My research engages with contemporary issues in the philosophy of mathematics, philosophy of language, logic, and linguistics. My research in these areas stems from an interest in a foundational question: how does *meaning* relate to our practices of *inquiry*? How is what we say about the world shaped by the ways we ask and answer questions about it?

This question is important for anyone who holds that we can use language to communicate knowledge. For a sentence to express knowledge about something, its meaning must be related to what we inquire into when we want to show that it is true. The sentence "Jupiter is a gaseous planet", for example, can communicate knowledge about astronomy. But if we could show, without undertaking any astronomical inquiry, that this sentence was true, then no astronomical knowledge would be required to justify asserting it; and so no such knowledge could be communicated from someone who asserts it to someone who understands its meaning. The idea that a particular sentence can communicate a particular bit of knowledge thus presupposes a relationship between what the sentence means and how we inquire into its truth.

I am interested in many issues in logic, mathematics, and natural language semantics that address this relation of meaning to inquiry. In the philosophy of logic, I am interested in alternative logics and styles of semantics which connect meaning directly with conditions of inquiry, such as game-theoretic and proof-theoretic semantics, dependence logics, and erotetic logic. I am also interested in Frege's distinction between objects and functions and how we can best relate these semantic categories to inquiry. This interest encompasses historical questions about how Frege himself understood the distinction, as well as more systematic questions, such as how we ought to interpret second-order variables. In the philosophy of mathematics, I am interested in how the meanings of mathematical statements and terms are connected with proofs. In this area, I am especially interested in how foundational programs like logicism and formalism explain what it means to talk about mathematical objects and to prove that such objects exist. In the philosophy of language and linguistics, I am interested in the semantic relationships between questions and other expressions, especially nouns, articles, quantifiers, and names. One such relationship appears in so-called specificational sentences, which were a major focus in my dissertation research.

I describe some of my current projects in these areas in more detail below. Central to my approach in these projects is one of the founding principles of analytic philosophy: that the meaning of an expression lies in its contribution to the meanings of whole sentences. In my view, this principle does not merely tell us to look for semantic theories which are formally compositional; it directs us to understand semantic categories as functional roles. Thus, if the meanings of whole sentences are connected with inquiries into their truth, then the meaning of each of their parts plays a particular role in such inquiries. This idea guides my thinking about how we should describe the semantics of non-sentential expressions, both in natural language and in mathematical settings.

"Who are the persons, and how many are the numbers?" In this article, I have articulated some of the main ideas from my dissertation about the semantics of certain expressions in natural language. The article focuses on the behavior of nouns which have a semantic relationship to question words, including 'person', 'number', 'reason', and 'way'. I argue that to account for this relationship, we should think of a noun as expressing the range of possible answers to a question. For example, a noun phrase like 'the way George entered the room' is connected to the question, how did George enter the room? The possible answers to this question include that he entered 'stealthily', or 'via the rear exit', or 'with an abrasive grin', and so on. Semantically, 'way' delimits the range of possible answers given by such adverbial expressions: to grasp the meaning of 'way' is to understand what counts as answering such how-questions and what does not. I further argue that this question-answer model of noun meaning can be extended to all common nouns, so it provides a more general view of noun meaning than the standard view that nouns denote classes of objects. The article is under review.

"Giving the value of a variable" In another article based on my dissertation work, I examine the connection between inquiry and meaning by taking problems in elementary algebra as a case study. In elementary algebra, an equation like $x^2 - 6x + 9 = 0$ gives a problem: what is the value of x? We answer this question with another equation that gives the value of x: $x = 3$. Since answers to many other kinds of questions can be conceived as giving the values of variables, the process of answering an algebraic question serves as a model for inquiries more generally. But a puzzle arises about what these equations mean. These two equations are truth-conditionally equivalent; each is true if, and only if, x takes the number 3 as its value. So in what sense could the second equation be an informative answer? Why does it count as *solving* the problem that the first equation poses? I argue that four different features are required for an equation to give the value of a variable and thereby answer an algebraic question: the variable must be in the *scope* of the problem statement; the values given must be in the *range* of the variable; the statement giving the values must represent a *complete* solution; and it must be in a *canonical form*. These features are a guide to the structure of inquiries more generally: to answer a question is to find a statement that has these four features. This article has recently been published in Kriterion – Journal of Philosophy.

"Frege, Hankel, and formalism in the *Foundations*" Since completing my dissertation, my work has focused on historical research about Frege's distinction between objects and concepts. In the *Foundations of Arithmetic*, Frege explicitly introduces this distinction in order to offer a critique of formalism in mathematics. In this article, I examine Frege's early engagement with formalism in the *Foundations*, where his main formalist interlocutor is Hermann Hankel. Hankel's text is not well-known among Frege scholars, but I argue that it had an important influence on Frege. Hankel, like Frege, wants to show against Kant that arithmetic is analytic, and he does so by arguing that basic arithmetic truths like $7 + 5 = 12$ can be deduced from purely analytic axioms. Hankel's formalism thus anticipates Frege's logicism to a significant extent. This undercuts Frege's claim that his logicism is "completely different" from Hankel's formalism, and raises the question of where the differences really lie. I argue that Hankel and Frege both recognize concepts as a kind of content which may be freely postulated or defined. But Frege differs from Hankel in recognizing that arithmetical terms have a different kind of content which we cannot merely postulate; before we can use arithmetical terms, we first need to *prove* that there are objects which serve as their contents. Frege thus aligns the distinction between concepts and objects with a practical distinction in mathematical inquiry, between what can be postulated, and what must be proven. This article is forthcoming in the Journal for the History of Analytical Philosophy.

Book project: *Frege among the formalists* There is additional historical work to be done on Frege's engagement with formalism. While Frege's opposition to formalism is well known, the views of the formalist figures he engages with, and the details of Frege's arguments against them, are under-explored. Moreover, his criticisms of formalism are important textual sources for his thinking about objects, functions, and the category of *Bedeutung* in general. Frege continues to stress in his later work that formalism fails because it postulates, rather than demonstrates, the existence of mathematical objects, which results from a failure to distinguish objects from concepts. He also sometimes charges formalism with failing to distinguish signs from their *Bedeutung* entirely, or with assigning them a kind of *Bedeutung* that makes them unsuitable for use in science. To make sense of these claims and the consequences they have for Frege's overall theory, we need a better picture of his other formalist interlocutors, including Heine and Thomae (whose views stem from Weierstrass), Hilbert, and Wittgenstein. My plan for the next three years is to write a book on this topic. The book will investigate the views of these interlocutors on their own terms, in order to bring unknown details to light, to describe their impact on Frege's views, and to explain the influence that they had—both through Frege and in spite of him—on the later development of analytic philosophy. I am currently in the early stages of this research, but it has already yielded some interesting results, and I look forward to developing it.