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*Of Time-scapes and Knowledge-scapes:  
Re-timing Research and Higher Education*

February 2016

PREPRINT

Department of Science and Technology Studies  
University of Vienna



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Felt, Ulrike (2016). "Of Timescapes and Knowledge Scapes: Re-timing Research and Higher Education". To appear in: Peter Scott, Jim Gallacher and Gareth Parry, *New Languages and Landscapes of Higher Education*, Oxford: Oxford University Press.  
Pre-print; Published by the Department of Science and Technology Studies, University of Vienna, February 2016. Available at <http://sts.univie.ac.at/publications>

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# ***Of Time-scapes and Knowledge-scapes: Re-timing Research and Higher Education***

***Ulrike Felt***

“[...] as Michael Serres repeats, ‘we are brewers and exchangers of time.’ [...] It is this exchange that defines us, not the calendar or the flow that the moderns had constructed for us.”  
(Latour 1993, 75)

## **Introduction**

Reflections on the current transformations of academic landscapes in general and the future of universities in particular, have more recently expressed concern about the changing temporal regimes that govern research and higher education (e.g., Gibbs et al. 2015, Felt 2009, Ylijoki and Mäntylä 2003). We find numerous diagnostic accounts—mostly from the policy side—that raise doubts about whether higher education institutions are performing in these terms, in regard both to educating the next generation of knowledge workers and ensuring the steady flow of innovations; whether they sufficiently are ahead of their time and participate actively in the construction of the future as an “object” of knowledge and concern; and whether they embrace the temporal imaginaries of speed, race and competition with enthusiasm to be able to claim a leadership position in the knowledge economy. As this chapter argues, many of the mentioned concerns regarding research and higher education institutions have been around for a while and were frequently addressed through profoundly restructuring the temporal dimensions of academic lives, work, knowledge production and management. Reforms in funding structures, assessment exercises, accountability procedures, curricula or career paths were all doing important temporal reordering work. However, these reforms were by no means straightforward remedies for the diagnosed ailments; rather, they produced “collateral realities” (Law 2011), which cause academics to experience considerable tensions and unease. Researchers often express such ambivalent feelings about change in nostalgic statements about a golden past (Nowotny and Felt 1997, Ylijoki 2005) when there was still time to think, when there was virtually no talk of careers and strategic planning, when research was not necessarily tied to finding a format that fitted the project logic, and when speed and efficiency were not the primary concerns (Felt 2009). Calls for a “slow university”, i.e. for a deceleration in academic environments to recreate space for more diverse developments, also bear witness to such a move (e.g., O’Neill 2014; Müller 2014).

What is striking about this temporal reordering of universities is that, on the one hand, we seem to realise how deeply time is entangled with questions of power, knowledge and control and how essential time is not only for structuring and ordering our worlds but also for creating and sustaining feelings of stability and belonging (Ad-

am 2004, Nowotny 1994). As Jeremy Rifkin (1987, 7) states, “Time is our window onto the world. With time we create order and shape the kind of world we live in”. On the other hand, as Barbara Adam (1998) convincingly argues, time is often simply taken for granted and treated as a straightforward physical entity, and people do not thoroughly consider its multi-dimensionality and performativity. The temporal regimes governing contemporary academia have thus become an invisible infrastructure guiding the ways in which we know and the kinds of lives we can have in academic environments (Felt 2009).

Analysts have only more recently started to examine more deeply the role of time in research and higher education (e.g., Felt 2009, Gibbs et al. 2015, Müller 2014, Ylijoki and Mäntylä 2003). They all argue that current temporal reorderings impact deeply on academic lives; frame the selection of who is attracted to, remains in or leaves academia; shape the questions that are (not) asked and the knowledge or innovations that can (not) be generated. While these changes in temporalities occur simultaneously in different areas of the research and higher education system and often are entangled, studies frequently tend to focus on one specific kind of temporal dimension of change or on specific groups. This chapter aims to draw attention to how these seemingly separated processes of change in temporalities might add up to a qualitative transformation in the fabric of contemporary academia and to indicate potential directions for conceptualising and reflecting on these larger shifts. In line with this, I will embrace a narrative approach to time (Ricoeur 1983; Czarniawska 2004), to grasp better how researchers (can) make sense of these temporal reordering and when and how this matters in practice. Narratives are understood not only as a way of sharing meaning, but as participating in the constitution of a broader sense of direction and purpose within a specific setting and beyond, of reconfiguring individual and institutional identities, and of enabling and constraining researchers’ actions. Using interviews and discussions with researchers as main empirical basis, I will identify the diverse narratives produced and circulated. For the sake of a more integrated narrative perspective, which pays attention to the interaction between these multiple levels, genres and forms of narratives inherent to academic environments, I will develop the concept of “infrastructure of temporal narratives” which alerts us the pervasiveness of such narratives and to effects of stabilisation (e.g., Deuten and Rip 2000; Fenton and Langley, 2011).

First, I will introduce the sensitising concepts that guide my analysis: timescapes, chronopolitics and epistemic living spaces. I will, then, focus selectively on four different major temporal (re)orderings: trajectories, projectification, ownership of time and emerging tensions, as well as acceleration as a consequence of our race to “the future”. I will identify how each temporal reordering is imagined and where and the extent to which each is performative, whether intentionally or unintentionally. Offering this gaze into academic transformations, I will draw on a large number of interviews with researchers concerning their lives in academic research and on the analysis of research and higher education policy discourse in the European context-. Finally, to conclude, I will reflect on the formation of the *infrastructure of temporal narratives* in contemporary academia, its key features and the impact this has on both the knowledge produced and the academic lives that can be lived. I will point to the emergence of profound temporal inconsistencies, to a hyperfragmentation of time researchers encounter and to the additional work researchers invest to find adequate articulations of the

different temporal requests. This leads to advocating a need for a theorizing of the changing landscapes of higher education through its temporal dimensions; an understanding of academia in terms of a knowledge ecology with a variety of local formations; and the need to develop adequate practices and policies of temporal care.

Although these new temporal regimes touch research systems more broadly, the current essay focuses on university environments and the research performed at them.

## Timescapes, Chronopolitics and Epistemic Living Spaces

Understanding that time is a formative factor in the development of innovation societies and their institutions, we must consider the diverse partly contradictory ways in which time is conceptualised: as a quantifiable resource that can be standardised, commodified, divided and allocated and that is “open to manipulation, management and control” (Adam 1998); as an infrastructure (Bowker and Star 1999) of temporalities that standardises perceptions of time, stabilising certain moral orders and fostering certain kinds of thinking and acting while inhibiting others; and, simultaneously, as experienced, embodied and practiced (Garforth and Cervinková 2009; Adam 1995). This plurality and multidimensionality of time will be at the core of the following analysis.

Barbara Adam’s (1998) concept of “timescapes” captures the multiple entanglements of different coexisting forms of time. The notion triggers our awareness that we need to consider the situated assemblages of different temporalities and pay close attention to “the multiple intersections of the times of culture and the socio-physical environment” (ibid., 9). Thus, we cannot simply investigate the different forms of time in a well-separated manner; rather, we need to reflect the simultaneous superposition and fusion of physical elements, cultural dispositions and personal perceptions of time (e.g., Rosa and Scheuerman 2009). This allows us to think of higher education as a set of nested relations between different temporalities in which change happens at different rates. Furthermore, the “scape” part of the concept acknowledges”, as Adam (2008, 1) argues, “that we cannot embrace time without simultaneously encompassing space and matter, that is, without embodiment in a specific and unique context.” Thus, a timescapes perspective is tied “to spatiality, materiality and contextuality but foregrounds the temporal side of the interdependency.” It will allow us to unfold how landscapes of higher education are deeply intertwined with timescapes and how researchers have to be understood in terms of their local embeddedness in an environment of ongoing processes of change in different temporal, material and spatial dimensions.

However, who can develop and impose specific temporalities? How do multiple temporalities come together to create specific orders? These questions call for a *chronopolitical*—a politics of time—analysis with close consideration of the relationship between time perspectives and political decision-making on all levels as well as of new forms of “tacit governance” (Felt and Fochler 2010) through time. Numerous analysts (e.g., Rifkin 1987, Innerarity 2012) have indicated that in modern societies, time has moved to the centre of societal battles. Innerarity convincingly argues that at the be-

ginning of modernity, economy, communications, technology, and work were the central “time generators” (Rinderspacher 1988, 14), i.e., they were the key sites that created binding temporal requirements and regulations; they imposed a rhythm on a specific system and standardised and homogenised time in each system. In contemporary societies, time has become much more closely entangled with power and many new time generators have been put in place in academia over the last several decades. They range from increasingly selective funding processes over institutional accounting cycles to ever more structured career paths (to mention only the most visible time generators). Thus, “controlling [researchers’] temporal resources” as well as “the regulation of rhythms, duration, speed, sequencing, and the synchronization of events and activities” must be understood as expressions of power (Innerarity 2012, 79-80).

Indeed, when a researcher is involved in a system— in our case, the research and higher education system—in which being on time and to “synchronize with other people, predict, make decisions at the appropriate moment” is essential, then, “time becomes a locus of social opportunities.” (ibid., 80) Thus, exclusion can be understood “in terms of not being allowed to coordinate one’s time with [the systemic] time in which vital opportunities, such as power, employment, or recognition, are negotiated.” (ibid., 80) Therefore, as Innerarity further argues, exclusion does not solely occur through depriving people of material resources or placing them at the periphery; rather, it also occurs through not allowing them to be an active part of the same temporal regime (e.g., interrupted career paths are one example). This points to how important an understanding of temporalities becomes for academia because it not only acts on the people within the system, on what they can do and what they can know, but also draws the line between those who can enter and stay and those who cannot.

While the need to accommodate different temporal demands, the struggle to adequately respond to simultaneous yet conflicting requests on time and the efforts necessary to make the different temporal orders cohere is not a radically new challenge, it seems to gain in importance in contemporary academia through the multiplication of newly introduced time generators. Let us recall the introductory quote of this chapter, in which Latour (1993, 75) notes the importance of the act of exchanging time by highlighting Michel Serres’ statement that “we are brewers and exchangers of time”. The notions of brewing and exchanging time highlight that we cannot consider time and temporal structures as simply given. Rather, we have to investigate how time is practiced, encultured and lived; how emotional work is invested in addressing temporal issues (expectation, nostalgia, waiting, etc.); how time is made and taken; how it is shared and traded, saved and wasted—in our case, by researchers and governing agents. In this understanding of temporality, it is essential to stress that time is intimately related to the act of narration, i.e., to efforts of meaning-making of the world around us. (Czarniawska 2004) When unfolding the observations on the current changes in academia, our account will thus pay close attention to researchers’ individual and collective narratives of the temporal infrastructures and rationales that they perceive as moulding, guiding and delimiting their potential action. Temporalities are therefore deeply entangled with how people can develop satisfactory lives in research, what degrees of agency they (believe they) have, or, more broadly speaking, how they assess their room for manoeuvring — in short, their perception of what I have called an “epistemic living space” (Felt 2009). This notion attempts to capture the multidimensional properties of the environment that researchers inhabit and consider rele-

vant for the knowledge they wish to generate and the lives they wish to live— these dimensions range from intellectual to symbolic and social to material and temporal. By specifically investigating how the multiple temporal orders are narratively mapped out and made sense of, we can learn how they are viewed as opening up or closing down researchers' room for manoeuvring, what kind of practices are developed to respond to diverse and somewhat contradictory temporal demands and how specific visions of time become rooted in habits of mind but also political-strategic practice. In doing so it is, however, essential to keep in mind the "multiplicity, patchiness and heterogeneity of the space in which science works" (Pickering 1992, 8) and thus to expect that temporal shift which seem to happen on a global scale might produce very different local phenomena—local pointing at places both on the epistemic, institutional as well as the geographic map of research (Felt 2009).

Considering these three ways of looking into time and academia together seems to be a promising approach to understand the wider changes that often go beyond single institutions, single fields, single tasks or single groups of actors and transform the landscape of higher education in more profound ways than are evident at first sight.

## Temporal Modes of Reordering Academia

Below, the power of time as an ordering force and the—often invisible—role it plays in reassembling research and higher education in context-sensitive ways will be investigated from four different angles. In grappling with the intricate ways in which time, academic institutions, lives in science and knowledge production are interwoven, this investigation will prepare the ground for reflecting on the kind of 're-timing' research and higher education need to answer contemporary and future societal challenges in a sustainable manner.

## Temporal Trajectories: Imagined and Practiced

When listening to researchers' and policy makers' narratives about the development of science and technology in contemporary societies, we are frequently confronted with what Appadurai aptly called "trajectorism" (2012, 26). According to him, trajectorism is "a deeper epistemological and ontological habit, which always assumes that there is a cumulative journey from here to there, more exactly from now to then [...]. Trajectorism is the idea that time's arrow inevitably has a *telos*, and in that *telos* are to be found all the significant patterns of change, process and history." Following this idea, the constitution of the researcher as subject, of institutions of research and higher education and of the research objects occurs through specific temporal alignments. Trajectories are thus simultaneously the result and the driver of specific temporal orders. They are performed in multiple ways: in the imagination and management of academic institutions, in the conceptualisation and assessment of their output, in the organisation and structuring of researchers' lives and in the means through which knowledge and innovations are produced. Trajectorial thinking aligns the past, pre-

sent and future in such a way that a shared belief that progress can be achieved by following a specific, traceable path emerges.

Within academic institutions, such developmental trajectories are performed, first and foremost, through not simply measuring but charting achievement in graphical forms: the rise in publications, the increase in citations, the growth in the number of PhDs, or the success in attracting external funding. They become indicators of the functioning of a system and transform highly contextual processes into more or less calculable phenomena that can be analysed and managed. Indeed, many of these trajectorial narratives come with statistics and numbers, which are particular trusted forms of enactment (Porter 1995) and point towards the growing “significance of new regimes of measurement” (Espeland and Stevens 2008). Presenting research through numbers—so the imagination—brings forward the public proof that “we” are on the right track, i.e., on a successful trajectory, in a convincing manner.

Trajectorial thinking is also omnipresent when listening to researchers’ narratives about their path through science, i.e., the stories about their career. In our interviews, young researchers often speak about (not) being on track, requiring certain achievements to take the next hurdle, having to accelerate their path, not missing windows of opportunity, seeing a tight connections between age and stage, and needing to reinvent their CV repeatedly to present their personal trajectory appropriately. Others reflect that to be in the research system always means “to move up or out”. We also encounter these visions in so-called career programmes that implicitly promise that one can achieve a goal if one follows a prescribed recipe to navigate the bewildering variety of conditions. This creates an imaginary of linearity, which is often “constructed retrospectively, as past events gain coherence and purpose through narrative” (Garforth and Cervinková 2009, 175), and of a smooth movement on a career trajectory that needs to be the goal that informs action. This “can be framed as desirable, or rejected and resisted”, but it always allows an individual or even enforces one to “be prospective, tied to envisioned futures” (ibid., 175).

Finally, in policy discourse and beyond, we encounter the persistent assumption that innovations also follow a trajectorial development, “starting from basic research, moving to applied research and then to product development” (Felt et al. 2013). This understanding suggests more or less direct causal relationships between input and output, that investing in specific areas of basic knowledge production will necessarily lead to the desired applications (e.g., nanotechnology is such a field) and that putting basic research on the right track is the key to a better future. Under the heading of efficient and targeted investment, this often induces science policies to construct the path to future economic success as a single track that most knowledge agents should follow and that most funding is devoted to.

All three sets of trajectorial narratives incorporate and perform to a certain degree the values, aspirations and logics of neoliberal models of efficiency. As a consequence, they tend to close down potential alternative trajectories at a rather early stage, leading to a decrease in the overall diversity with regard to (1) how institutions can create space for more open-ended thinking; (2) what kinds of careers can be realised and, thus, who will enter, stay in or leave academia; and, finally, (3) how more risky knowledge production can be imagined and practiced.



## Time-Knowledge Packages: The Project as Basic Organising Principle

Another way of temporalising research is through the colonisation of research, as is the case for many quarters of life, “by project-related principles, rules, techniques and procedures, aspiring to form a new iron cage of project rationality” (Maylor et al. 2006, 664). Bringing the project as a key organising principle into science has led to the introduction of multiple new temporalities into academic institutions. As Ylijoki (2015) indicates, these temporalities, in turn, bring to life multiple efforts to commodify, control, colonise and compress time.

First and foremost, projectification has led individuals to think in equivalences of knowledge and time. Researchers’ key question becomes the following: What (kinds of) questions can be asked in an average time of approximately 3 years allocated to a project? This not only demands that researchers develop the capacity to define “doable problems” (Fujimura 1992) but also triggers shifts in the overall temporal organisation of academic work. The way we think and speak of research has gradually been transformed from a more open imagination of knowledge generation to an imagination that is guided by the terminology of roadmaps, milestones, deliverables, time-knowledge equivalences and, above all, deadlines. Although most of the researchers we spoke to stated that the impact of these new terminologies is mainly in the realm of ex-ante and/or ex-post “fictions” that need to be constructed to fit the imaginaries of policy makers and other governing agents, it would be naïve to think that these conceptualisations do not slowly move into researchers’ own ways of thinking. In the end, evaluators are asked to judge not only the idea behind a project but also the orchestration of knowledge-time packages. Therefore, researchers always have to scrutinise whether their imagined plan might survive at least the plausibility check that will be performed. We thus witness a collective adaptation exercise: while we still often find the narrative that it is possible to simply pretend to perform this temporal imaginary and continue business as usual, we simultaneously observe that this logic has already become part of practices and impacts the thinkable.

The project as organising principle implies a quite fundamental reorganisation of academic work. The most important change triggered through projectification is likely the emergence of a new category of researchers, who temporarily join academic institutions as project collaborators and “sell their labour” (Ylijoki 2015, 95) through the tool of “project time”. This refers to a radical shift of relations between different kinds of workforce in academia—necessarily temporary and more stable ones. As Salenius shows quite convincingly, the project as a way to perform research has led to “the delegation of experimental work on projects to trainees” (Salenius 2010). We witness the “multiplication of the time of a project leader”, who is now able to successfully run multiple projects in parallel, which is interpreted as a sign of efficiency and success. This has gradually led to the industrialisation of work, to a growing highly qualified, young, flexible workforce that can be—at least for a certain amount of time—shifted between different projects, and to an “industrial” key evaluation framework (Boltanski and Thevenot 2006), which promotes efficiency and professionalism above all. This poses new challenges to how project time, researchers’ career time and per-

sonal life time can be folded into each other without major tensions and without neglecting one or more of them.

The need to document the use of one's time in the framework of any given project—often under the heading of transparency of the balance between achievements and resources—also deeply alters researchers' perception of time. The project thus opens up a new "theatre of accountability" (Marres 2012, 86), "a literary, spatial and technical arrangement of publicity" in which empirical evidence for the work done is presented (mainly in hours spent and papers produced) and "outside spectators" such as other scientists, policy makers and the public can (at least in principle) exercise some control. This vision of time as a physical entity that can be counted and accounted for fits perfectly with the broader diagnosis of changes occurring in academic work along the neoliberal logic of the New Public Management (Shore 2008). This, in turn, leaves traces in the "regimes of valuation" (Fochler, Felt, and Müller 2016), i.e., "the broader discursive, material and institutional background" on the basis of which researchers perform self-assessments or assess others. For example, as one of our interviewees shared with us, the documentation of time clearly indicates how much time was spent on each project and has unintended consequences among them a new kind of time consciousness. Young researchers under career pressures start weighing how much time they should spend on different tasks. The further they advance in their careers, the more their regime of valuation in which the worth of individuals is defined narrows and becomes mainly reduced to "their ability to succeed in competition, based on productivity in terms of acquiring internationally accepted and transferable tokens of academic quality, that is, indexed publications, grant money and recorded citations." (ibid.) While PhDs can still adhere to different regimes of valuation (ibid.; Louvel 2012), postdocs seem to adhere to a rather narrow temporal vision. This leads to the tendency of reductions in essential community or support work and changes in collaborative patterns because they do not fit the accounting or reward structures (Felt 2009; Müller 2012). This further supports a shift "from exploratory to exploitative learning" (Brady and Davies 2004) and submits the idea of learning, which is essential in the early phase of any scientific career, to the ideal of efficiency. As the innovation trajectories become narrowed down, the learning opportunities also gradually meet limitations.

### **Time: Ownership and Tensions**

With the successful projectification of contemporary research, the question of who can decide how a researcher's time is spent raises issues of ownership of time, impacting researchers' identity in important ways (Currie 2010). Control over one's time, as Innerarity (2012) claims, thus becomes a key territory on which power struggles take place. While it is well beyond the scope of this chapter to show the different time conflicts that emerged from our interviews, I will outline a set of temporal tensions visible when researchers narrate their lives in science. Many of these tensions arise as different performances and understandings of time clash, in particular the conceptualisations of time as a physical and accountable entity *versus* time as a lived and much more fluid entity. In each case we are also confronted with the question of who can decide which temporal regime to comply to and thus who owns time.

The first tension appears between “research time” and “administrative time” and is rather prominent in researchers’ accounts. There are two versions of this narrative. One form expresses the concern that administrative rhythms and rituals do not truly fit the reality of research and thus constantly create frictions and demand that researchers perform translation work to meet managerial requests. While institutions think in budget years and funding agencies think in project time, research is much more fluid, needs to accommodate the unexpected, requires detours in some cases and must cope with failure. Thus, narrative strategies and forms of organising expenditure have to match the “administrative time”. The other version of this tension is concerned with if, how and how often researchers can buy out of their administrative duties and become more engaged in their projects. In this framing, “administrative time” is often conceptualised as “wasted time” from the researchers’ perspective because only the project is valued (Ylijoki 2015).

The tension between “personal time” and “shared time” is the second time conflict narrated. It addresses the delicate balance between needing to contribute to the group/laboratory as a collective while simultaneously fostering one’s own advancement or survival. The latter becomes necessary because all excellence reward systems and career steps focus solely on individual achievements. Therefore, in certain research fields, even asking colleagues for help is a strategic decision because it might for example result in the addition of co-authors to “one’s” paper (Müller 2012). Thus, researchers have to reflect ever more strategically on how much they should engage in shared knowledge production processes, which are simultaneously viewed as essential to solving complex problems, and on how much they should engage in ensuring their own career progress. From a systemic perspective, the following question arises: what kinds of central, collective tasks that help maintain the system as a whole—such as caring for infrastructure, teaching/supervision, engagement with society and many more—are valued as academic achievements and truly impact the development of a successful academic career (Felt 2009; Felt and Fochler, 2010)?

A third tension identified arises between longer-term processes of reflection, developing ideas and trying them out and the more bounded logic of any single project. Ylijoki (2015) aptly labelled these times as “process time” and “project time”. Project time has a number of characteristic features. The project is imagined as a closed temporal sphere with an inner clock, where stages are predefined hand-in-hand with outcomes to be expected. Project time is generally imagined as “linear, cumulative and progressive” (ibid., 95) which is much in line with the trajectorial ideal sketched above. Knowledge and time seem to have already found their equivalences, expressed through work packages and person months, before the exploration started. Project time is anticipatory, promising at the beginning what is to be expected, thus not embracing the idea that you know as you go, but much rather that you know before you go (Ingold 2000). Finally, efficiency is the great promise of the project, the promise of an optimal use of time to maximize the knowledge (measured in publications). Process time seems to be the counter part: more open, explorative, adventurous, disorderly, risk embracing and many more. Obviously, as any dichotomy this is an idealisation. At the same time it raises awareness of potential dangers when embracing this temporalisation in an all to uncritical manner.

Cutting across all these tensions, researchers narrated a growing lack of larger stretches of time to work on one issue and shared multiple anecdotes about the constant need to juggle different demands on one's time. This allows us to diagnose a rise in interrupted time (Bittman and Wajcman 2000; Rosa 2013). In many cases, this fragmentation is not necessarily caused by an increase in direct interruptions to work, although this often occurs; rather, it is caused by the constant anticipation of being potentially interrupted by unexpected events in academic work. Researchers narrate that through the contemporary organisation of research both a feeling of ownership and control over one's time and a greater feeling of coherence is lost—and the rise in efficiency, which is assumed to be achieved through increased attention to time, might turn into its opposite.

### **A Race to “The Future”? Academic Acceleration**

This last temporal shift is embedded in a wider diagnosis of contemporary societies that points to growing attention to anticipating and actively working towards “the future”. Analysts describe this as a determination to tell, tame, trade and transform the future (Adam and Groves 2007), in short to “colonize the future” (Giddens 1999). Indeed, although imaginaries of the future have always played an important role in guiding individual and societal choices, they now play a much more strategic role. Innovation seems to have become the key driver in realising societal futures; thus, institutions of knowledge production and higher education have been attributed a central role in this imaginary. Global competition to attract the brightest minds, engaging in collaborations with economic partners and trying to compete in the race have become core motives for investing in research and development. ‘We have to act now before it is too late’ has become the mantra pushing both speed and competition. This is further reflected in many indicators and benchmarking exercises, including university rankings, which remind us how important such competition has become.

Anticipating things to come, promising techno-scientific developments for society and raising expectations more broadly speaking gradually became characteristic features of academic systems. We witness the emergence and establishment of an “economy of promise” (Felt et al. 2007), in which futures to be achieved or to be avoided are traded in order to obtain public support. This strong drive towards “the future” to be actively brought about, together with the idea of competition, triggers important changes in the current temporalities of academic systems. As in many other societal arenas, in academia, acceleration has become one of the most prominent diagnoses of development. However, acceleration is a complex phenomenon to address. Similar to Rosa and Scheuerman (2009), we must question whether we are witnessing an acceleration of research *per se* or whether different areas on which we reflected (more papers, more grants, more students, ... in the same amount of time) show separate processes of acceleration within academia. For example, Müller (2014) shows how postdocs in the life sciences experience phenomena of acceleration and the pressure to anticipate because they hold only temporary positions. Thus they are ready to engage in the wider temporal imaginary of increasing speed and rhythm in order to survive in the competition, which is accentuated through the temporality of their position.

This calls for a careful analysis of whether or not and, if so, the degree to which these single observations add up to a larger transformation of the contemporary re-

search system. This raises the question how we judge whether an acceleration carries the risk of crossing a threshold that requires our attention or whether we “simply” witness a variation in “the eternal interplay between the forces of movement and those of constancy and stability” (Rose and Scheuermann 2009, 2). While I have traced accounts of acceleration in many narratives and found strong support for the hypothesis of an acceleration, further systematic investigation is needed to answer the abovementioned questions. Such an investigation would make an in-depth empirical understanding of “academic acceleration” as an indispensable phenomenon, which in turn should lead to a better theorising of what acceleration means in diverse academic contexts. Such a theory of acceleration would also have to capture and incorporate the many stories we collected of moments of micro-resistance and of successful efforts of local re-timing.

Indeed, on many occasions, I have witnessed that treating time as a physical entity allows one to succumb to the illusion that one can pack an ever-greater number of activities into the same unit of time and, thus, fulfil the ideal of efficiency that modern societies consider a mark of success. Interviews contain many short reflections that support an acceleration hypothesis, showing the change in rhythm and the speed expected in knowledge production. Interviewees generally discuss a notorious lack of time, pressure, a need to rapidly gain momentum, lack of achievements in relation to the time spent, and many other issues. Some of the younger researchers even reflect that this accelerated pace may be a good reason to leave academia because they are not suited for a life on the fast lane. There is another perverse twist to this story of acceleration and speed. Explicit narratives of “having time” and “taking time” are quasi-banned from narratives, and what Rosa (2013) calls “time affluence” becomes sign-posted as a luxury and as a moral issue because it is taken as a sign that one is not fully engaged.

However, simultaneously with the rising production speed—for example of scientific papers—concerns about fabrication or falsification of research also increase. The number of retracted papers due to sloppy data or outcomes that cannot be verified by others seems to grow faster than the number of papers published, which is often taken as an indicator of a malaise in the system. (Fanelli 2009) In most cases of transgression of good scientific practices the competitive race and the pressure to succeed are given as one of the reasons that triggered the act. Furthermore, the peer review system has regularly come under greater scrutiny as it reaches its limits due to the rising number of papers that have to be handled.

## Concluding Discussion

The four different ways of looking at different simultaneous processes of the temporal reordering of academic research bring us back to Adam’s reflections on timescapes. We now have to ask how these temporalities merge in daily practice and how they are tied to “spatialities, materialities and contextualities” (Adam 2008). We have seen the many moments when new time generators, such as project funding, career structures or administrative procedures, have elicited new materialities and spatialities and, thus, new temporalities. However, viewing research through the lens of time and using ma-

terial from different national backgrounds allow us to see that beneath these temporal re-orderings in research, which seem to be widespread and nearly global, place matters. Under the same wider imaginary of more efficiently timed research, different groups, institutions, and national funding agencies are likely to perform different temporal practices. This demonstrates that change in research systems cannot be captured through a focus on the macro level of research policies; rather, a deeper understanding of their concrete time generators and the micro-political articulations is needed. Resistances and the creation of smaller enclaves of different temporalities also need to be attended to. Timescapes and landscapes thus have to be studied together as two interconnected formations that both have a high degree of situatedness.

What can we learn from the observations made so far?

First, it is important to observe the breadth of the narratives on time articulated by different actors (institutions and researchers) at different moments, their aggregation and the overall effects of the interactions of these narratives rather than study isolated stories. This means looking at the development of contemporary institutions of research through the lens of the *infrastructure of temporal narratives* which permeates them. (see Deuten and Rip 2000; Fenton and Langley 2011) Such an infrastructure not only directs the way we think about research and the horizons of the possible, it shapes the organisational landscape, it reorders practices and shifts our way of creating meaningful accounts on research processes, knowledge trajectories and lives in science (Law 1994; Czarniawska 2004).

The research system, similar to any other system, makes use of such characteristic, shared narratives to express exactly wider imaginations about the environment in which one lives, how that environment functions, what is valued in it, and actors' place and agency in a particular environment. These narrative infrastructures reflect prevailing institutional structures, express values and reinforce collective aspirations. In the world of research, narratives tacitly define the horizons of possible and acceptable action, project and impose classifications, define values and norms that should guide researchers, allow relevant issues to be distinguished from non-issues, and distinguish central actors from non-actors. (Felt et al. 2007) As has been shown, temporal narratives that shape research and innovation operate at many different levels and come in different genres. Some gain more space and visibility, while others disappear or have to live a secret life (e.g., stories of time affluence). An understanding of the development of contemporary research and higher education thus requires the capacity to identify the contours of the narrative infrastructure; where and when it allows temporal narratives to successfully unfold and gain power; who produces, distributes and reproduces it; and, in short, how the infrastructure is kept alive.

Second, it seems essential to be attentive to the many temporal inconsistencies (Giesen 2004) and the hyper-fragmentation of time. Temporal inconsistencies point to the challenge emerging from the simultaneous presence of multiple forms of time. Researchers' narratives indicate that too many demands not only are expressed in different places 'at the same time' but also evolve at different speeds and follow different rhythms. We might ask the following question: Why is this an important issue to attend to? Indeed, sharing the idea that certain temporal routines, including the pace and rhythms of developments and institutional responses, are adequate and at least acceptable contributes to creating a feeling of belonging (Edensor 2006). This, in

turn, allows us to address an essential issue for the further development of the system, namely, who is attracted to higher education and who stays in research. This ties excellence to issues of temporality in new and interesting ways: It poses the question of selection through temporality and not necessarily creativity. Even for those who stay, the complex interferences between different temporalities might lead to a deep feeling of asynchronicity and to the need to perform continuous articulation work to accommodate different temporalities and temporal demands while simultaneously carving out an epistemic living space that seems inhabitable. These complex and contradictory temporal demands of reconciling life, academic careers and epistemic achievements might explain why exclusion—whether based on gender or class—is still important in academia. (Felt 2009, Innerarity 2012) We therefore must give “carefull attention” to the means by which and to the price at which researchers fit everything together, coordinate actions and synchronise agendas.

Third, temporal hyper-fragmentation and, more broadly, the invisibility of temporal structures allow the tensions, asynchronicities and dysfunctionalities they create to remain largely unaddressed. Throughout the chapter, we have observed that individuals and collectives have to perform quite intense *temporal care work* to allow both order and change within contemporary research environments and to create cohesion in individual academic lives, academic work and epistemic practices. However, academic institutions have not developed ways to acknowledge this kind of work, to appreciate the amount of work that must be done and to understand how it impacts on knowledge generation. Furthermore, we have no clear estimation of the emotional labour that is involved in temporal care. Therefore, we need to give more theoretical and empirical attention “not only to the ways in which time is spent and saved, used and produced, managed and accounted for, day by day and week by week in concrete settings, but also to the plural ways it is experienced and made meaningful” (Felt 2009, 36). This is particularly important given that researchers, now more than ever, are not only expected to produce the innovations to assure the desired future but also do so in a responsible manner, i.e., by engage with society throughout the process of innovation (Felt et al. 2013).

Finally, drawing all these reflections together, I would like to stress that the answer to contemporary challenges in research cannot simply be the introduction of yet another—supposedly more efficient—time generator but, rather, to carefully reflect the limits of the chronopolitics described thus far. The metaphor of a knowledge ecology (Felt 2015) would be an excellent tool to rethink and potentially to *re-time* contemporary research and higher education systems. The preservation of the diversity of knowledge would be the core aim of such an ecology, which would demand promoting a balanced relationship between various forms of knowledge, respecting different temporalities needed for knowledge to grow as well as cultivating the diversity of researchers who live and work within academia. Safeguarding free access to knowledge as it is called for in the open science movement is not sufficient; rather, we need to ensure that the tendencies towards commodification of knowledge and towards an increasing number of theatres of accountability do not induce an artificial shortage of specific kinds of knowledge. Thinking with this metaphor would furthermore direct our attention to the fact that the legacies of our present actions will exceed any of the political and socio-economic time frames generally used when judging academic institutions; and it would remind us that sustainability is an essential feature because con-

temporary innovation societies largely live off resources generated in the past. Today, we exploit knowledge created at times when research was less driven by strategy, less tightly coupled to structured timescapes and not obliged to discuss ex-ante its wider relevance. Thus, we can no longer solely anticipate the world in which we want to live. Rather, we must ask whether we currently support the creation of sufficiently diverse knowledge resources and secure attractive “epistemic living spaces” (Felt 2009) for researchers that will enable us to develop solutions to currently unknown problems in the future.

When initiating and supporting change in research and higher education we thus have to develop a deeper sensibility towards and understanding of temporal orders and more “care-full” temporal policies. Looking at time and research through the lens of knowledge ecologies means that we have to develop a long-term cultivation perspective rather than a short-term exploitation perspective.

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