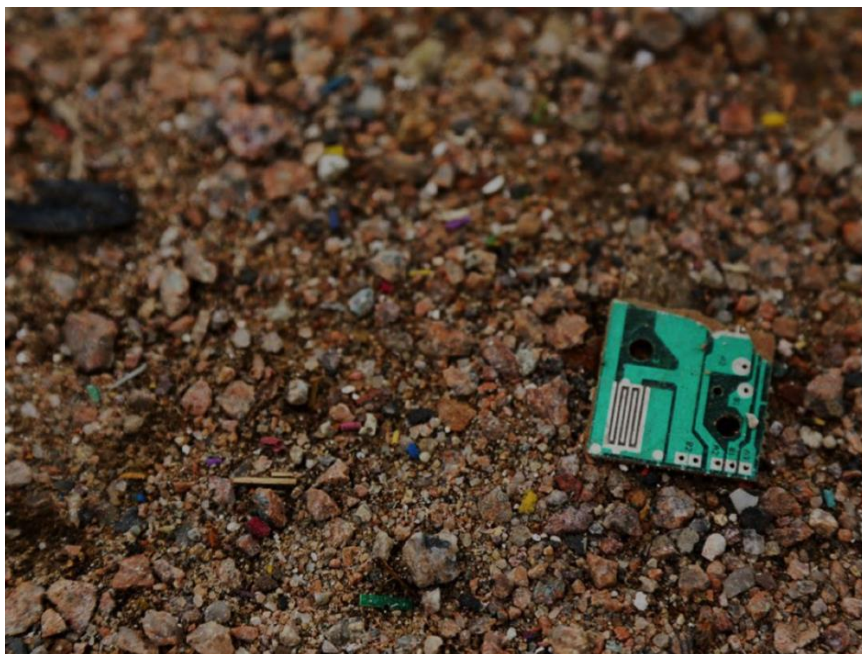


## Toxic E-Waste, Oriented Science

*Yvan Schulz, Anthropology, University of Neuchâtel*



Pick any media, artistic, activist, or academic account of discarded electrical and electronic devices (DEEDs) and there are good chances that toxics, environmental pollution and health risks figure prominently. E-waste, as DEEDs became known, reached the status of public problem in the early

2000s, when a number of non-governmental organizations (NGOs) issued reports denouncing the dangerous conditions people involved in the low-tech recycling of these devices live and work in, and pushing “rich” countries to take responsibility for their scrap instead of exporting it to “poor” ones. This framing progressively transformed into a master narrative: if anything, that is today what laypeople throughout the world know about e-waste. *Featured Image: A chunk of printed circuit board lying on the ground in a dump in South China. Photo Credit: Yvan Schulz.*

Photo credit: Greenpeace

E-waste flows form a threatening breaking wave. In China, Guiyu, a town located in Guangdong Province, became infamous worldwide as a pollution hotspot thanks in large part to awareness campaigns by NGOs such as the [Basel Action Network](#) and [Greenpeace](#). In the mid-2000s Greenpeace produced a toxicology study about electronic waste [in-](#)



[house](#) and commissioned [another](#). Soon there was a [flurry of academic publications](#) featuring China's e-waste dismantling hubs and making this "waste flow"'s harmfulness visible through figures. This trend persists to this day, as a [recent literature review](#) makes clear.

This body of scholarship is the first one I came across in 2013, when I started working on my PhD. In the following years, while conducting ethnographic fieldwork in Guangdong Province and trying to unravel the social construction (Spector & Kitsuse 1977) of e-waste as a public problem, I engaged with people who had produced, or were producing, scientific data on the sanitary and environmental impact of DEEDs, especially in places where so-called "primitive" dismantling and processing takes place.

*What struck me is the confidence with which scientists spoke of pollutants' presence, origins and effects in and close to "informal" dismantling sites.*

What struck me is the confidence with which scientists spoke of pollutants' presence, origins and effects in and close to "informal" dismantling sites. Many of them took for granted that DEEDs represent a highly toxic material stock/flow that accounts — if not fully, then at least to a great extent — for the pollution measured in the local ground, air and water, as well as in the tissues of (mainly human) animals and plants living in those areas. They saw it as their task to contribute to a growing body of evidence that illustrates and reinforces what they, in fact, seemed to regard as an established fact, namely e-waste's extreme noxiousness. I found that their oral narratives and writings provided little room for a discussion on the conclusiveness of their findings, the complex causality that links measurable pollution with concrete health effects, or the relative significance or severity of e-waste as a source of pollution in a country where, and at a time when, unfortunately, such [sources abound](#).

Scientists' steadfastness contrasted with my experience on the field, in particular with the fuzzy picture that resulted from my attempts to investigate the scale and effects of pollution. In interviews, for instance, local inhabitants gave widely varying accounts of the ways in which pollution impacted their lives (Lora-Wainwright 2013). This discrepancy intrigued me and prompted me to reflect on the conditions in which a science of e-waste toxicity is produced.

# Journal of Environmental Monitoring

Cutting-Edge Research on Environmental Processes & Impacts

www.rsc.org/jem

Volume 13 | Number 4 | April 2011 | Pages 765-1104



Focus on Asia/Pacific environmental science

ISSN 1464-0325

RSC Publishing

PAPER  
You et al.  
Short range transport of contaminants  
released from e-waste recycling site  
in South China

International Year of  
CHEMISTRY  
2011

1464-0325(2011)13:4;1-Q

A strikingly imaginative photomontage consisting of a fake dam made up of DEEDs and a real river in South China. Photo credit: Royal Society of Chemistry

In this article, I want to challenge the assumption that such a science reproduces reality in a univocal and unproblematic way. Some readers will no doubt regard this argument as a commonplace (see Latour & Woolgar 1979) and contend that it applies to any form of scientific knowledge. Yet I believe it must be reasserted in connection with e-waste, be it only because a number of **unsupported** or **widely exaggerated claims** and **distorted views** on this topic have emerged in

recent years (see Lepawsky 2014), some of which carried a clear aura of scientificity.

Before going any further, two things must be made clear. First, I am not making a claim for e-waste's harmless or lack of impact. To observe, as I do, that some people take a given phenomena for granted, focus on it, and all but ignore others is entirely different from claiming that this phenomenon does not exist. Second, I have no academic training in earth or life sciences and therefore lack the skills needed to assess the validity of scientific studies according to these fields of enquiry's own criteria. On the other hand, I spent a considerable amount of time in places where DEEDs are collected, dismantled and processed, and among people who engage in these activities or experience them in daily life. This, I think, makes me conscious of aspects that most toxicologists remain oblivious to.



A roadside trash heap in which e-waste and household waste mingle with each other. Photo credit: Yvan Schulz



## E-Waste: Environmental Risk Par Excellence?

In April 2015, I came across the name of a Chinese expert in geochemistry who had published on e-waste. He held a position at a national research institute and was based close to my home, so I contacted him. On the phone, upon hearing that I was conducting research in the same villages where he and his team had taken samples ten years ago, Prof. Chen (fake name) became very excited. He had not yet been back in that region of Guangdong Province but wished to initiate a follow-up study. He asked whether I could help him organize a workshop for his students in which local recyclers would demonstrate “how they burn e-waste”. I knew that the latter would most likely refuse to participate, because the local environmental protection bureau had recently launched a campaign against pollution that targeted open burning explicitly as well as informal recyclers. In the words of an official, the issue was “sensitive”.



Slogans against open burning painted on the walls of a rural region in Guangdong Province by the local government. Photo credit: Yvan Schulz

My data also suggested that open burning was not a common practice any more, and therefore arguably not as serious a problem as it had been in previous years. Recyclers used to burn electrical cables, among other parts, because they were interested above all in the (internal) copper wire and wanted to get rid of the (external) plastic sheath. But they later found a technique to separate one from the other and can now valorise both. Moreover, burning had become considerably more risky in the wake of media reports and ramped up controls by state authorities.

I shared this information with Prof. Chen, who understood, but asked me to keep an eye open for “small stoves” anyway. One of his peers at a prestigious Chinese university, he explained, was conducting a laboratory experiment that simulated open burning of e-waste and measured emanations. Prof. Chen wanted to follow suit and therefore needed to know, not so much whether informal recyclers in Guangdong Province were still burning e-waste at present, but how.

A week later, Prof. Chen came back to me with another plan: he had put together two groups of students from well-known universities and decided to send them to the field to collect samples of air and plant tissue. The goal was to measure levels of highly toxic pollutants such as flame retardants. I was invited to attend their preparatory meeting and, at some point during this meeting, Prof. Chen suggested that the students collect samples not only in and around the recycling site but also at intervals of five kilometres all the way back to the centre of a neighbouring metropolis. This came as a surprise to me and I first thought I had misunderstood. Were we not talking about a stretch of land about sixty kilometres long and covered with factories producing just about everything (e.g. furniture, drugs, apparel, toys, electronics)? In the presence of numerous other possible sources of pollutants, how could measurements be ascribed exclusively or even principally to e-waste? A junior researcher visibly shared my doubts and intervened in the discussion, but Prof. Chen eventually managed to impose the initial research design. In case e-waste recycling had any measurable impact on the lives of millions — not just thousands — of people it was clear that he wanted to be the one to prove it.



University students collecting samples of plant in tissues in a so-called “informal” e-waste dismantling and processing region: Photo credit: Yvan Schulz

A few days later, the students and I were sitting in a bus and on our way to the “informal” recycling site. At some point, I caught a few words from a conversation between three girls. Two of them felt uncomfortable at the idea of spending a day in a “super polluted place”, whereas the third one believed it was “alright”, because they would be exposed for only a few hours. While listening, I could not help but think about the long list of pollutants that can be traced in high concentrations in the bodies of urbanites living — as these girls did — in one of China’s largest industrial clusters. They seemed to have forgotten, at least for a while, the serious smog, food insecurity

and contaminated water that form part of their everyday lives, and were now obsessed instead with pollution arising from e-waste. For the whole group, in fact, e-waste seemed to have transformed into a synonym for pollution. One senior researcher, for instance, declared that he could already smell “burnt plastic” and thought it emanated from e-waste — despite the fact that we were still a good fifteen kilometres away from the recycling site. (In my view, a more plausible explanation was that we had just passed one of the millions of piles of burning household rubbish commonly found in villages in China due to rural collection systems’ limited effectivity.)

### Industrial Parks and the Question of Access

After our preparatory meeting, when the group and I were having lunch together, several of the more advanced researchers had enquired about my work. Obviously, they did not expect a foreigner — and an anthropologist— to conduct research on e-waste in China. I commented that my job was not always easy and mentioned, among others, that I was systematically denied access to official, large-scale industrial parks and plants. My interlocutors expressed no surprise at all and acknowledged that they too have trouble getting the necessary authorizations. For this reason, they rarely collect samples in or close to those sites.

Suddenly, it occurred to me that the entire production of scientific knowledge on e-waste’s toxicity in China (pure laboratory tests excluded) relates to “informal” recycling hubs. This is not self-evident, because the country now also possesses a large number of licensed and state-monitored, or “formal”, recycling plants, which number more than 130 and are located throughout the country, close to large urban centres and generally in industrial parks (Tong et al. 2015). The companies who own them portray themselves — and are portrayed by central state authorities, the media and research institutes — as an environmentally friendly alternative to “independent” recyclers (Schulz 2015). In contemporary China, more generally, large, capital-intensive operations and businesses are routinely considered preferable to smaller, more artisanal ones (Schulz & Steuer forthcoming). However, I found out through my research that this is done on the basis of incomplete evidence, unbalanced comparisons and assumptions rather than comprehensive and systematic studies. We are therefore faced with an artificially contrasted picture of the recycling sector, to which Chinese toxicologists’ restrained access to certain types of facilities no doubt contributes.



large licensed e-waste recycling plant located in an industrial park. Photo credit: Yvan Schulz

A few months later, I visited another team of scientists: toxicologists who have been conducting research on one of China's "informal" e-waste recycling hubs since the mid-2000s. I asked two professors (separately) if they had done any research on the town's industrial park, which had recently been shored up and expanded, or on any other similar industrial facility. One of them replied that she wanted to measure the body burdens of workers employed in the new park, but her project had been put on hold by the park manager on the pretext that too few businesses had joined the park thus far and there would therefore be a lack of participants for the study. My interlocutor acknowledged that she had not expected to face such a hurdle — after all, the park was supposed to be a safer place for workers, so why not prove it? She considered it likely that the study would not start until 2017 or later. The second professor planned on repeating a series of blood analyses among the non-working local population. In other words, she was not going to try to penetrate the park. She also seemed unsure as to whether she should factor in the advent of the park and, if she did, how.

### All Science is Political

*What the above ethnographic fragments make clear is how dominant narratives influence the production of science.*

What the above ethnographic fragments make clear is how dominant narratives influence the production of science. Existing studies on e-waste emphasize contamination in relation to either an artificial and supposedly general setting, i.e. the laboratory, or a concrete and specific one, i.e. "informal" recycling hubs. As a result, e-waste's toxicity appears as both an intrinsic characteristic or potential, and the consequence of wrongdoing by small businesses. Other socio-economic actors'



responsibility, on the other hand, remains out of sight, which is problematic (Schulz & Steuer forthcoming; see also Lepawsky 2012).

*Prejudices and ignorance are part and parcel of the process.*

Blaming Chinese scientists, however, serves little purpose. Their actions — like those of scientists elsewhere and humans in general — are guided by the knowledge they possess and the gaps they try to fill. Prejudices and ignorance are part and parcel of the process. My intention in writing this article was not to criticize them or the work they do. Quite to the contrary, I believe scientists make a powerful and valuable contribution. But since their studies have political foundations and implications — whether they like it or not — scientists should strive for more awareness of, and control on, the ways in which they help shape the social and natural world. Only then can they be certain of doing more good than harm.

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**Yvan Schulz** is a PhD candidate in anthropology at the University of Neuchâtel and a visiting researcher at the University of Oxford. His research explores the so-called “afterlife” of discarded electrical and electronic devices in China (Guangdong Province) and is supported by a grant from the Swiss National Science Foundation.