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Thought Pieces for UCLA Knowledge Infrastructure Workshop 2020

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1. What are the most urgent research questions to address about KI? Why?

Just as infrastructures are visible upon breakdown, the financial crisis has revealed to us the persistent and essential element of MONEY as a form of infrastructure in the development and maintenance of KI's. The questions of funding – who, how, what – should not just be questions about political influence over science or knowledge work, but instead examine the long term work of sustaining such fiscal infrastructures as relational work as well. For instance, in the past few years, I've observed two robust KI's I've observed struggle to survive. Two of the spacecraft teams had their missions abruptly ended before scientific work or archival work is complete. Funding cuts along the way led to loss of key personnel, expertise, and knowledge management issues. And in many cases, KI work has become invisible and even emotional labor, occurring off the record. One of our historical documents blames cost growth in spacecraft missions, for instance, on underreporting of human capital, essentially effacing relational work. A similar function is at play in these KI's facing loss of funding – because humans provide the underlying commitment and infrastructure to enable scientific work, these KI communities now rely more and more upon individual's limited, unpaid time.

2. Identify a KI whose survival is under threat.

In my research with David Reinecke at Princeton and in association with Stephanie Steinhardt at MSU, we see several trends in the activities of planetary science and oceanographic observatories take place in the wake of the financial crisis. Funding cuts and agency prioritization, combined with macropolitical changes and inter-institutional microconflicts, make survival of these infrastructures uncertain. The scientists we've observed are taking many approaches to solving the problem. Some are attempting a collective action approach, establishing new programs and initiatives to draw attention to their needs. Others have rebranded their experiments entirely to address new issues of concern; while others are making new relationships with scientists with public reputations in other fields in order to draw attention and funding. Our current and prospective grant projects address these micro-questions of how KI funding is *done* – accomplished, relationally, through work – as well as which new constellations of actors develop, and which implications for science.

What's lost in a “knowledge infrastructure” that goes under is precisely those two factors – knowledge and infrastructure. But as infrastructures are also relational, we should pay attention to the losses in terms of the social, institutional, and in some cases transnational relations and commitments that undergird these systems. Prospective losses include the transnational partnerships, instruments, large scale systems, data banks, and expertise that sustains such scientific investigation, as well as the loss of opportunities for the next generation of graduate students and scientists.

3. How do KI spread information? Misinformation? Alone and in combination with other infrastructures?

In terms of infrastructural combinations, we note that an ‘old wine in new bottles’ approach produces certain paradoxes and complexities in practice. Certainly combining two large scale KI's, with their associated interdisciplinary communities, is resulting in a new form of scientific

collaboration related to, and yet distinct from, the rise of the interdisciplines. Telling new stories about old equipment, retrofitting it for new aims and experiments is always a complex task in terms of the management of materials and narratives, as well as audiences. The combination of existing, underfunded and struggling KI's, however, is of especial interest. What new forms of sociotechnical, infrastructural, institutional, and interdisciplinary torque emerge as two KI's – the products themselves of multiple stakeholders and interests and historical circumstances and path dependencies and situated decision-making – attempt to merge?

In this way, we should consider the micro-political work of seeking, securing, and sustaining funding as part of the sociotechnical when it comes to KI. This includes the micropolitical work of developing the funding ecosystems that enabled and constrained these KI's in the first place; as well as the problems associated with finding new bedfellows and adjusting KI's accordingly. Such work does not examine 'undue influence' over scientific progress, but exposes science funding to an infrastructural inversion, revealing a crucial aspect of scientific work that was always, already underfoot.