I am a social scientist with expertise in sociology of work and sociology of knowledge. I use qualitative research methods to investigate the roles of non-scientists in today’s research laboratories, including technicians, students, and volunteers.

In laboratories, workers design experiments and theories, software and hardware, and their own sense of professional identity. All of these tasks are crucial to the success of research communities. Workers also shape the data and knowledge that these communities produce. The interactions and hierarchies of researchers, technicians, students, funders, and administrators shape the questions, methods, and innovations that a laboratory is capable of. Therefore, to understand a lab community’s products – i.e., publications, data, objects – we must understand the social system, behavioral norms, skills, and practices that guide the lab’s work. My research analyzes how a variety of laboratory workers collaborate to produce specimens, data, visual representations, technical and social practices, and new knowledge. Crucial topics include learning and training in the lab, concepts of skill and expertise, identity construction for groups and individuals, beliefs about innovation and problem-solving, and community ideals for “good” research and design.

Who does research?
Social studies of scientific workers

Caitlin D. Wylie
Assistant Professor
wylie@virginia.edu
Program in Science, Technology, and Society
Dept. of Engineering and Society
University of Virginia
Charlottesville, VA
434.924.6177

“Ivan: Investigating how we build knowledge, technology, and community in today’s laboratories.”
“Invisible” Technicians
My dissertation studied the work and social roles of fossil preparators, technicians who chip rock from fossils so that researchers can study the bones. These technicians have no shared training or credentials, and no standard protocols. They learn – and invent – their delicate, painstaking skills and techniques on-the-job. Their work to reveal fragile fossils is rarely described in research publications, making them “invisible” in print (Shapin, 1989). Yet my study showed that being omitted from scientific papers provided preparators with rare control over their methods, work practices, and group identity. Because researchers don’t consider preparators to be part of the research process, preparators retain significant power over their work, a shop-floor power that is rare in today’s regimented, protocol-driven laboratories.

Producing and Shaping Data
Lab workers in many fields depend on their own experience and judgment to determine “good” data from noise, background information, and mistaken results. For example, fossil preparators don’t just control their work practices; they also have crucial decision-making power over how fossil specimens look. Fossils are often the only information researchers have about an extinct organism. But fossils are essentially rocks encased in rocks, and deciding what rock to remove and what rock to study is rarely obvious. This critical choice relies on preparators’ experience and judgment, as well as on their skill at removing the surrounding rock with hand tools. This skillful data-making process is seldom mentioned in researchers’ publications, perhaps because they see it as threatening to the objectivity of research.

Who Does Research?
Fossil laboratories make clear that professional researchers with Ph.D.s are not the only people who conduct research. In addition to preparators’ knowledgeable, skillful work, volunteers often prepare fossil specimens for study in museum laboratories. Volunteers work beside staff preparators to learn how to use tools and distinguish fossil from rock. This trend matches research’s rising reliance on unpaid labor, including citizen science initiatives online and outdoors, students who volunteer in labs for research experience, and many kinds of volunteers in museum labs. Perhaps the funding shortages of 21st-century science are creating new opportunities for public access to the previously-hidden processes of producing data and knowledge.

Learning in Labs
Learning to do research cannot be achieved in a classroom. Instead, hands-on, constructivist, innovative, open-ended trial and error enable lab workers to develop skills of posing research questions, designing methods, carrying out those methods, and identifying “good” data. Research skills thus include social abilities, including collaboration, working effectively within a hierarchy, and learning to talk, joke, and act like the workers in the lab and in the broader field. How learners achieve this variety of lab skills, from designing studies to operating machinery to developing a sense of identity with the research community, is the subject of my future studies.

RECENT RESEARCH DEVELOPMENTS
• Completing a book on how laboratory technicians produce scientific data and shape the social structures of scientific workplaces.
• Analyzing scientists’ and technicians’ perceptions of CT scanning and 3D digital modeling of fossils.
• Planning a study of engineering students who work in research laboratories, to assess what they do, what they learn, and what roles they play in the lab and in the broader research community.
• Collaborating with historians and social scientists through the Max Planck Institute for the History of Science on two edited volumes; one about hands-on learning in science and technology and one about invisible labor in science.

RECENT GRANTS
• Max Planck Institute for the History of Science – Postdoctoral Fellowship
• History of Science Society – Travel Grant
• British Society for the History of Science – Travel Grant
• Department of History and Philosophy of Science, University of Cambridge – Williamson Studentship
• Clare Hall College, Cambridge – Student Bursary