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**International Council for Industrial and Applied Mathematics (ICIAM)**

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**Monday, September 15, 2014**

# 2015 ICIAM Lagrange Prize awarded to Andrew Majda

Philadelphia, PA— The International Council for Industrial and Applied Mathematics (ICIAM) is pleased to announce Andrew J. Majda of the Courant Institute at New York University as the recipient of the 2015 ICIAM Lagrange Prize in recognition of his ground breaking, original, fundamental and pioneering contributions to applied mathematics and, in particular, to wave front propagation and combustion, scattering theory, fluid dynamics and atmosphere climate science. His research, which has merged asymptotic and numerical methods, physical reasoning and modeling, and rigorous mathematical analysis, has had an enormous and long lasting impact on modern applied mathematics, science and engineering (geophysics, seismology, weather prediction, combustion, and more) and remains the state of the art today.

Andrew J. Majda is the Morse Professor of Arts and Sciences at the Courant Institute of New York University.

The Lagrange Prize was established to provide international recognition to individual mathematicians who have made an exceptional contribution to applied mathematics throughout their careers. It was created on the initiative of SMAI (Société de Mathématiques Appliquées et Industrielles), SEMA (Sociedad Española de Matematica Aplicada) and SIMAI (Società Italiana di Matematica Applicata e Industriale) and first awarded in 1999. Carrying a cash award of USD 5000, the Lagrange Prize is presently funded by the three member societies SMAI, SEMA and SIMAI.

Majda was born in East Chicago, Indiana on January 30, 1949. He received a B.S. degree from Purdue University in 1970 and a Ph.D. degree from Stanford University in 1973. He began his scientific career as a Courant Instructor at the Courant Institute from 1973-1975. Prior to returning to the Courant Institute in 1994, he held professorships at Princeton University (1984-1994), the University of California, Berkeley (1978-1984), and the University of California, Los Angeles (1976-1978). He is a member of the National Academy of Sciences and the American Academy of Arts and Science. His work has been honored by the National Academy of Science Prize in Applied Mathematics, the John von Neumann Prize of the Society of Industrial and Applied Mathematics, the Gibbs Prize of the American Mathematical Society and the Wiener Prize of the

American Mathematical Society and the Society of Industrial and Applied Mathematics. Some of the most fundamental contributions of Majda and his collaborators in the area of wavefront propagation are the identification and study of the absorbing boundary conditions for numerical computations of the wave equation in unbounded domains, which has had major impact in the field over the last 30 years; the existence and stability analysis of multi-dimensional shock waves, which is the only available complete and general result to date about multi-dimensional systems; a model for detonation, now named for him, which has served as an important testing ground for both theoretical and numerical studies of detonation waves; and the theory of turbulent combustion, which has led to a new understanding of the effect of the environment in reaction-diffusion-combustion phenomena.

Majda has worked extensively in the general theory of fluid dynamics, where, together with his collaborators, has made important and far-reaching contributions. Among them are the celebrated Beale-Kato-Majda theorem; a necessary and sufficient condition for the regularity of solutions to the 3-D Euler equations; an extensive analysis of the behavior of the advection and diffusion of a passive scalar by incompressible velocity fields whose statistical description involves a continuous range of excited scales; a mathematically rigorous equilibrium statistical theory for three-dimensional nearly parallel vortex filaments and the by-now-classical two-dimensional surface quasigeostrophic flow model which is used to predict the formation of sharp fronts between air masses in the atmosphere.

Majda has also made further revolutionary contributions to the development and analysis of mathematical models in atmosphere and ocean sciences. These include the multi-scale modeling and analysis of moist fluid dynamics in the atmosphere and, in particular, the tropics; the development of filtering methods for nonlinear chaotic systems; novel mathematical strategies for prediction and data assimilation in complex multi-scale systems, including new techniques for super-parametrization; reduced stochastic and statistical modeling for climate; and the development and exploitation of statistical physics methods in geophysical problems.

Five major ICIAM Prizes will be presented at the next ICIAM Congress, ICIAM 2015, the Eighth International Congress on Industrial and Applied Mathematics, which will take place in Beijing, China, August 10-14, 2015. To read about the other prizes and awardees, please visit http://www.iciam.org/. Look for the “new” item on the home page.

**About ICIAM**

The International Council for Industrial and Applied Mathematics (ICIAM) is a worldwide organization for professional applied mathematics societies, and for other societies with a significant interest in industrial or applied mathematics. The aims of the Council are to promote industrial and applied mathematics globally; to promote interactions between member societies; to promote the goals of these members societies; and to coordinate planning for periodic international meetings on industrial and applied mathematics. The ICIAM Congresses, held every four years, are run under the auspices of the Council.