


# Generation LWBS: introducing life–work balance in science

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In the COVID-19 aftermath, academia experiences an unprecedented drought of postdoctoral researchers. The new generation of scientists refuses to face the low odds of starting their own labs in a competitive arena that does not align with their work–life balance needs. We discuss the possible reasons and potential measures needed to sustain talented and passionate early career researchers in academia.

It is Friday night. While I am finishing an ELISA, exhausted after an intense week in the lab running experiments for a manuscript revision, I realize that during the day someone has used up the last drops of the substrate that I need for the final step of the assay. I am petrified. One week of work will be wasted as I cannot finish this analysis. “This is a disaster!”, I thought. My only hope was that someone would be around and have some substrate to share. I rush out and find Costas in the lab finishing his western blotting. Luckily, there is some substrate left in his lab. I am relieved that I can complete my experiment, and my work will not get wasted. Finding a colleague in the next-door lab late in the evening was not uncommon for many of us who worked as PhD students and postdocs in the late 1990s and early 2000s. Now, after the COVID-19 pandemic, we witness empty labs even in the middle of the day (Fig. 1). What has changed?

Science co-evolves with the people that pursue the research, and modern life priorities have altered working habits. In the past 10 years, postdocs and graduate students, who constitute the main data-production workforce, spend fewer hours in the lab and reprove the academic path by choosing careers in the industry. Overall, they seem to have a better sense of time management, organization and prioritization of their work, thus keeping a healthy life–work balance. Those of ‘Generation LWBS’ (life–work balance in science) aspire to maintain this balance throughout their careers, including their next move. When we were trainees, the term ‘life–work balance’ did not even exist. The price we had to pay to get published was investing an infinite number of hours on data generation. Working in the lab during the weekends or reducing vacation time to maximize productivity was normal and expected. Although many of us were exhausted, most people went with the flow because that was the norm. There was an inner drive mixed up with a belief that ‘if we do not endure this, our productivity will be low, we will not get a strong reference letter and we will not advance in academia’, which would have been considered a major failure.

The working style of Generation LWBS is raising eyebrows among some principal investigators (PIs), who frequently complain about the ‘less-motivated’ and ‘more-entitled’ trainees. Many express concerns about the drought of ‘trainees with passion for fundamental



**Fig. 1 | In search of trainees to fill state-of-the-art research buildings.** A photograph of biomedical research laboratories taken at noon during a visit to an academic institute in the USA.

discoveries’ and wonder who will be left in some years to pursue research in academia. Where is the root of this problem? Do those of Generation LWBS lack perseverance, or do the low salaries offered by academia challenge their ability to afford the cost of living and lead one of the most highly educated workforces to industry?

Academia faces the paradox of being desirable for 80% of the postdocs in North America and Europe<sup>1</sup> and 56% of graduate students globally<sup>2</sup>, but being unattractive to many as shown by the increasing flow of LWBS trainees to non-academic paths. LWBS investigators spend less time in the lab and no longer see academic development as the holy grail of research. One reason for this lies in the prioritization of life over work. Although life was equal to work for the past two to three generations in academia, this equation has now been reversed. The emotional stress that people underwent during the COVID-19 pandemic<sup>3</sup>, especially those who experienced it away from their families, affected the working morale and prioritized human relationships and personal equilibrium over work.

LWBS trainees care more about their well-being and resist unreasonable pressure or even bullying from mentors or senior lab members<sup>2,4</sup>. They do not see the sense in taking such a toll on a situation of uncertain academic and financial growth, especially when they have children. Nevertheless, approximately 70% of the postdocs do not make it to PI level<sup>5</sup> and the average income 10 years after graduation for those who pursued biomedical postdoctoral training is 11% lower than that of those who did not do a postdoc<sup>6</sup>. Furthermore, trainees have realized that although hard work often pays off, scientific productivity

and quality do not depend exclusively on the number of hours that one invests in the lab, particularly if they get burnt out. These facts, combined with the latest restrictive regulations in immigration policies in the USA, the post-Brexit UK and other countries in Europe that used to be major training hubs, have resulted in an unprecedented drought of postdoctoral researchers in academia<sup>7</sup>.

Academia faces these challenges at a time when technology has adorned the research arena with high-end tools, which have increased data generation to an unprecedented extent. Thirty years ago, generation of a knockout mouse would be a central subject of a PhD thesis, summarizing years of research efforts. Data analysis and writing were possible only in the lab, where computers were available. Now a knockout mouse can be generated in 3–6 months and writing can be done on a tablet or even a cell phone. The ability to produce more results in less time has decreased the time trainees need to spend in the lab.

Despite the wealth of research tools and the impressive annual increase in people graduating with science and engineering PhDs (2000–2018: +58% in the USA, +133% in the UK, +25% in Germany, +390% in India, and +400% in China), the annual increase of scientific publications is not proportional (2000–2018: +40%)<sup>8,9</sup>. This mismatch, which challenges the sustainability of the present academic research model, may be a consequence of the increasing amount of data required by journals and reviewers that entails the involvement of more people in a single study. The situation worsens because fewer trainees stay in research, as they cannot manage pressure from their environment for the combination of intense work and the need to obtain grants and publish at a high pace<sup>10</sup>.

'Life is worth living when it is fun and shared with others'. The academic track gives a sense of purpose, but it is a lonely, time-demanding and underpriced path. The long hours that an individual needs to devote to work and travel are taken from family and loved ones. Consequently, LWBS trainees tend to abandon the idea of pursuing a career in academia. On the other hand, the pharmaceutical and biotechnology industries have become major forces for the creation of lab and non-lab jobs, such as medical writing and communications, regulatory affairs, clinical research staff, consultancy and so on. Industry-sponsored funding on basic research in the USA has seen an impressive annual growth of +215% (2000–2017) while the increase in federal funding was only +6.3% (ref.<sup>11</sup>). The increase in spin-off and start-up companies attests to this shift. Concurrently, besides offering more positions, industry has become more appealing to Generation LWBS by providing training in well-equipped labs, opportunities for pursuing cutting-edge research supported by higher monetary portfolio, higher wages, well-structured career ladders, rewards and recognition in ways that academia does not presently match.

Most of those who remain in academia today choose to do so as a matter of principle. Some stay in academia because of the lack of more desirable alternatives, which constitutes a compromise for both academia and the early career researchers who are not satisfied by their professional environment and seek for other opportunities continuously. However, constant worry about financial insecurity for their research program and income hampers enthusiasm. In the USA, a large part of an investigator's salary is covered by research grants. In Europe, this occurs to a smaller extent, but salaries are lower and career growth is slower as it takes several rounds of short-term contracts that perpetuate insecurity. It is no wonder that academic training is seen, even by the most motivated trainees, as the 'necessary evil' that constitutes an underpaid steppingstone to a better-paid job in industry.

Academia needs to regain its reputation as the unmatched force that attracts the early career researchers who can make the difference by moving and driving scientific advances. Such people's noble ideas and hard work have been the seeds of the scientific breakthroughs that humanity has seen. Academia must help talented young researchers thrive by not ignoring their financial needs, wellness and mental health. Curtailing talent drain will require the following important changes in universities and research institutes that need to be backed up by governmental and private funding organizations: (1) restructuring the funding systems to provide competitive salaries and long-term research support with more opportunities for 'bridge funding'; (2) creation of career ladders and comprehensive roadmaps that will include solid evaluation criteria and mentoring for the development of PhDs to postdoctoral trainees and PIs; (3) promotion of life-work balance, which also needs to be included in the restructuring of the academic environment.

We have only just started to witness the early aftermath of the COVID-19 storm, whereby Generation LWBS breaks the old mold. As this seems to be a permanent change and not just a temporary post-COVID-19 adaptive stage, amendments that will attract and support young researchers of Generation LWBS within academia are much needed. An academic path filled with opportunities that bridges the need for freedom to original thinking and the thrill of scientific discovery with personal gratification and financial growth is the way to foster success of passionate and hard-working people in scientific research of the twenty-first century. Research without selfless passion for curiosity-driven fundamental discoveries is destined to fail. This passion cannot be attained with training and academia cannot afford to lose those who have it.

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## Competing interests

The authors declare no competing interests.