



## PREFACE

# In Honor of Silvio R. Salinas

André P. Vieira<sup>1</sup> · Suanī T. R. Pinho<sup>2</sup> · João A. Plascak<sup>3,4</sup>

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It is fair to say that the establishment of statistical physics as one of the main areas of theoretical and computational physics in Brazil owes a great deal to the efforts of Professor Silvio Salinas, whose 80th birthday was celebrated in 2022. Over the last 50 years, he has been responsible for supervising dozens of graduate students and postdocs, who themselves have been seeding or reinforcing statistical-physics groups all over the country.

Professor Salinas actually was bound to become an engineer, had it not been for the Brazilian military coup of 1964. Along with various fellow students of the Instituto Tecnológico da Aeronáutica (*Airforce Technological Institute*), he was expelled just after the coup for taking part in political activities deemed subversive by the military dictatorship. He then moved to Universidade de São Paulo (USP), where, in 1967, he finished not only his electrical engineering course but also a physics major, followed in 1969 by a master degree in experimental physics, working on low-temperature magnetism.

As it was not unusual at the time, he secured a position as a lecturer at USP still as a master student, leaving for his PhD soon afterwards, at a particularly troublesome period of the military dictatorship. He went to Carnegie Mellon University, where he got acquainted with leading statistical

physicists like Michael Fisher, Robert Griffiths, and James Langer, at a time when the renormalization-group theory was promoting a revolution in the understanding of phase transitions and critical phenomena. For his PhD thesis, completed in 1973 under the supervision of John Nagle, he worked on the theoretical description of phase transitions in ferroelectric materials.

Soon after returning to Brazil in 1974, taking advantage of the huge interest generated on the subject of critical phenomena, he started to supervise graduate students, forming a research group focusing initially on phase transitions in magnetic systems, in close collaboration with the low-temperature experimental group at USP. That collaboration gave rise to important works on multicritical behavior in magnetic insulators, combining fine experimental results with elaborated theoretical analyses based on renormalization-group techniques.

Over the following decades, as the group grew and became more diverse, many other subjects have been introduced as research themes, widening the scope of interests: the problem of modulated phases in magnetic systems, as described by the axial-next-nearest-neighbor Ising model, establishing contact between condensed matter physics and the theory of dynamical systems; the investigation of spin glasses, bringing along the areas of complexity theory and neural networks; the extension of ideas from equilibrium phase transitions to the realm of nonequilibrium systems and to stochastic thermodynamics; the study of aperiodic systems, inspired by the experimental discovery of quasicrystals, stimulating research in mathematical themes and in the interplay with quantum fluctuations; and the proposal of microscopic models for liquid-crystalline phases, allowing collaboration with the complex-fluid group at USP. In all of these initiatives, Prof. Salinas has been instrumental, either as a direct participant or by way of his continuing and enthusiastic support. Most of those topics are represented in the present collection of papers, highlighting the ongoing influence of Prof. Salinas in bringing the attention of Brazilian researchers to topics in the frontier of knowledge.

✉ André P. Vieira  
apvieira@if.usp.br  
Suanī T. R. Pinho  
suanī@ufba.br  
João A. Plascak  
pla@uga.edu

<sup>1</sup> Instituto de Física, Universidade de São Paulo, Rua do Matao, 1371, 05508-090 São Paulo, SP, Brazil

<sup>2</sup> Instituto de Física, Universidade Federal da Bahia, Campus Universitário de Ondina, 40.210-340 Salvador, Brazil

<sup>3</sup> Departamento de Física, Universidade Federal de Minas Gerais, C. P. 702, Belo Horizonte, MG 30123-970, Brazil

<sup>4</sup> Departamento de Física, Centro de Ciências Exatas e da Natureza, CCEN, Universidade Federal da Paraíba, Cidade Universitária, PB 58051-970 João Pessoa, Brazil

**Silvio R. Salinas.** Photograph: Léo Ramos Chaves/Revista Pesquisa FAPESP(<https://revistapesquisa.fapesp.br/silvio-roberto-de-azevedo-salinas-um-fisico-de-altas-e-baixas-temperaturas/>)



Another key aspect of his personality has been his engagement in scientific policy, as a member of the Brazilian Academy of Sciences and of the Brazilian Society for the Advancement of Science, as well as chief editor for the Brazilian Journal of

Physics, from 1998 to 2007. In the late 1970s, he was among the organizers of the first Brazilian conference on condensed matter physics, giving rise to a series which continues to this day. Later, he was also one of leading figures in the early days of Universidade Federal do ABC, an institution founded in the beginning of the twenty-first century with the aim of offering innovative undergraduate courses on science and technology.

He has also been deeply involved in teaching, being the author of a textbook on statistical physics (with editions both in Portuguese and in English) widely used in undergraduate and graduate courses in Brazil. Currently, he is the editor of *Revista Brasileira de Ensino de Física (Brazilian Journal of Physics Teaching)*.

We are immensely grateful that Prof. Salinas continues his contribution to teaching and research activities on statistical physics, critical phenomena, and correlated areas.

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