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Preface, by Piermarco Cannarsa and Franco Flandoli

Giuseppe Da Prato passed away on October 5th, 2023, at the age of eighty-seven. A National Member of the Accademia Nazionale dei Lincei and Professor Emeritus at the Scuola Normale Superiore di Pisa, he was one of the most distinguished Italian mathematicians of his generation. His influence on modern analysis – functional, stochastic, and infinite-dimensional – is profound and enduring.

Da Prato's scientific life spanned more than six decades of continuous creativity. His work is characterised by an exceptional unity of vision: from functional analysis and the theory of semigroups to deterministic and stochastic partial differential equations and control theory, each new problem he touched seemed to find its natural formulation within the analytic structures he helped to build. He combined technical mastery with an extremely fast mathematical intuition: he could grasp the essential structure of a problem in a few moments, often finding a simple and elegant argument where others saw only technical obstacles.

Through this intuition he contributed to the creation of a coherent analytic framework for evolution equations in Banach and Hilbert spaces – first deterministic, later stochastic – thus laying the foundations for an entire area of research. Over the years, these ideas have inspired a vast literature and have found applications far beyond their original context, in physics, engineering, and finance. His writings are admired for their clarity and conceptual depth: they convey the sense of mathematics as a harmonious structure rather than a collection of separate techniques.

Equally remarkable was Da Prato's human presence in the mathematical community. He was open-minded, curious about every new development, and genuinely interested in the ideas of others. He had the rare gift of communicating with everyone – young researchers taking their first steps as well as senior colleagues with established reputations – with the same natural warmth and respect. Many mathematicians remember discussions with him as moments of illumination, where a difficult idea suddenly became transparent. His combination of intellectual generosity and gentle humour made him an unforgettable teacher and friend.

This special issue of the *Rendiconti Matematici della Accademia Nazionale dei Lincei* is dedicated to his memory. It is the first of two issues collecting contributions by colleagues and friends from many countries, reflecting the breadth of his interests

and the vitality of the community that grew around his work. The articles cover a wide range of themes inspired by his scientific legacy:

- problems of stochastic analysis and optimal control in infinite-dimensional spaces;
- evolution and fractional equations, with new perspectives on regularity and hidden trace phenomena;
- mean-field models and control-theoretic formulations of collective dynamics;
- geometric and analytic structures arising in shape optimisation and image processing;
- and gradient flows and nonlinear diffusion equations, which resonate with his lifelong concern for the interplay between analytic and probabilistic viewpoints.

Taken together, these papers testify to the continuing influence of his ideas and to the affection and admiration he inspired in so many mathematicians. They show that his scientific intuition, his taste for clarity, and his trust in the unifying power of analysis continue to shape ongoing research in areas that he helped to create.

With this issue we wish to honour Giuseppe Da Prato's memory as both a great mathematician and a remarkable human being. His scientific legacy will remain a source of guidance and inspiration; his kindness, humour, and openness will remain in the hearts of all who knew him.

With our greatest affection and gratitude,

Piermarco Cannarsa and Franco Flandoli