

Ingraffea Named Distinguished Member

BY Noel Pratt

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Anthony R. Ingraffea, Ph.D., P.E., Dist.M.ASCE, a pioneer and one of the world's most important researchers in computational and experimental fatigue and fracture mechanics, has been honored by ASCE with inclusion in its 2019 class of Distinguished Members for exemplary service to society and the profession of civil engineering.



Ingraffea

Ingraffea's contributions range from public service in rural Venezuela to cutting-edge developments in computational mechanics for civil, mechanical, and aerospace structures, while ever the consummate teacher and mentor. He was the developer of foundational finite element and boundary element methods of analysis for crack propagation. His group at Cornell University first forged the field of computational fracture mechanics by creating software based on these two methods that could be used to simulate incremental crack propagation in two-dimensional and three-dimensional structures.

He then applied his tools to improving methods for design in fracture-safe structures used in civil, aeronautical, aerospace, mechanical, and materials engineering. Generations of Ingraffea's software environments have been used by individuals and groups in academia and industry alike. In his early career with Grumman Aerospace, he contributed to the preliminary design of the Navy's F-14 and dynamic stress analysis and final design of NASA's Space Shuttle.

The philosophy Ingraffea holds to isn't unique to him, but is personally and fearlessly advanced – "Think globally and act locally." Beginning his career as a Peace Corps volunteer in the tropical forest of Bejuma, Venezuela, as County Engineer, he responded to all technical services for more than 40,000 people. He directed surveying, design, and construction of the farmer's market, tourist hotel, and cemetery, and helped develop the urban renewal program for a section of the state's capital city.

Ingraffea is the Dwight C. Baum Professor of Engineering Emeritus and Weiss Presidential Teaching Fellow in the School of Civil & Environmental Engineering at Cornell. Beginning in 1977 he authored or coauthored over 250 technical papers, many of them prestigiously awarded. After experience with some \$37 million in R&D projects from the likes of Shell, NASA Langley, Kodak, IBM, Schlumberger, and Boeing, he became a member of the first group of Presidential Young Investigators named by the NSF in 1984.

In 1990 he began directing NSF's Synthesis: A National Engineering Education Coalition, a federally funded collaboration of colleges and universities with the mission of transforming the education of young engineers. This groundbreaking work led to new courses, projects, and curricula, outreach to historically black schools, and national K-12 programs, earning the Almeida Award for his work with middle-school students in Chicago.

2011 brought another recognition, that of *TIME* magazine's "People Who Mattered," for escalating fracking to a national environmental issue. Other awards include the George R. Irwin Medal from ASTM, the Grumman Masters Fellowship, the 1999 Premiere Award for Educational Software, and the Aviation Safety Turning Goals into Reality Award from NASA.

Ingraffea earned his B.S. in aerospace engineering from the University of Notre Dame, his M.S. in civil engineering from Polytechnic Institute of New York, and his Ph.D. in civil engineering from the University of Colorado, Boulder.

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