

## PREFACE

This is a second special issue in the memory of Michelle Schatzman.

Our esteemed colleague Michelle Schatzman prematurely passed away in August 2010. She had turned 60 on December 8, 2009, on which occasion a workshop had been organized in her honor. The impressive list of speakers she had carefully chosen, consisting of friends, collaborators and former students, included one Fields medallist, Pierre-Louis Lions, and one future Fields medallist, Cédric Villani. Remarkably, it turned out that she gave up her long-lasting fight against cancer just the day after Cédric Villani received his medal. She was so happy for him.

To celebrate her memory, most speakers of her sixtieth birthday workshop have accepted to contribute to a special issue of *Confluentes Mathematici*. Both the journal, of which she was an associate editor, and the subjects of the articles that follow reflect her eclectic mathematical tastes. Indeed, she liked the idea of “transversal” mathematics. Looking back to her research projects and the seminars she enlivened, the word “frontier” appears many times. In particular, she had worked hard these last years on the frontier between numerical analysis and algebraic geometry. She had indeed made the connection between the dimension of certain algebraic manifolds and the possibility of improving numerical approximations of partial differential equations. This work is unfortunately left incomplete. She was also proud of some pioneering work in

- nonsmooth mechanics with finite or infinite degrees of freedom, particularly elastic impact equations describing movements constrained by obstacles,
- the theory of hyperbolic systems of conservation laws, in which she introduced a continuous version of the Glimm functional,
- reaction-diffusion equations and motion by mean-curvature, on which she left a seminal paper co-authored with P. de Mottoni, a great friend of hers she grieved the tragic death for years,
- semi-linear elliptic systems and their symmetric solutions,
- high order numerical methods and splitting techniques.

Her name is attached to the Chapman–Rubinstein–Schatzman model for superconductivity. She used to say that her mathematics was applied, not applicable, and she would never hesitate to tackle new problems coming from such diverse fields as fluid or solid mechanics, electromagnetism, or even algebra. Instead of flowing with the stream, she always preferred working on problems that were most interesting to her, especially those urging her to question herself, to go ahead, and to

learn from other fields. Since her early youth she lived an intense relationship with mathematics. She described it as being a key, an inner world, a detective story, as poetry. She likened it to the experience of diving, and recognized it as a way of thinking not in words but in symbols and pictures. She was a true intellectual who loved sharing her knowledge and training students. In this respect, she fully agreed with and often quoted the Talmudic teaching that comes from Rabbi Hanina: “I have learned much from my teachers, and from my colleagues more than from my teachers, but from my disciples more than from them all.” She would also share her strong opinions on women in science, and defend fiercely her political views, defining herself as a “generalized man”. Her favorite words were: ‘Tant de choses à faire, et je n’ai qu’une vie.’<sup>a</sup> A too short life, unfortunately. This issue is dedicated to her, a woman not tall in physical height, but a great mathematician.

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<sup>a</sup>So many things to do, and I have only one life.