Kinematics," 19th Symp., 1978
1980	Jones, Jr., F.O, W.W. Owens, "A Laboratory Study of Low Permeability Gas Sands," Proc. 5 PE 1979 Symp. on Low Permeability Reservoirs.
1981	?
1982	?
1983	Klaus, W.J., M. Baudendistel, "A Compromise Approach to Tunnel Design," Proc of the 22nd U.S. Symp on R.M., 1981
1983	Swift, R.P., A.S. Kusubov, "Multiple Fracturing of Boreholes by Using Tailored-Pulse Loading," J. of the Soc. of Petroelum Engrg., December 1982.
1984	None
1985	Teufel, L.W., C.M. Hart, A.R. Sattler, J.A. Clark, "Determination of

- Hydraulic Fracture Azimuth by Geophysical, Geological, and Oriented-Core Methods at the Multiwell Experiment Site, Rifle, Colo," Proc of the 59th Annual Tech Conf and Exhibition, Houston, 1984
- 1985 Teufel, L.W. "Prediction of Hydraulic Fracture Azimuth from Anelastic Strain Recovery Measurements of Oriented Core," Proc of the 23rd U.S. Symp on R.M., pp. 238-246, 1982
- 1986 Pariseau, W.G., E.L. Corp., M.E. Poad, "Recent Experience in Calibration of Finite Element Models by Back Analysis of Underground Hard Rock Mine Data," Proc Int'l Symp on Large Scale Underground Mining, Lulea, pp. 175-182, 1985
- 1987 Delaney, P.T., D.D. Pollard, J.I. Ziony, E.H. McKee, "Field Relations Between Dikes and Joints: Emplacement Processes and Paleostress Analysis," J. Geophys Res, V. 91, No. B5, pp. 4290-4938, 1986
- 1988 None?
- 1989 Morita, N., D.C. Whitfill, O. Nygaard, A. Bale, "A Quick Method to Determine Subsidence, Reservoir, Compaction, and In Situ Stress Induced by Reservoir Depletion," publication ?

Basic Research

- 1969 Friedman, M. "X-Ray Analysis of Residual Elastic Strain in Quartzose Rocks," 10th Symp. R.M.
- 1970 Haimson, B., C. Fairhurst, "In-Situ Stress Determination at Great Depth by Means of Hydraulic Fracturing," 11th Symp. R.M.
- 1971 John, K.W. "Civil Engineering Approach to Evaluate Strength and Deformability of Regularly Jointed Rock," 11th Symp. R.M.
- 1972 Martin, R.J. "Time Dependent Crack Growth in Quartz and Its Application in the Creep of Rocks," JI. Geop. Res. 77, pp. 1406-19, 1972

1973	Pariseau, W.K.	"Plasticity Theory for Anisotropic Rocks and Soils," 10th Symp. R.M.
1974		None
1975	Brace, W.F., H.R. Riatt, A.D. Black,	"Friction and Deformation of Jointed Quartz Diorite," 3rd Int. Cong., 1974
1976	Barton, N., R. Lien, J. Lunde,	"Engineering Classification of Rock Masses for the Design of Tunnel Support," Rock Mech., V. 6, N-4, 12/74.
1977	Rudnicki, J.W., J.R. Rice,	"Conditions for the Localization of Deformation in Pressure-Sensitive Dilatant Materials," JI. Mech. & Phys. of Solids, V. 23, 1975
1978	Pratt, H.R., H.S. Swolfs, A.D. Black, W.F. Brace, J.W. Handin,	"Elastic and Transport Properties of an In Situ Jointed Granite," Int. JI. R.M. & Mng. Sci., F. 14, P.35-45, 1977
1979	Gangi, A.F.	"Variation of Whole and Fractured Porous Rock Permeability with Confining Pressure," Int. JI. Mng. Sci. & Rock Mech., V. 15, No. 5, 1978
1980	Brady, B.H.G., J.W. Bray,	"Boundary Element Method for Determing Stresses and Displacements Around Long Openings in a Triaxial Stress Field," and "Plastic Analysis of Tabular Orebody Extraction Assuming Plain Strain," Intern. JI. Rock Mech. & Mng. Sci., V. 15, 1978
1981		?
1982		?
1983	Palciauskas, V.V., P.A. Domenico,	"Characterization of Drained and Undrained Response of Thermally Loaded Repository Rocks," Water Resources Res., April 1982
1984	Long, J.C.S., J.S. Remer, C.R. Wilson, and P.A. Witherspoon,	"Porous Media Equivalent for Networks of Discontinuous Fractures," Water Resource Res., V. 18, No. 3, Pages. 645-658
1984	Shi, G.-H., R. E. Goodman,	"Underground Support Design Using Block

Theory to Determine Keyblock Bolting Requirements," Proc. of Symp. on R.M. ISRM South African Nat'l Group, 1983

1985 Dieterich, J.H. "Constitutive Properties of Faults with Simulated Gouge," Mechanical Behavior of Crustal Rocks, Geophysical Monograph 24, p. 103, 1981

1986 Wong, T.-F. "Shear Fracture Energy of Westerly Granite from Post-Failure Behavior," J. of Geophys. Res., V. 87, No. B2, pp. 990-1000, 1982

1987 Costin, L.S. "Damage Mechanics in the Post-Failure Regime," Mechanics of Materials, V. 4, pp. 149-160, 1985

1988 Kemeny, J., N.G.W. Cook "Effective Moduli, Non-linear Deformation and Strength of a Cracked Elastic Solid," Int'l J. Rock Mech. Min. Sci. & Geomech. Abstr., V. 23, No. 2, pp. 107-118, 1986

1989 Brown, Stephen R. "Fluid Flow Through Rock Joints——The Effect of Surface Roughness," publication?

Case Histories

1981 ?

1982 ?

1983 None

1984 Voight, B., R.J. Janda, H. Glicken, P.M. Dgoulass, "Nature and Mechanics of the Mt. St. Helens Rockslide-Avalanche of 18 May 1980," Geotechnique, V. 33, pgs. 243-273, 1983

1985 Pariseau, W.G., M.E. Fowler, J.C. Johnson, M. Poad, E.L. Corp, "Geomechanics of the Carr Fork Mine Test Stope," Geomechanics Applications in Underground Hardrock Mining, pp. 3-38, 1984

1986 Heuze, F.E. "Geomechanics in Hard Rock Mining: Lessons from Two Case Histories," Int'l J. of Mining and Geol. Engrg., V. 1, pp. 3-25.

- 1987 Fernandez, G., A.J. Hendron, "Interpretation of a Long-Term In Situ Borehole Test in a Deep Salt Formation," Bulletin of the Association of Engineering Geologists, V. 21, No. 1, pp. 23-38, 1984
- 1988 Nelson, P.P. "Performance Comparisons for Tunneling Projects in Weak Rock," Proc. of 28th Symp. on R.M., Tucson, pp. 32a-33b, 1987
- 1989 Voight, B. "Methods for Prediction of Volcanic Eruptions," publication ?

Special

- 1972 Mellor, M., I. Hawkes "Measurement of Tensile Strength by Diametral Compression of Discs and Annuli," Intern. JI. Engrg. Geol., V. 5, Oct. 1971; "Uniaxial Testing in Rock Mechanics Laboratories," ibid, V. 4, No. 3, July 1970
- 1977 Clark, G. Continuous and Outstanding Research in Rock Mechanics
- 1979 Hawkes, I. Continuous and Outstanding Research in Rock Mechanics
- 1981 ?
- 1983 Fairhurst, C. Distinguished and Successful Contributions Over 25 Years as a Scientist, Engineer, and Educator Significantly Advancing the Field of Rock Mechanics
- 1987 Brace, W.F. Distinguished and Successful Contributions Over 25 Years as a Scientist, Engineer, and Educator Significantly Advancing the Field of Rock Mechanics
- 1987 Obert, L.A. Long and Distinguished Service in the Field of Rock Mechanics