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LETTER FROM THE EDITOR

Lighting the way

Alexandra Ozorio de Almeida | EDITOR IN CHIEF

In certain fields, innovative scientific discoveries are increasingly reliant on large and often multinational facilities. These projects are frequently the subject of controversy within (and outside) the scientific community due to the high costs involved, particularly in developing countries, but supporters argue that such investments are needed to stimulate qualitative advances in science.

In December 2018, Brazil inaugurated its largest, most complex and versatile research instrument: a fourth generation source of synchrotron radiation, a type of light that allows scientists to study materials on an atomic scale. The Sirius project is located at the Brazilian Centre for Research into Energy and Materials (CNPEM) near Campinas, São Paulo State. Tests on the accelerator are scheduled for the second semester of 2019. By the end of the year, six of the thirteen beamlines foreseen in the project should be open to researchers based in Brazil and abroad.

The CNPEM is also home to UVX, the first synchrotron light source in the Southern Hemisphere. The knowledge acquired during the development of the UVX and the experience gained by the researchers that used it were essential to the Sirius project, which has a budget of R\$1.8 billion. The cover article of this edition, originally published in Portuguese in July 2018, tells the story of the new synchrotron facility in Brazil (page 4).

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Algorithms are behind programs that help us face daily challenges. By applying sequences of rules and logical procedures to a data set, algorithms find the route home with the least traffic, recommend music and films, and suggest which shares to buy or sell and how

to stock control or carry out warehouse maintenance, among many other uses. A feature in this issue, the cover of our April 2018 edition, explains how these algorithms are created and describes some of their current and future applications. Their omnipresence stems directly from the ease with which large amounts of information (known as big data) are now collected, stored and processed by increasingly powerful computers (page 58).

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The political sociologist Elisa Reis is dedicated to studying the Brazilian elites. Institutional position is key to how Reis defines the elite: people who control material and symbolic resources and occupy high positions with the capacity to influence or make important decisions. Reis discussed in an interview the main objective of her research, which is to understand, often using comparative studies with other countries, how the Brazilian elite relates to poverty and inequality (page 12). Based at the Federal University of Rio de Janeiro, Reis has a PhD from MIT, studying there at a time when there were few women and foreigners at the institution. She advocates the production of knowledge as a collective effort. While recognizing the desire for originality, Reis argues that this inclination contributes to a high level of fragmentation, making it difficult to consolidate and generalize results: “Teamwork is essential in academic research.”

This international edition of *Pesquisa FAPESP* brings other interesting features from our Portuguese editions published between March and August 2018. They range from the performance of Embraer’s new aircraft in flight tests (page 70) to the depth and size of the reefs in the Amazon river (page 40).