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# 36 Labs

**Abstract:** The laboratory is an important but largely understudied phenomenon in criminology. This chapter delves into four criminologically relevant aspects of laboratories: (i) labs and the production of criminological knowledge, (ii) forensic labs and criminal investigations, (iii) labs as sites of crime and harm, and (iv) labs as sites of resistance. If labs are particularly pertinent to digital criminology, it is because they are increasingly digitalized and networked spaces, affecting their functionalities and relations to wider society.

**Keywords:** laboratory, knowledge production, forensic science, crime, resistance

## Introduction

Like many academic disciplines, criminology was born in the laboratories of 19th-century researchers who pioneered a set of practices and technological constellations that formed the spatial, temporal, and material backbone of the modern sciences. Cesare Lombroso and the positivist school of criminology's physiological theories of deviance may have fallen out of favor due to their reliance on deeply flawed methods, but the laboratory persists as a site of criminological knowledge production in contemporary biosocial approaches. From forensic labs to clandestine drug labs, laboratories are also crucial to both criminal investigations and criminal organizations. This chapter delves into four criminologically relevant aspects of laboratories: (i) labs and the production of criminological knowledge, (ii) forensic labs and criminal investigations, (iii) labs as sites of crime and harm, and (iv) labs as sites of resistance. If labs are particularly pertinent to digital criminology, it is because they are increasingly digitalized and networked spaces (see Digital by Wernimont). Special attention will be paid to this process of digitalization and how it has affected the laboratory's many functionalities and its relationship to wider society.

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## Labs and the production of criminological knowledge

While it is "almost impossible to imagine science without laboratories" (Schmidgen, 2021: 1), it is all too easy to forget that criminology emerged from the laboratories of 19th-century criminologists who searched for the causes of deviance in the measurement and visualization of 'criminal' bodies (Lombroso, 2006). This legacy of lab work continues to inform a great deal of criminological research, particularly in the subfields of biosocial criminology (Rafter et al., 2016) and neurocriminology (Nordstrom et al., 2011). Laboratory experiments are frequently touted as examples of scientifically rigorous, evidence-based criminology because they ostensibly offer researchers greater control over the conditions under which certain variables are studied (Nagin and Pogarsky, 2003; Yang et al., 2009). These studies are often published in high-ranking journals such as *Criminology* and they give the discipline the veneer of a hard science.

Biosocial criminology and neurocriminology have been criticized for overemphasizing individual and biological factors in explaining criminal and deviant behavior, to the detriment of environmental and societal factors that, by definition, cannot be studied in a lab setting (Fallin et al., 2019; Burt, 2023). Despite these critiques, little attention has been paid to the lab as a site of knowledge production in criminology. There is, however, a rich and diverse body of ethnographic literature on laboratories in the field of science and technology studies (STS), including Bruno Latour and Steve Woolgar's (1979) seminal work *Laboratory Life.*

Based on extensive fieldwork in a neuroendocrinology laboratory, Latour and Woolgar (1979: 105) argue that a laboratory should be regarded "as a system of literary inscription, an outcome of which is the occasional conviction of others that something is a fact." Scientific facts are *constructed* through a slow and practical process 'by which inscriptions are superimposed and accounts backed up or dismissed' (Latour and Woolgar, 1979: 236). This reduction of laboratory practices to a series of operations on literary inscriptions proved controversial and garnered its fair share of critics (e. g., Tilley, 1981; Murphy, 1994; Hacking, 1999). Regardless, *Laboratory Life* inaugurated the subfield of laboratory studies and inspired many STS scholars to conduct laboratory ethnographies (e. g., Knorr Cetina, 1981; Lynch, 1985; Bowker and Star, 1999; Doing, 2009). Criminologists working under the umbrella of digital criminology would do well to engage with this STS literature to better understand the role of labs in the production of criminological knowledge.

## Forensic labs and criminal investigations

The role of forensic or crime laboratories in the functioning of law enforcement has been explored from a variety of angles. In criminology, much of this work has focused on the unrealistic impressions that laypeople might have of forensic scientists and their

technological capabilities. Highly fictionalized depictions of forensic practices and technologies in popular media, epitomized by the American television series *Crime Scene Investigations (CSI)*, were feared to have a real and detrimental effect on the functioning of the criminal justice system by distorting juror expectations of the kind of forensic evidence required for a criminal conviction. The '*CSI* effect', as it came to be known, provoked a lot of media and scholarly debate over its validity and even about the effect that media coverage of the phenomenon might have on criminal justice outcomes (Cole and Dioso-Villa, 2009). Meanwhile, academics and public institutions such as the American National Research Council have sounded the alarm over the lack of quality control and sufficient institutional independence from law enforcement in many forensic labs, arguing that "with the exception of nuclear DNA analysis, no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source" (National Research Council, 2009: 7).

Despite these concerns about crime labs and the recognition of their highly consequential role in the outcomes of the criminal justice system, there are but a few ethnographic studies of crime labs that examine the day-to-day practices of forensic scientists and their changing technological infrastructures (see Infrastructures by Grisot and Parmiggiani).[1] Two noteworthy studies are Corinna Kruse's (2016) *The Social Life of Forensic Evidence* and Beth Bechky's (2020), *Blood, Powder and Residue.* Kruse traces the production of forensic evidence as it moves from site to site within the Swedish criminal justice system. She dedicates a chapter to Sweden's only forensic laboratory (the Swedish National Laboratory of Forensic Science), emphasizing the probabilistic logics that forensic scientists employ to manage the uncertainty inherent to their work (Kruse, 2016: 70).

Bechky (2020), meanwhile, relates the findings of an 18-month ethnographic study of a crime lab in the United States. She details the practices by which "messy crime scenes are transformed into clean scientific reports and courtroom evidence" (Bechky, 2020: 7–8) and, crucially, how these practices are undergoing transformations due to technological and organizational innovations. These innovations include the shift away from forensic generalists who could perform most tasks in the lab (toxicology, firearms, fingerprint analysis, etc.) to highly specialized practitioners, resulting in increasingly fragmented labs in which units have "distinct social practices" (Bechky, 2020: 19). She also addresses the forensic scientist's relationship to digital technologies, especially algorithmic tools intended to automate, supplement, or even replace human expertise, arguing that "these experts work in dialogue with their instruments and techniques, and their embodied and community understandings are needed for interpretation and translation" (Bechky, 2020: 182). Here again we have an opportunity for digital criminology to build on this work and narrow in on the incorporation of digital

**1** For books aimed at a more general audience on forensic labs and the many problems in forensic science, see Garrett (2021) and Murphy (2015).

technologies in forensic practices, such as DNA phenotyping (Kaufmann and Vestad, 2023), to understand how these new technologies affect the politics of knowledge production in forensic labs and criminal investigations.

## Labs as sites of crime and harm

Laboratories are also sites of harmful and/or criminal behavior. Popular media is rife with representations of clandestine drug labs and, thanks in part to the success of television series like *Breaking Bad*, they are typically associated with the production of methamphetamine in the US. In addition to being illegal, drug labs can pose enormous health risks to the people working in them and are often sites of labor exploitation (Chiu et al., 2011). These laboratories speak to the historical and etymological links between laboratories and workshops. The Latin term *laboratorium* originally referred to a task or work, but around the 15th century it came to denote the "workshops of alchemists, apothecaries and metallurgists" (Schmidgen, 2021: 4) who required controlled and secluded spaces to practice their crafts. Clandestine drug labs retain elements of the pre-modern laboratory, with its mixture of scientific practices, material production, and secrecy.

The relationship between harm and laboratories extends well beyond clandestine drug labs. Harm, abuse, and exploitation have been all-too-common features of scientific experimentation in lab settings. Unethical experimentation on humans might seem a thing of the past in an era of ethics committees and strict regulation, but this ignores a more complicated reality. To evade ethical oversight, "experimentation sponsored by the pharmaceutical industry has progressively migrated to the [Global] South" (Negri, 2017: 1022), resulting in some grotesque abuses of clinical trial participants. One particularly egregious case was the American pharmaceutical company Pfizer's testing of an experimental antibiotic on Nigerian children in 1996, which resulted in the death of eleven children and major bodily injury to many others (Ezeome and Simon, 2008). If we widen our lens to consider the abuse of animals in laboratory settings, then the amount of harm perpetrated in labs in the name of science or consumer product development increases exponentially (Goyes and Sollund, 2018).

The digital dimension of lab-based harm and criminality warrants greater scrutiny. On the one hand, the expanding use of computer simulation and big data systems (see Big Data by Završnik) might have the effect of reducing the need for unethical experimentation and facilitate the sharing of experiment data (to the benefit of lab rats across the world). On the other hand, the digitization of consumer products has given profit-driven actors greater capacities to exploit consumers through personal data collection. What's more, the software embedded in smart products can be designed to circumvent legal restrictions, as was the case with Volkswagen's 'defeat devices' in their vehicles, i. e., software that altered the car's nitrogen oxide emissions in a test setting to give the impression that it complied with emission restrictions when in fact emissions far surpassed legal limits under normal driving conditions (Fitzgerald and Spencer,

2020). What is clear is that digital criminology has an opportunity to make meaningful contributions to the study of deviance in technological and scientific communities and examine how harmful practices are embedded in the pursuit of scientific knowledge (Ben-Yehuda, 1986).

## Labs as sites of resistance

Finally, labs can also act as sites of resistance to hegemonic power structures. Hackerspaces, makerspaces, and fabrication laboratories (Fab Labs) have emerged in recent decades as networked spaces where people interact with digital technologies in new and sometimes subversive ways. My own work has focused on the maker movement, an international network of people who make things using digital fabrication machines such as 3D printers and laser cutters, and how the movement might be considered a form of resistance to consumerism (Mazzilli-Daechsel, 2019). Makers, as those who belong to the movement call themselves, tend to conduct their activities in makerspaces or Fab Labs where members have access to digital fabrication equipment and, just as importantly, the opportunity to collaborate with or learn from other members. Projects are sometimes documented and then shared on databases and wikis online. Fab Labs will also organize events for the general public to promote technological literacy. This combination of in-person and online community building is a good example of how digital and networked technologies can transform the nature and functions of labs, from enclosed and exclusive spaces of knowledge production to networked and more inclusive spaces of experimentation, creativity, and alternative forms of material production.

The case study of the maker movement should also temper any overenthusiastic appraisal of lab-based activism or resistance. The fact remains that makerspaces are biased in their design towards highly skilled users and can be difficult to navigate for the uninitiated (see Bias by Oswald and Paul). The majority of makers already have an educational or professional background in technology or design, and tend to be male and middle-class, meaning that the opportunities that makerspaces and Fab Labs afford their users are flowing to a relatively homogenous demographic, one that already has a relatively high degree of technological literacy. Much like public libraries assume a certain level of literacy across the population it serves, makerspaces are dependent on a certain baseline of technological competence held by a mostly privileged minority. Digital criminology should continue to study the intersections of political resistance and laboratories where they arise, such as in citizen science initiatives and climate change activism.

## Conclusion

The laboratory is an important but largely understudied phenomenon in criminology. As I have tried to demonstrate, it can serve as a site of many criminologically relevant practices. The growth in lab studies in STS offers a host of methodological and conceptual tools that should be taken up by criminologists to better understand the role of labs in crime, crime control, and the discipline of criminology itself. For digital criminology, it is important to explore the ways in which digital and networked technologies are changing the functions and capabilities of specific labs or networks of labs, paying particular attention to the ways in which processes of digitalization challenge "the iconography of the laboratory as an isolated, self-contained structure in which equally isolated scientists sit in front of a microscope" (Schmidgen, 2021: 24).

From my own experiences studying labs, and by way of conclusion, here are some dynamics to consider when conducting an ethnographic study of a laboratory:

- The interactions between humans and humans, humans and nonhumans (machines and animals), as well as between nonhumans and nonhumans, how they shape the spatial arrangement of the lab and the temporal rhythm of its operations;
- The relationships between inside and outside. Labs have an internal coherence, but they are always connected to several outsides, be they wider societal structures, illicit economies, personal histories, or digital networks;
- The production of subjectivities within the lab. As Schmidgen (2021: 24) reminds us, laboratories don't just produce new knowledge and technologies, they also produce "new types of people."

## Suggested reading

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