# Mathematicians against the clock: Accelerated work and accelerated careers in the Neoliberal University

*Even though we grapple with different scientific questions, academics in different disciplines all face the same ongoing challenges with academic acceleration.* **Dr Milena Kremakova** *argues mathematics as a discipline is an excellent test case for understanding recent transformations in academia — and a cautionary tale for the social sciences and humanities. The main problem is that technocratic time of the neoliberal university is in a direct clash with the thinking time required to learn, and do, science. Something must be changed if we want good science and decent working conditions for knowledge workers.*

*This piece is part of a series on the Accelerated Academy.*

*"I am shocked by how fast this programme is! Everything is happening at once!"*, my friend Alice, a Masters student, exclaimed today in the common room of the Maths Department. Academic pressure, acceleration and rationalization are widespread features of postgraduate education in the UK today. British MA and MSc courses are among the world's shortest, with most only lasting 12 months. After a whirlwind first academic term, most Masters students are still finding their feet. The challenging course is interesting, but there is little time to take it all in, and the uncertain future along with the speed at which Masters students are expected to adapt to the academic pace create anxiety, doubt, impostor feelings, and the urge to cut corners both in the learning, and in planning their own future.

Those Masters students who want to carry on with research cannot afford to become lost in the beautiful maze of mathematics. Prospective PhD students have little time to find their way in the maze of their discipline's subfields, find a doctoral advisor, and secure funding. They must not stray from the track and submit their applications for a PhD within only a couple of months of starting their Masters degree. Should they prioritize completing the (many and hard) weekly homework assignments, focus on getting their teeth deeper into the new subjects they find most interesting, or on navigating the academic landscape and applying for potential PhD positions? There are no easy answers to this question which plagues virtually all students I've met.

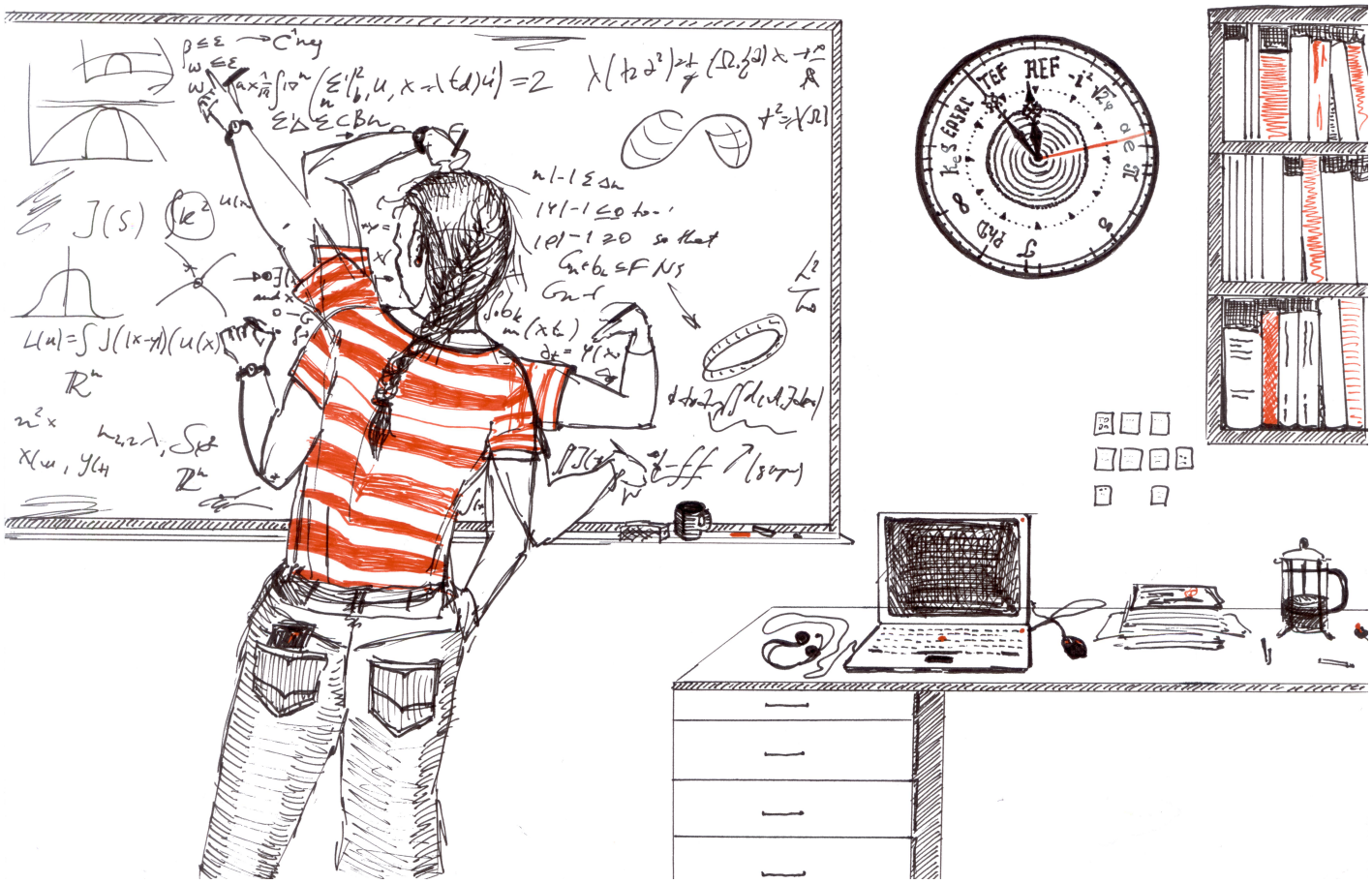


**Image credit: *Milena Kremakova***

Assuming the student finds a supervisor, a place on a PhD programme, and even funding, the real uncertainty only just begins. Would I be able to manage the several-year-long “immersion into abstraction”, as one student put it? Can, and will, the curious mathematics graduate student transform into a real mathematician? What is a mathematician anyway, and can you know what one is before becoming one – and by the time you have become one, will you have a secure future?

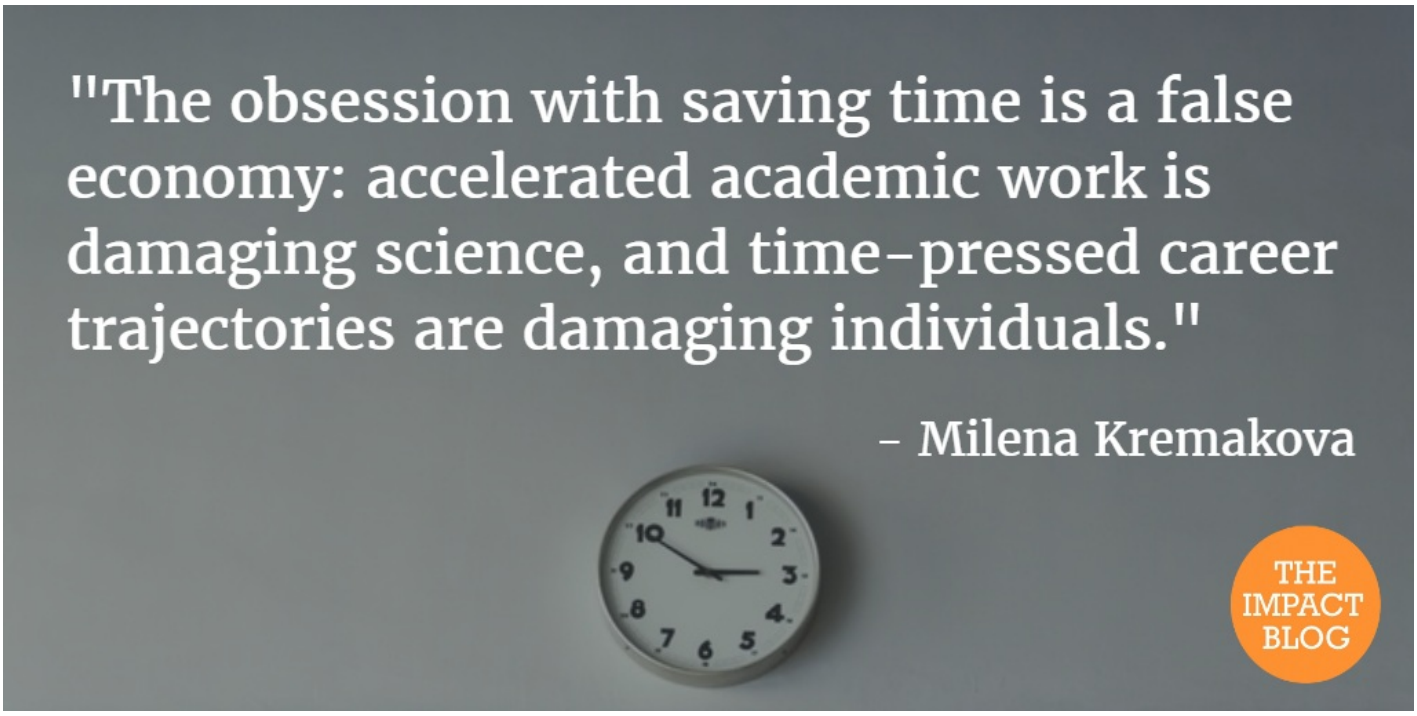
For most graduate students, post-PhD life is too many steps removed to even consider, they have enough to worry about with the PhD itself. Doctoral researchers also increasingly seen as students and not as researchers in their own right, pressured to “deliver” within three years of their registration and discouraged from taking more time to complete their dissertations. Many are not sure – or even want to begin to think about it – whether they will try an academic career, even if the PhD dream works out. Most say they want to keep their options open. Some say they are not interested at all, especially many of the more mature students with prior experience in industry or education and who tend to be more decisive and pragmatic: they know how intense the competition is, how few academic positions are available, and how low the pay compared to similarly challenging non-academic jobs.

But many interviewees who are further along the academic “career ladder”, tell me that they used to think they would never go into academia, but changed their minds “in the last moment”, lured into “staying” when a suitable postdoc job came along. Similarly, many of the more senior mathematicians I have interviewed tell me that they “fell into” their research area by chance, after approaching a nice lecturer whose course they enjoyed. Needless to say, “falling into” a career in research is most easily done at your home institution, or at another one where you have a professional contact – which few at Masters level do. Students studying at smaller institutions have a smaller choice

of fields and supervisors, though smaller class-sizes might allow lecturers to get to better know their students in person. Foreign students and/or those from non-academic backgrounds for whom the whole university experience is new, face even more glass barriers, invisible to those who are better prepared for navigating the complicated social rules of the academic world.

Learning to be a mathematician is a steep path which starts in childhood, but many professional mathematicians would say that they really *"became mathematicians"*, that is, independent researchers, only at some point during their PhD or their first or second postdoc. The labour of learning existing mathematics and of creating/discovering new mathematics that does not yet exist, does not lend itself to being easily timed and engineered, even if external factors (such as health, financial security, family, relationships, care commitments or mental wellbeing) are ignored. Most of the time, research in mathematics feels like a Sisyphean pursuit, but collectively, over the centuries, sometimes slowly, sometimes in sudden bursts, mathematicians push knowledge further up its rock face. Importantly, mathematical "talent", contrary to widespread urban legends, depends much less on innate ability and much, much more on hard work – but also, as my research has convinced me – on enjoyment, playfulness, curiosity, resilience in the face of frustration, and (as one mathematician put it), *"sheer pig-headedness"*.

The main problem is that technocratic time of the neoliberal university is in a direct clash with the thinking time required to learn, and do, science. The unrelenting time pressures to which undergraduate students, postgraduate researchers and professional mathematicians are subjected is just one of the symptoms of the acceleration which has been pervading the academic culture in the last couple of decades. Education, training, learning, and even teaching and research become conveyor belts, and the training of scientists – one of the most creative and highly-qualified societal groups – is no exception.  Students, and increasingly also academics, have less and less time for exploration, mistakes, wrong turns, or self-doubt; and even less time for building up a healthy well-rooted confidence in their own abilities and achievements or clarifying to themselves what it is that they really want to do – with their science, but also with their lives.




Mathematicians in the university do not work for their salary. In fact, for mathematicians in particular, working in academic research means incurring a loss of earnings, since most academics' salaries do not measure up against the salaries of almost all mathematics graduates employed in industry. Those mathematicians who do research do it because they love maths. They find it fun, beautiful, irresistible, the most fundamentally important thing in the Universe, and they are addicted to generating new knowledge. As Saul Schleimer, a topologist, responded to a

journalist asking why he does maths: *there are just some things that he wants to know.*

Because of this necessarily playful nature of mathematical discovery, work and non-work in mathematics are extremely difficult to distinguish. The question of what counts as work acquires huge importance in the neoliberal university, because the power to decide what counts as work also gives political power. This produces the discrepancy we, academics, all know only too well, between official working hours on the one hand, and the actual hours we do what we ourselves consider "our most important work". As many other academics, most mathematicians do their work not only in their official working hours. They think about mathematics 24/7. This easily lends their labour to exploitation – in which they themselves are complicit because they treat their work as artists, not as administrators. I argue that what the neoliberal university does wrongly, is that it urges mathematicians to become administrators. The accelerated practices and expectations of contemporary academia impose external criteria of excellence which often go against the grain of the nature and demands of good scientific work. Today's excellent and successful academics are increasingly those able to "play the game" of money and time, not necessarily those with the best mathematical ideas.

This academic acceleration, and its relation to neoliberal academic capitalism, have recently become a separate theme within the critical literature (see Vostal, 2015, for a comprehensive literature review). While there are undoubtedly positive aspects to acceleration, nevertheless the main problem is, as Vostal (2015, p. 4) points out, that

> *"[e]xperimenting, thinking through, and writing are slow, contemplative, and time-consuming attributes of research. If academics (are forced to) speed up these activities, they may compromise accuracy, correctness, and validity."*

The university become a space of "acceleration and militarisation". Slaughter & Leslie (1997) were among the first critical theorists of "academic capitalism" and audit culture of the "entrepreneurial university" in the USA. In the UK, managerialisation of higher education arrived about a decade later. Since Ros Gill's 2009 article on the "*hidden injuries of neoliberal academia*", there has been an exponential expansion also of British literature on academic acceleration, neoliberalisation, marketisation and precaritisation.

I have been asked why we should care about academic mathematicians' experience of academic acceleration and marketisation, when the situation in the humanities and social sciences is clearly so much worse. I disagree. Here are two important reasons.

First, it is not only puzzling, but also a great loss for social scientists that the hard sciences – and mathematics to the greatest extent – largely remain a terra incognita for many of us, mere mortals, including scientists and researchers from other fields. Both sociologists of science and researchers in cultural studies of science have only relatively recently developed a active interest in mathematics as an activity and social practice. There is still a lack of interpretative understanding of the "making" of scientists and of the practice of research as work and labour, and of the ways in which the global scientific labour market shapes the work done by scientists, their professional identities, and their biographical pathways. Mathematics could also be (but so far, to my knowledge, has not been) theorised as emotional labour, identity work, production and reproduction, community work, digital labour and self-exploitation.

Secondly, and more importantly for this particular debate, mathematics as an academic discipline is an excellent test case for understanding recent transformations in academia — and a cautionary tale for the social sciences and humanities. And yet, the so-called "hard" sciences have been largely ignored within this burgeoning literature. Critical analyses of academic precarity mainly focus on the humanities and social sciences. My research shows that early careers in mathematics are also precarious. But if even mathematicians, workers in the purest and most removed from social affairs academic field, are affected by the shift from a "public good" towards a "market"

academic culture, this would be a strong indication that issues which are becoming wide-spread in the social studies and humanities — such as precarity, fragmented and uncertain professional trajectories, an academic "race to the bottom", the "publish or perish" imperative, the imperative to justify the utility of one's research and prove impact and productivity, etc. — have, in fact, reached into all corners of academia, and that something must be changed if we want good science and decent working conditions for knowledge workers.

Even though we grapple with different scientific questions, academics in different disciplines all face the same ongoing challenges posed by the globalisation of the scientific labour market, the increased pressure to procure funding, publish and be visible in our respective fields, the precarious and short-term employment opportunities, and the need to adapt our life course and family life to the temporal and spatial demands of the academic professions. The obsession with saving time is a false economy: accelerated academic work is damaging science, and time-pressed career trajectories are damaging individuals.

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*Note: This piece has been edited for clarity on 25 May 2016. This article gives the views of the author, and not the position of the LSE Impact blog, nor of the London School of Economics. Please review our Comments Policy if you have any concerns on posting a comment below.*

**About the Author**

**Dr Milena Kremakova**'s research asks how mathematicians are made and what happens to them when they are ready. She uses ethnographic and qualitative sociological methods to examine the working lives and careers trajectories of contemporary (mainly early career) mathematical scientists in the UK and Germany and seeks to uncover what tensions are present in their daily labour and careers of mathematicians, what mathematical work entails, and how being a mathematician is reflected in career, life course and identity. Fieldwork has entailed 94 interviews in two locations in the UK and Germany and two years of ethnographic observation in a UK maths department; analysis is ongoing and more findings will soon be available. She sometimes blogs about it at mattersmathematical.wordpress.org.