Introduction

Thomas Edison is often credited with creating the first research laboratory. Legend has it that when a new hire asked about the rules of the lab, Edison responded with a wisecrack. "We don't have rules. We're trying to accomplish something."

This book, in part, is about the rules of research – but those of you who find such rules burdensome, don't put the book down yet. We have some empathy with you. We understand the sentiment behind Melissa Anderson's assertion that it's "no secret that researchers tend to view instruction in the responsible conduct of research as an annoyance" (Anderson 2009). That said, we must immediately add that the policies and regulations governing research are critical to your – to our – success. If someone tries to conduct research in ignorance of the rules they are headed for trouble. And that said, we return to our opening theme, Edison's quip. In this book we will not take a traditional approach to what is now called RCR "training." Rather than emphasizing the rules, we emphasize what we're trying to accomplish.

And what is that? In a phrase, it is a philosophical task, the asking of good questions.

The goal of this book is to welcome researchers into the community of question-askers

But let's start with who "we" are. The book is addressed primarily to graduate students beginning their careers as researchers, people who ask and try to answer good questions. Because there are all kinds of good questions, the book features the contributions of scholars from diverse disciplines within the so-called knowledge industries. So "we" usually means the so-called author's we – me and you. Sometimes, however, I use the editorial we and cast myself in the role of a spokesman for a larger group of people all of whom – you must take it on my authority – agree with my opinions. I'll let the context convey which form of "we" I mean.

When I presume to speak on behalf of others, the others I have in mind are a loose ensemble of dozens of researchers known as the OpenSeminar in Research Ethics. This informal scattered group consists of faculty and graduate students from the physical and biological sciences, mathematics and engineering, and the social sciences and humanities who participated in one way or another in the creation of the pedagogical approach found in this book. I hasten to add that members of the group have varying degrees of philosophical agreement with the consequentialist theory around which the book is organized. That, of course, is a polite way of saying that some strongly disagree with consequentialism. Given the fact that disagreement about theoretical matters is a good thing in research, however, it's also an indication of the scholarly health of our community.[1]

[1] See the Acknowledgments for more information about the OpenSeminar and its predecessor, LANGURE. Members of both groups helped to shape the way in which the RCR topics are presented in the 15 chapters and the way in which the expanding circle decision-making method is laid out in the four

Research Ethics: A Philosophical Guide to the Responsible Conduct of Research. Gary Comstock. Published by Cambridge University Press. © Cambridge University Press 2013.

What does this group have in common? We ask questions and search systematically for answers, look for reasons as to why one answer is better than another, and then pose more questions. We identify problems, articulate questions, try on various answers for size, and demand comprehensive and satisfying explanations for why this answer is better than that one. On the basis of accumulated explanations, we construct theories, submit these abstractions to scrutiny, and try to identify the overall theory with the greatest explanatory power, usefulness, elegance, and beauty. We form hypotheses and test them. We examine evidence and analyze arguments. We try to decide which of the competing explanations is the best justified. But we do not rest there. Our work invariably leads to new questions, and we begin again.

The problem facing new researchers is that research pressures undermine vocations

Research is a personal activity requiring individual dedication and perseverance. Max Weber called research (he specifically had scientific research in mind) a vocation, a word taken from the Latin *vocare*, a verb meaning to call (Mills & Gerth 1946).[2] In the medieval Christian context, *vocare* was used to refer to the invitation God issued to select men to join the priesthood. In a secular context, a vocation simply means a line of work to which one feels particularly drawn, as if one had been created to be a physicist, chemical engineer, or a scholar of religion.

Mark Sagoff argues that research is inherently value-laden insofar as it is a process of self-examination and self-clarification. He writes,

> As a vocation, research insists on intellectual honesty, trustworthiness, candor, and clarity; and anything less is to that extent not research. These virtues are what Weber describes as the inward conditions of research. The outward conditions – the business of research – may not fully cohere with the inward conditions but for research to thrive they cannot depart too widely from them.[3]

There is no doubt that research is a business activity and a source of income. Nor could many of us pursue it if we weren't paid a stipend or a salary and benefits. But how, asked Weber, can a graduate student pursue his or her vocation while also navigating through these financial waters? Can one remain true to one's calling while being consumed by the business of paying off one's student loans, much less the task of being the first one to submit a patent application on one's discovery? Compounding these challenges is the fact that research occurs in a university culture that may very well regard research instrumentally – as a means to a paycheck – a culture that seems at times almost to encourage mercenaries and cheaters.

More and more, graduate students are products of an educational system telling them that being a good professional simply requires state-of-the-art technical expertise. Something is missing here, the message that research is a vocation. And there is a cost for this omission. In 1997, Robert McGinn asked his Stanford undergraduate engineering

parts (A, B, C, and D). Disciplines represented in the OpenSeminar and LANGURE included the physical and biological sciences, engineering, the social sciences, and humanities. I recount these points to emphasize that "we" encompasses a broad swath.

[2] I thank Sagoff for bringing Weber's lecture to my attention.

[3] This paragraph is taken from the grant proposal Sagoff and I drafted with Rachelle Hollander.

majors whether their instructors had given explicit information about what it means to be ethically responsible as an engineer. Less than two-thirds of the students – 63% – said they had received the information. Four years later, in 2001, the number dropped to 60%.

We shouldn't be surprised, then, that scientists are engaging in questionable conduct, although perhaps we should be surprised that they admit it. A headline in *Nature's* News pages proclaims, "One in three scientists confesses to having sinned" (Wadman 2005). An article in the same issue reports that, in a poll of more than 3000 scientists, 15% admitted to having changed the design, methodology, or results of a study in response to pressure from a funding source (Martinson *et al.* 2005). Twelve percent said that in the past 3 years they had overlooked another scientist's use of flawed data. Faculty, meanwhile, pay less attention than they should to their own practices when writing up the results of their research. According to a study in *Nature*, "up to 20% of published papers contain some degree of self-plagiarism." It's bad enough when professors pad their résumés. However, as *Nature* goes on to note, when an author publishes the same paper in multiple venues, life-threatening consequences may follow. If another author conducts a meta-analysis of publications on a certain topic and one author has duplicated his or her paper in the record, the meta-analysis may be fooled into making dangerous errors (Giles 2005).[4] For instance, in a meta-analysis of 84 randomized clinical trials conducted between 1991 and 1996 that studied the ability of a drug to suppress postoperative vomiting, the author's inclusion of duplicated papers "led to a 23% overestimation" of the drug's efficacy (Tramèr *et al.* 1997).

Other ethical pitfalls, such as prevarication and evasion, are also not foreign to research. Here are two examples.

Marc Hauser, a psychologist at Harvard University, conducts research on the moral lives of animals. While coding video of primates listening to novel sounds, Hauser consistently coded the animals' responses differently than had his two graduate students who were handling the same data. Hauser's coding supported his hypothesis that the monkeys exhibit responses to novelty that are similar to those of human children. When the graduate students questioned his methods, the university investigated his actions and eventually found him solely responsible for the fabrication of data (Bartlett 2010).

In March 2006, at the University of Vermont, a research assistant suspected Professor Eric Poehlman, an exercise physiologist studying aging, of switching data points to exaggerate patients' deteriorating health. An expert on metabolism in menopausal women, Poehlman was found guilty of misrepresenting his data so that they fit with his favored interpretation. He was barred from receiving additional funds from any US research agency. He admitted to having made material false statements in grant applications, stating that in one case, since he did not have access to preliminary test results needed to complete his proposal, he simply made up the numbers (United States Department of Health and Human Services 2005a and Kintisch 2005).

Do graduate students enter a community that winks at wrongdoing as often as it exposes it? Donald McCabe, a sociologist at Rutgers, has studied student misconduct for decades. McCabe has found that more than 40% of faculty report that they have ignored cheating. More than half of all faculty members have never reported a single case of cheating to anyone

[4] Giles cites (Tramèr *et al.* 1997).

else (McCabe *et al.* 2006). As we shall see in Chapter 1, most of us allow a certain amount of dishonesty in ourselves, if not in others. Dan Ariely's experiments with students on Ivy League campuses suggest that students have a fudge factor; they allow themselves to inflate their own scores by as much as 10 or 20% when they self-report scores under conditions of anonymity. That is, rather than reporting, correctly, that Mark got four answers right out of a possible 20, Mark will help himself to an extra point or two and report that he actually got five or six right – if he believes he won't be caught. Is it simply "human nature" to improve one's score when one is given the chance? The data suggest that it is. And that's the problem.

In the face of these grim facts about the competitive nature of research, its financial pressures, the human tendency to cheat, and the apparent paucity of moral support for young researchers, can graduate students afford to treat their research as anything other than a self-interested business endeavor? Weber thought not. He called the academic life "a mad hazard" because he was convinced it would ruin most of the students who tried to succeed in it. And he told them so.

The solution is not RCR training or a series of unconnected lectures and online exercises

The RCR field – if it is a field – is confused and muddled. Instructors in the area have not paid adequate attention to its foundations. Institutions responding to federal demands for education in the area have produced unimaginative programs with a familiar and unpromising face. According to the conventional model, young researchers are required to attend a series of lectures by local or national experts on each of the nine RCR subjects identified by the Office of Research Integrity as "core topics":

1. Data Acquisition, Management, Sharing and Ownership
2. Conflict of Interest and Commitment
3. Human Subjects
4. Animal Welfare
5. Research Misconduct
6. Publication Practices and Responsible Authorship
7. Mentor/Trainee Responsibilities
8. Peer Review
9. Collaborative Science

But what is the relationship between these topics? What makes them individually necessary as members of the list? Are they mutually exclusive of each other or do they overlap? What makes them jointly sufficient to cover all the main topics? Answers to these critical questions are not easy to find.[5] Typically, lecturers invited to address RCR rarely comment

[5] Each of the nine topics on the list is important, but neither the number of items nor their order is sacred. In 1994, NIH listed six topics (NIH 1994). Recent enumerations often add two topics – science in society and safe laboratory practices – for a total of 11. The Council of Graduate Schools (CGS) adds five and comes up, apparently, with 14 (The Council of Graduate Schools 2008). If the teachers are so confused conceptually, how can we expect students to understand? Ironically, the CGS document asserts that "a comprehensive approach" should include, as two of its additional five topics, "ethical decision-making and deliberation processes" and "ethical principals [sic]." But shouldn't these two so-called additional areas be considered part and parcel of the original nine?

on the field as a whole. Instead, new topics seem to be added to the list as this or that historical scandal erupts and some authority decides training must be offered for the new area, too.[6]

In too many universities, so-called RCR training consists of a set of exercises in which students passively listen to a series of lectures by a procession of experts, each of whom explains the regulations governing their area but not the connections between the areas.[7] The result is that students are exposed to rules but they are not offered the opportunity to discuss the moral principles on which the rules are based or the connections between the various RCR topics. Is there a moral decision-making procedure that one could use to think through issues arising not only in the canonical list of areas but also in novel situations?[8]

Research has evolved its own set of rules and regulations. We – the OpenSeminar group – share the view that research regulations can impede progress and we worry that the rules are becoming increasingly burdensome, perhaps even counterproductive (Grady 2010). Minimally, we – you and I – should question the value of the traditional response to the federal requirement to provide RCR training. Why, for example, should we call it training rather than education?[9]

How could one discuss any of the first nine topics even superficially without explaining the processes and principles of ethical decision-making? (How, we are tempted to add – assuming that you could discuss RCR without discussing ethics – could you discuss "ethical decision-making and deliberation processes" without discussing ethical principles?) CGS no doubt has good intentions, but its confused discussion exemplifies and exacerbates the conceptual disarray of the field.

6 For example, the US Public Health Service syphilis trials in Tuskegee, Alabama, gave rise to the topic of informed consent and the use of humans in research. The use of monkeys in Silver Springs Maryland in head injury experiments spurred the emergence of animals in research as a topic. The controversy swirling around David Baltimore's lab prompted discussion of issues related to falsification of data and whistle-blowing. At some point questions were raised about proper storage of data and interpretation of statistics. Disrespect of research assistants and abuse of mentoring relationships added even more subjects to the agenda. And so on. The topics on the list, in other words, have no obvious relationship to each other. The list itself is nothing more than a bunch of topics lassoed together largely as the result of historical accident.

7 So, for example, the head of the Institutional Review Board (IRB) visits the seminar and explains the rules regarding the use of human subjects – but nothing about how the rules regarding the use of animals are related to the use of humans. The head of the Institutional Animal Care and Use Committee (IACUC) visits to discuss the regulations governing the use of animals – but does not explain why these rules differ so dramatically from those governing the use of humans. Then the Director of Sponsored Programs visits to explain university rules about intellectual property but doesn't explore the question of whether the claim that these rules are justified because they spur innovation and economic development has any basis in fact. The director of Student Conduct provides statistics on the number of undergraduate plagiarism cases but does not ask about the moral psychology of the student who cheats occasionally – which is most of them – nor the philosophical justification of the claim that cheating is always wrong. And so on down the line.

8 Is it necessary for RCR training programs to cover every item on the canonical list? Do graduate students in electrical engineering or ancient philosophy, for example, need to be trained to use human subjects? And are there topics not on the ORI canonical list that ought to be on it (e.g., we'll add intellectual property, environmental ethics, and the social responsibilities of researchers)? The problems here are two-fold. First, the relevance of ethical theories to each of the RCR topics may not be explained. Second, after the lecture on ethics, the theories may never be coherently spoken of again.

9 And why should we put up with a process that consists of little more than a set of rote online activities designed to satisfy an administrative check-off requirement (cf. Comstock *et al.* 2007)?

RCR books do not serve researchers well if they represent a printed form of a compliance exercise. Such exercises allow students to sit alone in front of a computer screen and mechanically regurgitate rules. Despite the fact that the conventional model may be successful in introducing students to relevant policies and regulations, it is not designed to convey the idea that ethical reflection itself is a systematic endeavor. Nor do students come away from online click-through "training" exercises feeling that they are part of a community of moral discourse. Teachers of RCR should approach the subject as a research area in itself. That means taking seriously relevant literature amassed over the past few decades in the areas of normative ethics and meta-ethics. This book takes a step in that direction, showing how ethical theories and methods can bring coherence to the canonical topics.[10]

[10] Adil Shamoo and David Resnik (Shamoo & Resnik 2009) helped to begin rectifying the problem with the first edition of their textbook. Now in a second edition, the book begins with an introduction to ethical theory and decision-making and proceeds to discuss as a linked pair the issues of authorship and peer review. They also follow their discussion of the use of animals with the protection of humans, another natural alliance. The book does not, however, structure itself according to a decision-making method that readers could use in resolving moral dilemmas in different areas. In his brief introduction to the subject, historian Nicholas Steneck (Steneck 2004) discerns a different order in the topics. He begins with ethical issues arising in the planning of research, moving on to consider the questions that arise in conducting research, and concludes with issues that come up in reporting and disseminating research. Putting on a historian's hat can bring temporal order to the topics.

These two works are notable as viable alternatives to the received "RCR training" paradigm. Our book differs from theirs in four ways. First, we adopt a single, straightforward, philosophical approach to the material. Second, we use this approach to group the various topics in more natural ways. Third, we sustain our general, consequentialist, vision throughout the treatment of particular issues in a way that shows the intellectual cohesion of RCR. Fourth, we structure the book as an exercise in moral imagination, an exercise that moves from the good of the individual to the good of the whole.

Our approach does not reinforce the mistaken idea that ethics is a matter of memorizing regulations and obeying authorities. The conventional model approaches RCR education as an exercise in rule-teaching and rule-following, but there is no evidence that this model works. This conclusion comes as no surprise to those who work in the area because the model assumes an impoverished notion of the professions. Professionals don't memorize rules and follow them. Rather, we form vibrant communities of moral discourse. We question our procedures and probe the foundations of our rules. We come to know how to behave by reasoning about what we do, behaving conscientiously because we have the freedom to exercise independent judgment. We know that professionals are society's conscience. When society faces a new ethical question, professionals must figure out what is the right thing to do even though no one has yet discovered the right rule for the situation.

The OpenSeminar approach is critical of the received view. We find it ineffective at best and self-contradictory at worst. Part of the reason for this state of affairs is that when the first government agency began to require RCR training decades ago, it did not provide benchmarks by which the success of efforts could be evaluated. Consequently, it is disquietingly unclear what works and does not work in this critical area. We note, for example, that the number of RCR training programs overall is increasing, as is the absolute number of graduate students so "trained." The obvious expectation, therefore, would be that the number of research misconduct reports would decrease. However, to the contrary, the number of institutions reporting misconduct cases to ORI has not decreased year to year (Titus *et al.* 2008; Wells 2006).

The solution is a vibrant moral community and a coherent introduction to ethical thinking

In this book, we depart in two ways from the conventional model.

First, whereas RCR training aims at compliance with rules, we aim to welcome students into the community of scholars – people who ask questions systematically when a new ethical challenge arises. We aim to nurture interests in critical inquiry and self-motivated responsible behavior, believing that individuals invested in and closely supervised by their communities will not only follow rules they have autonomously adopted for themselves. They will also be prepared critically to examine and on occasion revise such rules.

Second, whereas the received approach relies on a framework cobbled together from a hodge-podge of topics (Heitman & Bulger 2005), we sort the topics philosophically so as to reveal their coherence and systematicity. In footnote 10 we saluted the advances represented in the work of Shamoo and Resnik, on the one hand, and Steneck, on the other. Might there be an even better way to organize the material?

We think so, and we think the right organizing principle is philosophical. We start by introducing egoistic self-interest as a way to motivate right behavior, expanding the moral circle beyond the self in the next step to include one's group. In a third step, we recognize the moral rights of those outside our contractual arrangements. The fourth and final step acknowledges the claims on us of animals and, perhaps, of future generations and even nature itself. Our approach aims, as we say, first and foremost to welcome junior researchers into academic communities and to hone their skills of critical inquiry. We strive to provide them with a method by which to resolve complex and changing ethical questions. We draw insights from educational psychology, evolutionary biology, and the moral development literature, to confront student apathy. We take seriously the fact that when it comes to research ethics many graduate students think "Really? Who cares?" We do not pretend that this thorny question does not hover over all of our endeavors. We choose to address it directly and at the very start by introducing cases in which students have been harmed by misconduct. Yes, we appeal initially to self-interest. But then we expand the circle outward – from oneself to others – motivating this move by citing the role of the moral emotions in personal identity. Our approach is conceptually coherent, research based, and focused on imagination and question-asking rather than compliance and rule-following.

This book also focuses on the intrinsic rewards of research, the inherent pleasures of what we're trying to accomplish. The chapters are designed to help you hone your talents as you gain knowledge and experience and to introduce heroic folk who have overcome significant obstacles and helped to advance research in responsible, admirable ways. They also introduce people who, by taking shortcuts or engaging in outright fraud, have undermined the fabric of trust that's so essential to the health of our community. Along the way, we will direct you to read your professional code, and you will learn steps you can take to help restore confidence in our essential practices: authorship and mentoring, honoring of intellectual property, responsible gathering and use of statistics, avoidance of potential conflicts of interest. The book is intended to help you – the serious younger scholar of the natural, biological, or social sciences, or of engineering or the humanities – to "read" your environment, size up the contingencies that threaten

the achievement of your goals, and steer around them.[11] The authors will have achieved their goal if the book helps to make "normal misbehavior" less normal and the idea of research as a vocation more normal.

As you prepare to enter your research community, we emphasize self-awareness and clarity about your values, as well as effective mentoring, as methods for achieving your goals. Along the way, you may meet researchers who are unwilling to play by the rules. A central objective of this volume is to help you take a realistic approach to them. We suggest that you strike up conversations with those more advanced in their careers, for an isolated researcher is a vulnerable researcher. The OpenSeminar in Research Ethics sponsors a Facebook group and we encourage you to join us (http://www.facebook.com/group.php?gid=15680283403). Our online group promotes discussions of ethical concerns that arise in the daily work of senior scientists, mathematicians, engineers, social scientists, humanists, and their doctoral and postdoctoral students. But it only aims to stimulate and support moral discourse by and about researchers engaged in their own self-clarification, self-criticism, and self-education. Neither the group nor this book is meant to replace the primary research community, for only in face-to-face communities can we truly pursue the vocation of research.

If it is face-to-face contact with people that I need – you may now be asking yourself – why should I read this book? Why read a book about research ethics when one can learn the rules much more quickly from one's mentor and peers, codified in your discipline's code of ethics, and when there is so little time in a graduate student's life for activities not directly related to their degree program? What fledgling researcher has time for abstract philosophizing?

The answer is three-fold. First, your mentors and peers probably cannot teach you all that you need to know. Second, sometimes the rules we seek are not found in the code; without additional guidance, we'll remain at a loss, not knowing how to behave. Yet as professionals, we must do the right thing. Third, if anyone should make time for philosophizing, it should be those who wish to earn a *philosophiae doctor* degree.

But the short answer is this: read this book to protect yourself. As a new researcher, you will encounter many obstacles in your attempt to build a successful career. Your mentor cannot possibly cover all of the problems or tell you how to deal with all of the temptations to take shortcuts, to free ride on others' work, or to adopt a purely instrumental attitude toward your project. This book can help you focus on the intrinsic rewards of research and meet others who share your interests.

Research means asking questions and looking for answers

Speaking generally, research begins in wonderment, when we are puzzled by how something works or what a certain proposition means or whether a correlation suggests a causal

[11] The research community must constantly acculturate new members, acquainting them with its norms and aspirations and thereby reinvigorating and perpetuating the best version of itself. And newcomers must be able to trust established mentors, mentors who in turn empower them, as well as others, to be as autonomous as is appropriate. Toward that end – renewing the research community by welcoming you into it – this book seeks to introduce you not only to research ethics, but also to people whom you can trust and who share your objectives and puzzles, your desire for knowledge and your values.

relation. We then discuss our questions and form a hypothesis. We go on to gather data, run experiments, try out our explanations on others and test our answers in whatever ways we can think of.

Defined more formally, research is

> a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge (Dept. of Health and Human Services 1992, p.45 CFR 46.102).

So construed, research includes activities in the basic and applied fields of science, engineering, and mathematics, as well as the social sciences and humanities. Yes, research involves the formation and testing of hypotheses whether the subject matter is DNA, a software code sequence, or an electrical engineering design. And yet, research also refers to a wider set of practices and institutions. For example, research in the humanities and arts, traditionally known as scholarship, involves other sorts of activities, including the systematic search for explanations of the imaginative expressions we find in literature, music, and the creative arts.

We must keep an open mind about the breadth of activities that qualify as research if we are to understand the multitude of practices that legitimately fall into the category. As a point of departure, however, we might think of research as an organized family of activities that begins in wonderment and questioning, proceeds with methodical searches for generalizable answers supported by good reasons, and continues with the generation of new questions.

Research is inherently a human activity involving not only our reasoning capacities, but also our emotions and attitudes. Just think about the act of asking a question. Any time a peer of yours raises her hand during a class discussion or waits urgently for a conversation partner to finish his sentence so that she can press an objection, she embodies a range of virtues: wonder, humility, honesty, self-confidence, and integrity, to name a few. To ask questions is to risk the possibility that others will think you ignorant. But it also brings the possibility that others will admire your commitment to pursue the truth. To express these attitudes to another, especially publicly, demonstrates courage and resolve. Asking questions requires and rewards persistence, skepticism, and self-examination. Without those traits, you may not have the staying power necessary to steer clear of the obstacles that will likely arise.

Posing questions, and the emotions this involves, is central to science. Without questions, our search for the truth lacks motivation, drive, persistence. Systematicity is also important, because the process must be directed and cumulative. Without a designed, orderly way of learning from previous mistakes and successes, the process will lack comprehensiveness and direction, and we will be unable to extend it, build on prior successes and failures, and generate generalizable knowledge.

Successful research results not in arcane bits of trivia, meaningless streams of data, or idiosyncratic observations about random events. It results in broad ideas and overarching syntheses that are portable, casting light on matters beyond the matters for which they were originally developed. Sometimes, the results of research produce observations or breakthroughs leading to revolutionary new principles or exciting theories. Breakthroughs, however, must be justifiable. The results of our experiments, which allow us to separate good hypotheses from bad ones, must be replicable by others and explanations of observations must pass muster before juries of academic peers.

How can we distinguish between stronger and weaker hypotheses? Generally, the best hypotheses in experimental fields are consistent with each other, and result in predictions that can be confirmed or disconfirmed by empirical tests. The best hypotheses are fecund, giving rise to new predictions and ideas for experiments in other areas. When scientific disciplines such as astronomy and geology are involved, or any of the social sciences and humanities where empirical confirmation may not be possible, generalizations that lend coherence to diverse phenomena and observations are important. Simple and lower-level explanations are better than complicated explanations that unnecessarily appeal to higher-order domains. All things being equal, elegant, simple, and beautiful theories are preferred over excessively complex and pedantic ones.

Ethics means asking questions and looking for answers about right and wrong, and good and bad

The study of ethics is a field of research in which we ask questions about harms and benefits, virtues and vices, choices and dispositions, conflicts and agreements, and the justifications of decisions. The three central branches are:

- descriptive ethics, the empirical study of what people actually do, believe, and value;
- normative ethics, the evaluative study of how we should behave in particular cases;
- metaethics, the philosophical study of the foundations of moral language.

Descriptive ethics involves psychological, sociological, and anthropological inquiry into ethical values as evidenced by what people say they ought to do, as well as by what they actually do. This book focuses primarily on normative ethics, which analyzes the development of moral standards, and applies them to the following kinds of questions: what topic ought I to choose for my dissertation research? What should I do if I witness someone cheating? What policies and regulations concerning research would be the best for my institution to adopt? Finally, metaethicists study questions such as: where does morality come from? How do we ultimately justify ethical judgments? Is the basis of ethics found in God's will? In evolutionary adaptations? In moral intuitions? All of the above? None of them?

One way to begin our venture into normative ethics is to consider a paradigm case of unethical behavior. Jan Schon, a promising young physicist, won awards for his work in organic molecular crystals; in February 2002 he was named outstanding young investigator by the Materials Research Society. But by April of that same year, Bell Labs had fired him for falsifying data. Why would his fabrication be considered wrong? One reason would be the harm it caused. And who was harmed? Himself, obviously. His employer. His friends and colleagues, who had believed in him. The Materials Research Society, which had honored him. Those who read his work and redesigned or redirected their research because of his (false) findings. And indeed the entire community of physicists, which was embarrassed and chagrined by his misdeeds.

Harm is a moral concern; where there is harm, there may be a breach of moral duty. Can beings other than humans be harmed? What is the scope of the prohibition against harm? Does it include animals? Plants? Ecosystems? Future generations? Artificial intelligences? Our regulatory bodies acknowledge that vertebrates are sentient and can experience pain, and so our research regulations include protections for some, although not all, animals. Perhaps we should say, then, that ethical