



## Preface

This special issue of CMS is dedicated to Andy Majda, one of the most prominent and outstanding applied mathematicians in the world. Andy has made seminal and fundamental contributions both to the theory of partial differential equations as well as to many applied areas including but not limited to scattering theory, shock waves, combustion, incompressible flows, vortex motion, turbulent diffusion, combustion, and atmosphere ocean science. He has authored or co-authored in excess of 200 papers and has written five books. The papers are highly cited and the books have become classical references.

In almost all the areas that he concentrated on, Andy Majda made groundbreaking modeling, mathematical, and computational work, which have become part of the basic and classical theory. An inclusive but by no means exhaustive list of the areas that Andy Majda left his mark are multi-dimensional shock front existence and stability, absorbing boundary conditions for the simulations of waves (work with Engquist), breakdown of smooth solutions for the 3D Euler equations (work with Beale and Kato), concentrations and weak solutions for vortex sheets (joint with DiPerna), stochastic model reduction (work with Timofeyev and Vanden-Eijnden), turbulent diffusion (work with Avelaneda), turbulent reaction-diffusion and combustion (work with Souganidis), and, more recently, multi-scale modeling of waves in the tropics (work with Klein, Khouider, Biello and Stechmann).

Andy Majda came up from a very modest background. His undergraduate degree was from Purdue University and his Ph.D. from Standord under the supervision of Ralph Phillips. He began his professional career at the Courant Institute as an Instructor from 1973 to 1975. He then moved to UCLA (1976-1978) and from there to Berkeley as a Professor (1978-1984). The next stop was Princeton (1984-1994) from where he moved back to the Courant Institute in 1994 as the Morse Profes-

sor of Arts and Science. Since then he has been instrumental in the establishment and development of the Center for Atmosphere Ocean Science that aims to promote cross-disciplinary research using modern applied mathematics in climate modeling and prediction.

Andy Majda has received numerous awards and prizes recognizing his seminal contributions to both pure and applied mathematics. He is a member of the National Academy of Sciences and has received the National Academy of Science Prize in Applied Mathematics, the John von Neumann Prize of the Society for Industrial and Applied Mathematics, and the Gibbs Prize of the American Mathematical Society. He is an honorary professor at Fudan University, a Fellow of the Japan Society for the Promotion of Science, and has twice been awarded the Medal of the College de France. He has delivered many major invited plenary talks at prestigious gatherings such as the First International Congress of Industrial and Applied Mathematics in Paris, the International Congress of Mathematicians in Tokyo, the SIAM von Neumann Lecture in Chicago, and the AMS Gibbs Lecture in San Francisco.

This special issue provides a unique opportunity, in a dynamic way, for Andy and his former students, postdocs, colleagues and friends to celebrate his distinguished academic achievements. The collected articles cover modern applied mathematics in the broadest sense, from modeling, analysis, to computation. All papers went through the rigorous refereeing procedure of the journal.

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