# 2004 Daniel Drucker Medal


*Presented To :*

**Frank A. McClintock**

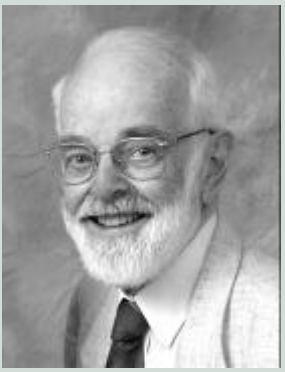
*In Recognition:*

For extraordinary accomplishments in furthering basic understanding of the process of fracture and fatigue in engineering materials, and for life long intellectual leadership in this field in both academe and professional practice.

*Presented At:*

2004 International Mechanical Engineering Congress and RD & D Expo
Hilton Anaheim
Anaheim, CA

ASME
SETTING THE STANDARD
1880 2005



## FRANK A. McCLINTOCK

*Conferral at the Drucker Symposium,*
*2004 International Mechanical Engineering*
*Congress and RD & D Expo*

**FRANK A. McCLINTOCK**, P.E., Ph.D., professor emeritus of mechanical engineering, Massachusetts Institute of Technology, Cambridge, *for extraordinary accomplishments in furthering basic understanding of the process of fracture and fatigue in engineering materials, and for life long intellectual leadership in this field in both academe and professional practice.*

Dr. McClintock has been contributing to the field of applied mechanics and mechanical engineering for more than half a century as a teacher, researcher and author.

McClintock joined the faculty of the Massachusetts Institute of Technology (MIT), Cambridge, after receiving his doctoral degree in 1949. His thesis was on fatigue of single and polycrystalline iron. Holding the rank of assistant professor (1949-55), associate professor (1955-59) and professor of mechanical engineering (1959-91), he mainly taught undergraduate and graduate subjects in the mechanical behavior of materials, in plasticity, and in deformation and stress in solids. He spent sabbatical semesters at Harvard University (Cambridge, Mass.) and Brown University (Providence, R.I.), in 1968 and 1969, respectively; and at the University of California at Berkeley in 1983. McClintock retired from MIT in 1991 and is now professor emeritus of mechanical engineering.

His prior experience includes United Aircraft (1943-46), first on engine cooling in the Research Division and later as one of eight engineers starting gas turbine design in the Pratt and Whitney Aircraft Division.

McClintock's research has centered on fracture, particularly where more or less plastic flow occurs. Recently, emphasis has been on relating the history of stress and strain in the immediate vicinity of the tip of a crack to the local phenomena which lead to fracture, such as hole growth, fracture of brittle phases, flow localization or, in more brittle materials, fracture statistics. Currently, he is developing slip line fracture mechanics to use in predicting ductile crack growth in large structures from tests on small specimens.

Among his numerous accomplishments, McClintock produced the first plastic and elastic-plastic solutions for cracks that he applied to understand fracture toughness, fatigue crack growth and issues related to stable crack growth; this was the beginning of plastic fracture mechanics. He gave the first analysis of ductile fracture as a process of nucleation, growth and coalescence of cavities around a crack tip; and provided the first analysis of stable crack growth. His recent work on the crash-worthiness of automotive and naval vessels has been relevant to the engineering practices of these industries.

McClintock co-authored the classic book, Mechanical Behavior of Materials (Addison-Wesley, 1966), which has and continues to play a central educational role in this field worldwide.

A member of the National Academy of Engineering, McClintock is also a member of the American Academy of Arts and Science and the American Society for Metals (ASM), and an honorary Fellow of the International Congress on Fracture.

His honors include ASME's Nadai Medal (1978), ASM's Howe Medal (1991) and the European Structural Integrity Society's Griffith Medal (1998).

McClintock received his bachelor's and master's degrees at MIT in 1943. He earned his doctoral degree at the California Institute of Technology, Pasadena, in 1949. He holds an honorary doctor of law degree (1981) from the University of Glasgow, U.K. He is a registered professional engineer in California.

# Daniel Drucker Medalists

## *Past Honorees*

1998 Daniel C. Drucker
1999 Ascher H. Shapiro
2000 Philip G. Hodge, Jr.
2001 Bruno A. Boley
2002 George J. Dvorak
2003 Leon M. Keer

The **DANIEL C. DRUCKER MEDAL**, established in 1997, is conferred in recognition of distinguished contributions to the field of applied mechanics and mechanical engineering through research, teaching and service to the community over a substantial period of time.