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Why and How Research Ethics Matters to You. Yes, You!

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Welcome to the special issue of Empirical Software Engineering on the topic of research ethics. We are excited to bring this crucial topic to the attention of empirical researchers. At this point, however, you are probably asking yourself, why ethics and what does it have to do with my research? We will begin to answer this question in this introduction. The articles, cases and commentaries that follow will further detail the relevance of ethics to empirical software engineering research. By the end of the special issue, we hope to have convinced you of the pivotal role that ethics plays in empirical research. We also hope to have convinced you to ensure that the research you conduct and supervise meets ethical standards. Finally, and probably most importantly, we hope to foster a discussion in the research community about ethics and its application to empirical software engineering research.

Perhaps one of the most compelling reasons for academic researchers to concern themselves with ethics relates to research funding. In many countries, including the USA, Canada, and Australia, most research projects receiving government funding and involving human subjects must be reviewed by an ethics review board to ensure compliance with the relevant ethical guidelines (McNeil, 1993; NHMRC, 1999; Penslar, 1993; Sedgley, 2000; Tri-Council Policy Statement, 1998). It is important to note that the funding bodies most likely to fund software engineering research require review and compliance with certain procedures and guidelines. In the US, this includes the Department of Energy, NASA, the Department of Defense, the Department of Education, the National Science Foundation, and the Central Intelligence Agency (Penslar, 1993). In Canada, the Natural Sciences and Engineering Research Council requires an ethics review and compliance with the Tri-Council's guidelines (Tri-Council Policy Statement, 1998). In Australia, the Australian Research Council (ARC) also demands review and compliance with the most recent National Health and Medical Research Council (NHMRC) guidelines (Sedgley, 2000). Moreover, in an Australian institution receiving NHMRC funding, all human subjects research, regardless of funding source, must be reviewed lest the institution lose its NHMRC funding (NHMRC, 1999). In addition to the current rules in force, there are a number of upcoming legislative proposals regarding research ethics. For

example, in the United States, proposed legislation would allow funding agencies to fine individual researchers who do not comply with relevant standards. As another example, in the UK and Canada (Black, 2000), new electronic privacy legislation regulates the management of personal information stored on computers. Although these privacy initiatives were not specifically designed to regulate research activities, they may. In sum, from a regulatory and funding perspective, it is important for researchers to ensure that their research practices are ethical.

Other pragmatic reasons to behave ethically center on the researcher's relationship with the subject population and/or hosting organization (e.g. a company). For instance, it is incumbent upon researchers to act ethically if they wish to maintain their access to the data source. If, for example, a researcher promises a manager a report of the research, but never delivers it, the manager might be less inclined to allow access to source code and/or software engineers in the future. As another example, it would be extremely inconvenient if a research program were cancelled before data collection were completed because of an ethical faux pas, such as the failure to obtain consent from the subjects.

There can also be legal ramifications to unethical behavior. In general, legal issues are based on ethical considerations; e.g., one shouldn't steal or commit murder. Accordingly, in some cases, the courts have relied on ethical codes from professional bodies in making legal judgements (Duncan, 1996). It is important to follow ethical provisions, because researchers are not immune from legal repercussions, such as being sued by a research subject. Though we know of no such cases in software engineering research, several lawsuits have resulted from biomedical research (Katz, 1972).

Regardless of pragmatic issues, many people have a basic motivation to behave in what they believe is an ethical manner. Moreover, people have a strong desire to be treated ethically by others (Baron and Byrne, 1987). This desire for ethical behavior is yet one more reason to consider ethics when performing studies.

Our special issue contains articles, cases and associated commentaries, each representing a different facet of research ethics as it applies to empirical software engineering research. The advantage of cases is that they illustrate how ethics apply to real world research situations. In our special issue, we have enlisted ethics experts to provide commentary to the cases. The first case is about Open Source research and metrics. It was written by Khaled El Emam and follows a discussion we had concerning some of the research he was thinking about conducting. We have provided the commentary for this case. The second case is written by Carolyn Seaman and describes a situation that arose when she was conducting some qualitative research. Donald Gotterbarn, one of the co-authors of the IEEE/ACM Software Engineering Code of Ethics has supplied the commentary for this case. Following these cases is an article by Tracy Hall and Valerie Flynn describing a survey they conducted of UK computing departments. The next case is written by Timothy Lethbridge and describes his experiences with industrial sponsored research and the need for continuing review in the context of a longitudinal study. Joan Sieber, an ethics expert, who has written and edited some very useful books on planning for ethics, comments on Dr. Lethbridge's case. Regulations and rules provide the cornerstone of gov-

ernmental overseeing of research ethics. The next paper by Joan Sieber, thus reviews the United States Common Rule and talks about the risks involved in research. Although, the Common Rule does not apply to those outside of the United States, it is important to understand its regulatory framework as other countries are moving in the same direction. The final case is written by Margaret-Anne Storey, B. Phillips, and M. Maczewski. It talks about their experiences and reservations using students as subjects. Michael Davis, a recognized expert in engineering and ethics, has provided the commentary on this case. Finally, Ulrike Becker-Kornstaedt writes about her experiences as a process engineer and provides an initial set of guidelines. Although the guidelines are geared towards process engineers, they are just as pertinent for empirical software engineering researchers.

The three articles that we have included mirror the process that would allow the empirical software engineering research community to move an ethics agenda forward. First, as Hall and Flynn have done, it is important to survey the field to discover best practices and areas generally in need of improvement. Next, as Sieber has outlined, it is important to understand the generic risks involved in research. It is also important to understand the government regulations that govern research in different countries. Finally, as Becker-Kornstaedt, has shown, we must identify specific ethical issues in the context of particular research practices, and author proposed guidelines to address the issues identified.

We hope that you enjoy the special issue as you learn about research ethics. As a final note, we would like to thank all the authors, case contributors, commentary providers, and those who submitted articles in response to the call for papers. We would also like to thank all the reviewers whose comments greatly improved the quality of this issue.

Good reading!

References

Black, H. 2000. Personal Communication. Legal Advisor, Industry Canada, Canadian Federal Government.

Baron, R. A. & Byrne, D. 1987. *Social Psychology: Understanding Human Interaction*. 5th Ed. Boston, MA: Allyn and Bacon.

Duncan, G. 1996. Is my research ethical?. *Communications of the ACM* 39(12): 67–68.

Katz, J. 1972. *Experimentation with Human Beings*. New York: Russell Sage Foundation.

McNeil, P. 1993. *The Ethics and Politics of Human Experimentation*. New York, NY: Cambridge University Press.

National Health and Medical Research Council (NHMRC), 1999. *National Statement on Ethical Conduct in Research Involving Humans*. Canberra: AusInfo.

Penslar, R. 1993. Office from the Protection of Research Risks. *Protecting Human Research Subjects*. National Institutes of Health. http://grants.nih.gov/grants/oprr/irb/irb_guidebook.htm.

Sedgley, S. 2000. Personal Communication. Director, Policy & Planning, Australian Research Council.

Tri-council Policy Statement: Ethical Conduct for Research Involving Humans, 1998. http://www.nserc.ca/programs/ethics/english/policy.htm.

Dr. Singer is a cognitive psychologist working in the Software Engineering Group of the National Research Council Canada. Dr. Singer conducts studies on the work practices of software engineers with the goal of improving both software engineering tools and processes. Her current methodological approaches are primarily ethnographic, such as observation and interviewing. In the past, however, she has had a great deal of experimental experience. Dr. Singer is also interested in the application of ethics to research in software engineering. She currently serves on the Research Ethics Board of the National Research Council Canada, which reviews research proposals ranging in scope from human computer interaction studies to complex biomedical experiments.

Dr. Vinson is a cognitive psychologist whose research focuses on visual perception and spatial cognition as they relate to human–computer interaction. He is also interested in the psychological processes involved in data visualization and analysis. His current project is to devise and test design principles supporting human navigation in virtual or augmented reality. Dr. Vinson also collaborates with Dr. Singer in examining the ethical issues raised by human subjects research in information technology fields. The Institute for Information Technology (IIT) of the National Research Council (NRC) of Canada has recently begun to perform research involving human subjects. The NRC's Research Ethics Board is unaccustomed to reviewing proposals for human subjects research in information technology. Drs. Vinson and Singer are examining the ethical issues involved in such research to ensure that human subjects research practices at the IIT are both ethical and reasonable. Dr. Vinson is a member of IEEE.