

# The heroic journey of young Brazilian scientists: challenges and opportunities

Mariana Araújo-Pereira<sup>a,b,c,d</sup> and Bruno B. Andrade<sup>a,b,c,d,\*</sup>

<sup>a</sup>Laboratory of Clinical and Translational Research, Goncalo Moniz Institute, Oswaldo Cruz Foundation, Salvador, Bahia 40296-710, Brazil

<sup>b</sup>Post-Graduation Program in Human Pathology, School of Medicine, Federal University of Bahia, Salvador, Bahia 40296-710, Brazil

<sup>c</sup>Multinational Organization Network Sponsoring Translational and Epidemiological Research Initiative, Salvador, Bahia 41810-710, Brazil

<sup>d</sup>Instituto de Pesquisa Clínica e Translacional, Faculdade Zarns, Clariens Educação, Salvador, Bahia 41720-200, Brazil

Since 2014, national investment in Brazilian science has faced significant cuts, affecting universities, research institutes, and funding for students at various academic levels.<sup>1,2</sup> Although 2023 marked the start of budgetary improvements for scientific and technological development, the desired levels of support and encouragement for Brazilian science are yet to be achieved. Scientists have made remarkable contributions across various fields, demonstrating resilience and innovation even under limited support. Achievements include participating in capturing the first image of a black hole, unravelling the relationship between Zika virus and microcephaly, and advancing sequencing and vaccine development for SARS-CoV-2.<sup>3-5</sup> These achievements demonstrate that, if we can do science with the little support we have, with adequate investment we can go much further.

For young scientists, the journey through academia is fraught with challenges, particularly in securing funding and transitioning to independent research roles. Opportunities for postdoctoral fellows are constrained by outdated scholarship amounts and a lack of formal employment benefits, making alternative career paths more attractive. Although recent adjustments to postdoctoral stipends have been made, the struggle for adequate compensation continues. Even today, with the current amount of R\$5200 (\$1000) per month, it is bearing absurd to think that exclusive dedication is required (often not even allowing the practice of teaching) from a professional with this level of qualification for the proposed remuneration without any work benefits. In fact, the postdoctoral fellows in our country are not considered as qualified professionals, but as post-graduate students. This is a barrier that potentially impacts on the brilliant minds retention in the Brazilian scientific field.

Emerging researchers face additional obstacles in securing their first research funding due to eligibility criteria that often require permanent positions. But at

the same time, permanent positions require and/or favour those who have already gone through a post-doctoral stage and/or have had a project approved as principal investigator. However, recent changes by funding bodies, including the National Council for Scientific and Technological Development (CNPq), have begun to address these issues, albeit the impact remains limited compared to the more than 25,000 Ph.D. in the country.

Many Brazilian postdoctoral researchers seek international funding opportunities such as the Wellcome Trust Early-Career Awards and The World Academy of Sciences (TWAS) Research Grants, or to smaller, field-specific funding sources like the RePORT Advanced Career Training (ReACT). An alternative trajectory for those seeking international opportunities is also migration to countries offering superior funding opportunities, reflecting the ongoing challenge of retaining talent within the country.

Furthermore, the lack of technical-administrative support complicates project management for new researchers, highlighting a gap in doctoral education that neglects essential skills for funding proposal writing and project administration. Few (if any) doctoral programs in Brazil teach how to write funding proposals, let alone how to manage them. Those embedded in well-established groups may rely on the available technical, administrative, and personnel support, but it is crucial to carefully balance the right amount of dependence/independence in this relationship with the “umbrella” group. The transition from doctoral student to independent researcher also demands a proactive approach to learning and self-development, often without sufficient mentorship or support from academic programs.

Finally, it is necessary to highlight another obstacle: the balance between the quality, quantity, and financial resources necessary for scientific publications. The poorly funded new doctor often does not have sufficient resources to conduct a study that results in a high-quality paper and may be tempted to produce small, low-quality articles to try to “compensate.” Although it may seem an absurd idea, this “temptation” comes from the overvaluation of the number of articles published by those applying for subsequent funding and/or a



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\*Corresponding author.

E-mail address: [bruno.andrade@fiocruz.br](mailto:bruno.andrade@fiocruz.br) (B.B. Andrade).

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permanent position, to the extent that some calls for proposals do not even assess the quality of the journal. Furthermore, even if the project yields highly relevant and impactful results, the young researcher faces the final hurdle: the publication fees of high-impact international journals. A single publication can exceed the cost of \$5000, sometimes forcing research with fantastic results to be published in a journal of lesser reach due to a lack of funds for a prestigious international periodical.

Despite all these difficulties, thousands of young Brazilian researchers choose to embark on this journey, hoping for an opportunity for funding, and development, to attach themselves to research and/or teaching institution, become an independent researcher, and contribute to Brazilian science. Therefore, just as these young people must face challenges with a resilient, positive, and innovative mindset, new investments must be made to encourage and promote the development of these young talents in the country. Only through a united effort will it be possible to overcome existing

barriers and pave the way for a future where science in Brazil can flourish without limits, bringing significant benefits not only to the scientific community but to society.

#### Contributors

MA-P and BBA have conceptualized and wrote the comment.

#### Declaration of interests

We declare no competing interests.

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