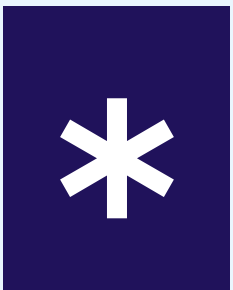
DYMAT Association

The John Rinehart Award

Award for outstanding effort and creative work in the science and technology of dynamic processes



DYMAT

History of the award

This award was established to recognize outstanding effort and creative work in the science and technology of dynamic processes in materials and related applications.

This encompasses the processes by which materials are welded, formed, compacted, and synthesized, as well as dynamic deformation, fracture, and the extreme shock loading effects.

The award is named after a true pioneer who witnessed and actively contributed to the field for over forty years. This award has been given every five years, at the occasion of the EXPLOMET conferences. The selection of the first two awards, announced in August 1990, was made by a committee composed of the EXPLOMET chairmen and Dr. J. S. Rinehart. In subsequent years, the awardees chaired the committee for future awards. A permanent committee is in such a way was established to select the nominees. In selecting the individuals, special attention has been given to the balance between fundamental science and technological implementation.

Since 2009, DYMAT is the Custodian of the Award. Every three years, a special jury, composed of the members of the DYMAT International Advisory Committee and members of the DYMAT Governing Board, vote and select two winners.

Dr. John Rinehart

Dr. Rinehart with the first recipients of the award.

John S. Rinehart has not only witnessed, but actively taken part in the development of the field of dynamic deformation.

He has dedicated his life to the study of stress waves in solids; the results of these investigations have been published in over 130 technical articles and three books, two of them co-authored by John Pearson. Behavior of Metals Under Impulsive Loads, Explosive Working of Metals and Stress Transients in Solids, have been the vade mecum of all scientists and engineers throughout the world working in the field.

The simple, no nonsense, yet fundamentally correct approach used by Dr. Rinehart combines the rigorousness of the physicist with the practicality of the engineer. His fifty-year career has been divided between government and university, and he has frequently served as a consultant to industry. He has occupied many positions of high responsibility throughout his career:

Director of Research and Development for the U. S. coast and Geodetic Survey, Director of the Mining Research Laboratory of the Colorado School of Mines, which he founded, Assistant Director of the Smithsonian Astrophysical Observatory, Head of the Mechanics Branch at the Naval Ordnance Test Station, China Lake, Professor of Mechanical Engineering at the University of Colorado. Dr. Rinehart was associated with Dr. E. J. Workman's Ordnance Research Group before this activity became a division of the New Mexico Institute of Mining and Technology in the early 1950s.

EXPLOMET 90

Andrey A. Deribas

Mechanics of continuous media

- Research Area: Physics of explosions, explosive hardening and welding, explosive compaction of powders and explosive synthesis
- He was the head of Laboratory of the Institute of Hydrodynamics in Novosibirsk
- Authored over 100 scientific papers and 25 inventions
- Head of the special Design office of high-rate hydrodynamics in Novosibirsk
- Notable awards: Lenin Prize for science, Prize of Council of Ministry of the U. S. S. R.

Mark L. Wilkins

Computer simulation of material behavior

- Joined LLNL in 1952, year it was established
- Pioneered the application of large computers to simulate material behavior.
- His numerical techniques are in use world-wide.
- Modeled the effects of micrometeorite impacts, space program.
- Lead the effort in developing a fundamental understanding of penetration mechanics, DARPA.
- Founded a new division in Physics Dept. at LLNL for experimental and theoretical research on the behavior of materials.
- He has published over 70 scientific papers on modeling and simulation of materials behavior.

EXPLOMET 95

Rolf Prümmer

Explosive compaction of powders

- Associated with several Fraunhofer Institutes and is a professor at the University of Karlsruhe.
- He completed his “Habilitationsschrift” entitled “Explosive Compaction of Powdered substances.
- He has worked on explosive welding, forming, cutting, hardening.
- He has more than 150 papers and has developed more than 20 patents.

Akira B. Sawaoka

Dynamic high-pressure research on materials

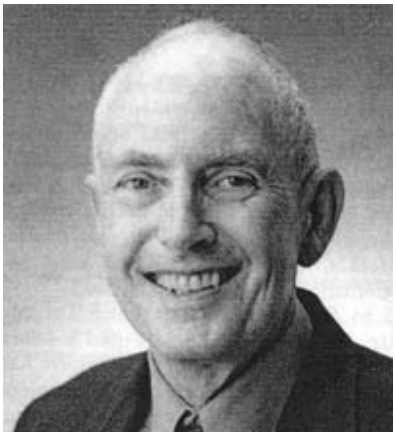
- Professor, Dean and Director of the Research Lab. Of Eng. Materials at the Tokyo Institute of Technology.
- President of the Japan Society of Microgravity Applications.
- Extensively worked on shock compaction and synthesis of hard materials such as SiC and BN, developed diamond compacts for rock drilling.
- Published more than 200 scientific papers and co-author of “Shock Compression Chemistry of Materials.

EXPLOMET 2000

Don Shockey

Dynamic fracture, fragmentation, shear bands

- Worked on supersonic crack propagation.
- Co-developed the NAG fracture concept of shock-wave-induced fracture.
- Leads a research effort in ballistic protection, advanced fractography, and aging system life extension.
- Published over 100 papers on deformation and fracture of materials under dynamic and static loads.
- Notable awards: Lenin Prize for science, Prize of Council of Ministry of the U. S. S. R.



Don Curran

Dynamic fracture

- Joined LLNL in 1952, year it was established
- Pioneered the application of large computers to simulate material behavior.
- His numerical techniques are in use world-wide.
- Modeled the effects of micrometeorite impacts, space program.
- Lead the effort in developing a fundamental understanding of penetration mechanics, DARPA.
- Founded a new division in Physics Dept. at LLNL for experimental and theoretical research on the behavior of materials.
- He has published over 70 scientific papers on modeling and simulation of materials behavior.

TMS 2007

Lawrence E. Murr

High-strain rate phenomena in materials

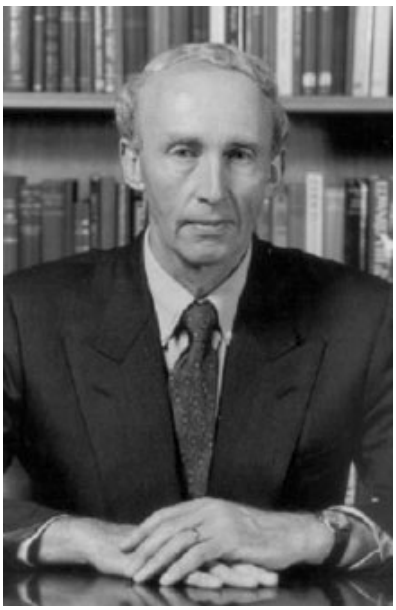
- Seminal contributions to shock compression.
- First experiments on dynamic compaction of high temperature superconductors.
- Elucidation of mechanisms of microstructural evolution in plastic deformation. – Co-founder and co-organizer of EXPLOMET conference series.
- Global leadership.

Yilong Bai

Impact dynamics, damage mechanics and multi-scale problems

- Professor at the Institute of Mechanics, Chinese Academy of Sciences (CAS).
- Chairman of the academic committee of the State Key Laboratory of Non-Linear Mechanics (NLM), CAS.
- Member of Chinese Academy of Science in 1991 and European Academy of Sciences in 2002.
- Published about 150 papers and two research books: Adiabatic Shear Localization, Pergamon Press (1992) and Ductile Fracture and Ductility, Academic Press (1987).

DYMAT 2009



John E. Field

John Field was born in September 1936. From 1955 to 1958 he attended University College, London obtaining a First Class Honours degree in Physics. In 1962 he graduated PhD in Physics at Cambridge under the supervision of the late Professor Philip Bowden. The title of his thesis was “High speed liquid impact and the deformation and fracture of brittle solids”. In 1962 he was elected an Owens Illinois Research Fellow. In 1964 he joined Magdalene College, Cambridge as a Research Fellow and College Lecturer in Physics. This was followed in 1966 by his appointment as University Demonstrator in Physics at the Cavendish Laboratory (Department of Physics), Cambridge. He rose in seniority in the department becoming a Lecturer in 1971, a Reader in 1990, and Professor (of Applied Physics) in 1994. He was a Deputy Head of the Department of Physics 1995-2003. He was awarded the Duddell Medal and Prize in 1990 by the Institute of Physics, the citation being for “Advances in Instrumentation”. He retired from his professorship in 2003, taking the title Emeritus Professor of Applied Physics. Two universities have bestowed honorary doctorates on him: Luleå (Sweden) in 1989 and Cranfield (UK) in 2003. The Royal Society of London elected him a Fellow in 1994 and the Royal Society of South Africa elected him an Honorary Fellow in 2002. He is a Visiting Professor at the University of Luleå, Sweden, the Ecole Polytechnique Federale Lausanne, Switzerland, and the National University of Singapore.

His research interests are wide. They include: strength properties of solids, fracture, impact, erosion (by both liquid and solid impact), reactivity of solids, explosive initiation, shock physics, laser damage, acoustics, and diamond physics. He has supervised 83 students who obtained PhD degrees, authored or co-authored over 420 papers, edited two books (on Diamond Physics), obtained two patents, and organised (or co-organised) a number of conferences on erosion phenomena, diamond physics, high speed photography, energetic materials, and high rate properties of materials.

Marc André Meyers

Marc André Meyers was raised in João Monlevade, Brazil, and Luxembourg. Both his father and grandfather were engineers (Aachen and Louvain, respectively). He is a graduate of the Federal University of Minas Gerais (mechanical engineering) and the University of Denver (MS and PhD). He has carried out research since 1972 on dynamic behavior of materials in the three principal areas: dynamic processing, dynamic failure, dynamic and shock response of materials.

Through a 35-year effort, he has attempted to unify the field of dynamic behavior of materials and significantly enhanced its visibility in the materials community. He started his professional career at the Military Institute of Engineering (Brazil) where he helped to establish one of the first laboratories for shock and explosive effects in Latin America; he worked at the South Dakota School of Mines and Technology; and at the New Mexico Institute of Mining and Technology, where he was the co-founder of the Center for Explosives Technology Research (Associate Director, 1983-1988), and was the co-founder (with L.E. Murr) and co-chair of the EXPLOMET conference series (1980, 1985, 1990, 1995, 2000). He served as Advisor to the Director (Dr. G. Mayer), Materials Science Division, US Army Research Office (1985-1987). In that capacity, he was actively engaged in stimulating and directing research in the dynamic behavior of materials. He is currently professor of Materials Science, University of California, San Diego, where he was Associate Director and Director of the NSF Institute for Mechanics and Materials (1992-1997). At the University of California, he has collaborated extensively with Lawrence Livermore National Laboratory scientists on laser, explosive, and gas gun shock effects.

A Fellow of ASM International, he is the recipient of the Humboldt Senior Scientist Award, the Structural Materials Division (TMS) Distinguished Scientist/Engineer and Distinguished Service awards, and the Lee Hsun Lecture Award from the Institute for Metal Research, China. He and his students and coworkers are the authors of approximately 320 research papers and three books (two of them translated into Chinese); and co-editors of seven books..

DYMAT 2012

Alain Molinari

Alain Molinari was raised in Lorraine, France, and graduated from the University of Strasbourg (MS) and the University of Metz (PhD). He is professor of solid mechanics at the University of Lorraine where he conducted his entire academic career and was jointly "professeur chargé de cours" at Ecole Polytechnique during 14 years. He spent five years abroad, mostly in the USA, where he was a visiting professor at Brown University, the California Institute of Technology, the University of California at San Diego, the San Diego State University, and the Johns Hopkins University. His research on high strain rate phenomena was initiated during a sabbatical leave at Brown University (Providence, USA) in 1981 where he was introduced to the fascinating problem of adiabatic shearing by Rod Clifton and the late Jacques Duffy. Since his return to France, he has been head of the group "dynamic loading and extreme conditions" of the Laboratory of Physics and Mechanics of Materials at the University of Lorraine at Metz for 30 years.

His research activity comprises the theoretical analysis of dynamic damage by strain localization and microvoiding, and phase transformation under impact loading. He brought forward new constitutive models for the quasistatic and dynamic response of metals. The multiscale approaches that he proposed for the modeling of the viscoplastic response of polycrystalline materials are used worldwide. Motivated by practical applications of his fundamental research in dynamic plasticity, he has developed a new modeling of high speed machining. His research interests include also porous mate-

rials, powder metallurgy, spark plasma sintering and nano-cutting. He obtained the "Grand Prix de la Recherche des Universit´es de Lorraine" (1981), was awarded the Clark B. Millikan distinguished visiting professorship at Caltech (California, 1996), was distinguished scholar and Gledden Senior Fellow at the University of Western Australia (1995 and 1997), has received the Spiru Haret Award of the Romania Academy of Sciences (jointly with Prof. C. Faciu in 2008) and was awarded a chair of excellence at the University Carlos III of Madrid (2009 and 2011). He has organized or co-organized several conferences on high speed machining and material instabilities, and is author and co-author of about 200 research papers and co-editor of one book.

DYMAT 2015

Carlo Albertini

Carlo Albertini born in Parma (Italy) where he studied Physics at the University of Parma. Since 1963 he was researcher at the Joint Research Centre (JRC) of the European Commission. He developed a precision impact testing laboratory based on the modification of the Hopkinson bar technique for the measurement of the mechanical properties at high strain rate of as-received and irradiated nuclear reactor materials. The laboratory consisted of unique uniaxial and biaxial hydro-pneumatic and Hopkinson bar devices including the largest Hopkinson bar in the world (5MN loading capacity, 1.5 m displacement, 35 m/s speed, 200 m length).

He was project leader of the JRC programme of reference impact testing on automotive materials and structures. He was the founder of Dynalab, a spin-off company of JRC, authorized by the European Commission, with the aim of JRC technology transfer in the field of precision impact testing to industrial and academic laboratories.

He was responsible of the creation and activation of material impact testing laboratories at: Arcelor (France), University of Trondheim (Norway), Impact Engineering Laboratory (Japan), Tianjin University (China), SUPSI (Switzerland), FIAT (Italy). His scientific activity is illustrated in more than hundred papers published in scientific Journals and in the proceedings of specialized international conferences. 17 European and world-wide patents had Albertini as co-inventor mainly showing his innovation capability in this field.

Ron Armstrong

Ron Armstrong is emeritus professor, University of Maryland, College Park, MD, USA, in the Department of Mechanical Engineering, Center for Energetic Concepts Development; see www.cecd.umd.edu. He was educated at Johns Hopkins University, Baltimore, MD, 1952-5, and Carnegie Institute of Technology, CarnegieMellon University, Pittsburgh, PA, 1955-8. Previous employment was at Westinghouse Research Laboratories, Monroeville, PA, and Brown University, Providence, RI.

Numerous visiting research positions have been with industrial and government laboratories in the United States and overseas. Principal research activities with students and colleagues have included: (1) studies of polycrystalline material strength properties, most notably with N.J. Petch, Leeds University and University of Strathclyde, UK; (2) microstructural aspects of fracture mechanics properties, with G.R. Irwin, U.S. Naval Research Laboratory and University of Maryland; (3) crystal perfection and initiation of detonation in energetic materials, with W.L. Elban, U.S. Naval Surface Warfare Center and Loyola University Maryland; and (4) development of constitutive relations for material dynamics calculations, with F.J. Zerilli, U.S. Naval Weapons Center, White Oak Laboratory and Indian Head Division, MD.papers and three books (two of them translated into Chinese); and co-editors of seven books..

DYMAT 2018

Gordon R. Johnson

Gordon Johnson is a Program Director at Southwest Research Institute (SwRI) in Minneapolis, MN, USA. He began his career at Honeywell and Alliant Techsystems in 1966, moved to Network Computing Services in 2001 where he was involved with the U.S. Army High Performance Computing Research Center at the University of Minnesota, and then joined SwRI in 2007. He received a BS (1964), MSCE (1966) and PhD (1974) in Civil Engineering and Structures from the University of Minnesota.

He began development of the EPIC (Elastic-Plastic Impact Computations) code in the 1970s and has been the principal developer of this code since then. EPIC is both a research and production code with applications for high-velocity impact and other intense impulsive loading conditions.

During the course of his career he has developed numerical algorithms for finite elements, meshless particles, contact and sliding, and automatic conversion of highly distorted elements into meshless particles (which combines the accuracy of finite elements for small distortions and the robustness of meshless particles for large distortions). He has also developed computational constitutive models for metals (Johnson-Cook), concrete (Holmquist-Johnson-Cook), ceramics (Johnson-Holmquist-Beissel), composites (Johnson-Beissel-Cunniff) and glass (Holmquist-Johnson). Some of these models are widely used in the computational community.

George T. (Rusty) Gray III

George T. (Rusty) GRAY III is a Laboratory Fellow and staff member in the dynamic properties and constitutive modelling team within the Materials Science Division of Los Alamos National Laboratory (LANL). He came to LANL following a three-year visiting scholar position at the Technical University of Hamburg-Harburg in Hamburg, Germany having received his PhD in Materials Science in 1981 from Carnegie-Mellon University.

As a staff member (1985-1987) and later team leader (1987-2003) in the Dynamic Materials Properties and Constitutive Modelling Section within the Structure / Property Relations Group (MST-8) at LANL, he has directed a research team working on investigations of the dynamic response of materials. He conducts fundamental, applied, and focused programmatic research on materials and structures, in particular in response to high-strain-rate and shock deformation.

His research is focused on experimental and modelling structure/property studies of defect generation, substructure evolution, mechanical behaviour, and dynamic damage-spallation of materials. These constitutive and damage models are utilized in engineering computer codes to support large-scale finite element modelling simulations of structures ranging from national defence (DOE, DoD, DARPA), industry (GM, Ford, Chrysler, and Bettis), foreign object damage, and manufacturing.

DYMAT 2021

K.T. Ramesh

K.T. Ramesh, the Alonzo G. Decker, Jr., Professor of Science and Engineering at Johns Hopkins, is a leading authority in the areas of impact physics and the failure of materials under extreme conditions. Ramesh is a professor in the Department of Mechanical Engineering, and also holds joint appointments in the Department of Earth and Planetary Sciences and the Department of Materials Science and Engineering. He is the founding director of the Hopkins Extreme Materials Institute (HEMI), which develops science and technology to protect people, structures and the planet. HEMI brings together experts from Johns Hopkins' Whiting School of Engineering, Krieger School of Arts and Sciences, and Applied Physics Laboratory, as well as scientists and engineers from the federal government, U.S. national laboratories, industry, and research institutions across the world.

Ramesh's current research focuses on the design of materials for extreme conditions, hypervelocity impact, the massive failure of rocks and ceramics, impact processes in planetary science, and impact biomechanics. As an example, his research group has developed a high-fidelity computer model of the human head and brain to understand how head impacts can cause brain injury. Other current projects include the use of laser shock experiments to improve the design of protection materials, the use of data science approaches in materials design, the development of a hypervelocity facility for defense and space applications, and the development of models for

the disruption or redirection of asteroids that could hit the Earth. He has written over 200 archival journal publications, and is the author of the book "Nanomaterials: Mechanics and Mechanisms."

Ramesh has received numerous research awards including the Murray Medal and the Lazan and Hetenyi awards, from the Society for Experimental Mechanics. He is a recipient of the Johns Hopkins University's William H. Huggins Award for Excellence in Teaching. Ramesh is a Fellow of the American Association for the Advancement of Science, the American Academy of Mechanics, the Society for Experimental Mechanics and the American Society of Mechanical Engineers. He served as president of the Society of Engineering Science, and has played leadership roles in other professional societies. He holds memberships in a number of scientific societies, and provides scientific advice to national and international advisory bodies.

Ramesh received his bachelor's degree in Mechanical Engineering from Bangalore University in India in 1982. He then studied at Brown University, where he received an ScM in Solid Mechanics in 1985, an ScM in Applied Mathematics in 1987, and a PhD in Solid Mechanics in 1988. Ramesh completed postdoctoral work in solid mechanics at the University of California, San Diego, before joining the Whiting School of Engineering faculty in 1988. He served as chair of the Department of Mechanical Engineering at Johns Hopkins from 1999 to 2002.