

Interdepartmental PhD Proposal

Benjamin Mako Hill

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The following people will serve as the program committee for this PhD program:

Chair _____
Eric von Hippel
Professor of Technological Innovation
MIT Sloan School of Management

Thomas W. Malone
Patrick J. McGovern Professor of Management
MIT Sloan School of Management

Mitchel Resnick
LEGO Papert Professor of Learning Research
Program in Media Arts and Sciences

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This proposal is approved by the academic heads of both departments:

Ezra Zuckerman Sivan
Chair, Sloan PhD Committee
Nanyang Technological University Professor
MIT Sloan School of Management

Mitchel Resnick
Academic Head, Program in Media Arts and Sciences
LEGO Papert Professor of Learning Research
Program in Media Arts and Sciences

1 Proposal

1.1 Background

Over the last eight years, my research interests have focused on the phenomena that Benkler (2002) calls “peer production” and what many others call “open source” — nonhierarchically organized cooperation facilitated by the lowered costs of communication technologies. Famous examples of the phenomena include what von Hippel (2005) calls user innovation communities, free, libre, and open source software (FLOSS) projects, and Wikipedia. von Krogh and von Hippel (2006) argue that this phenomena represents an important and under-exploited area for research in a variety of fields.

The last several years has seen von Krogh and von Hippel’s call answered with a growth of research on peer production in several fields. But at once both a social and technical phenomena, this work has been largely unorganized, frequently “stuck” inside either social science and technical communities of scholars, and poorly coordinated. Attempting to bridge existing work from several active areas of research, I aim to bring together social scientific analysis of peer production and FLOSS communities with engineering research on the design and the evaluation of the media technologies that facilitate new modes of distributed and cooperative work.

I have pursued interdisciplinary academic work in this area for nearly a decade. My self-designed undergraduate degree brought together a committee of social scientists and computer scientists and my undergraduate thesis evaluated social and technological forms of control in the context of cooperative work (Hill, 2003). Subsequently, when I worked as a full-time software developer in several FLOSS start-ups, I explored the social implications of technical decisions I made in these projects in two published papers co-authored with University of Chicago anthropologist E. Gabriella Coleman (Coleman and Hill, 2004a,b). As a founding member of the Ubuntu project, I created and served in the role of “community manager” for what subsequently became the single largest FLOSS community. As part of this work, I became deeply concerned with sociological questions of how FLOSS communities work, how they interact with firms, and the role that technology plays in framing their work.

In an effort to more satisfactorily answer these questions, I returned to graduate school and completed a *Scientiae Magister* at MIT in Media Arts and Sciences (MAS). My MAS

Masters thesis was again supervised by both technologists and social scientists (Hill, 2007). Most recently, I moved within MIT from the Media Lab to the Sloan for my PhD where I have completed the introductory year in the Behavior and Policy Sciences (BPS) doctoral program in the Technological Innovation, Entrepreneurship, and Strategy (TIES) group. At the same time, I've maintained my connection to the Media Lab as an affiliate of the MIT Center for Future Civic Media. In both my current roles at Sloan and at the Media Lab, I am focused on understanding the social and technological context of work in peer production communities. At Sloan, I seek to understand how these communities work. At the Media Lab, I attempt to build on this knowledge to inform the design of technological systems supporting cooperation.

1.2 Research Overview

So far, I have pursued research in social science and engineering in parallel. I believe that my academic interests and strengths will be better served when I combine my experience and knowledge in both fields in a more integrated effort. MIT's interdepartmental degrees provide the ideal space in which to construct and pursue such an interdisciplinary program.

My proposed program is for a management focused PhD program based in the Technological Innovation and Entrepreneurship group at Sloan — my current department of registration — with an added focus on the application of this research toward the design and evaluation of media technology that facilitates work in my communities of interest. The program will bring together together the expertise of Sloan social scientists studying management science, sociology, and the effects of technological change with the MAS's media technology researchers focused on building new user-focused technological systems.

My research will continue to center on peer production, FLOSS, and free culture communities. I will seek to better understand these communities with an eye toward: (a) using empirical social science to unpack the mechanisms that drive free revealing, volunteer-based, "peer production" communities in technologically mediated environments and (b) translating these results into design principles for technologists working in this space.

1.3 Need for Faculty from Both Departments

Faculty in BPS at Sloan are social scientists pursuing research in economics, sociology, and psychology. Although several faculty members have engineering backgrounds and

BPS research often investigates the development of new technologies, Sloan faculty do not routinely explore the implications of technological design decisions from the perspective of technology designers. Faculty in Media Arts and Sciences build technologies and, more than other engineering programs at MIT, often include strong social scientific theory and methods in the design and evaluation of these systems. But MAS faculty are not primarily social scientists of the type that I intend to become.

But while neither group is a perfect match for my interests and goals, a combination of faculty from both programs offers the potential to create strong support for a program in an important interdisciplinary space. Both programs are methodologically rigorous in ways that I want to see incorporated into my own work. An interdepartmental degree will bring together important tools and techniques from both departments. It will help me create my own academic orientation as a social scientist interested in speaking to technology designers and illuminating the social implications of technological design decisions. It will prepare me for an academic career in interdisciplinary field of growing importance in information schools, technology focused communications programs, informatics departments, and elsewhere.

2 Preparation

My preparation for this degree includes course work in both departments and a strong familiarity with faculty and research in both BPS and MAS.

In Sloan, I have completed the required courses for PhD students in BPS and TIES group through classes on organizations and environments (15.342), introductory social science research methods (15.347) and quantitative research methods (15.348). Additionally, I have completed course work in technology management (15.975), sociology of strategy (15.968) and two classes on applied statistical research taken at the Harvard Graduate School of Education (S012 and S030).

I have prepared for doctoral work in MAS through the successful completion of a Masters degree program in Media Arts and sciences in Summer 2007. During the two years that I pursued my degree, I took on a full work load as a research assistant in two different groups at the lab, took five additional classes at the Media Lab, and four other classes at Harvard and elsewhere at MIT that were focused on issues related to technology design.

Over the last year, I have also engaged in self-initiated course work in interdisciplinary areas of overlap between BPS and MAS through the initiation and execution of two for-credit independent reading groups bringing together students from both departments. This included interdisciplinary readings groups I organized on collective intelligence (15.960) and on FLOSS (MAS.967).

I have maintained a 5.0 grade point average out of a possible 5.0 throughout my work in both programs.

3 Program Committee

The Program Committee will administer the academic program described below. Members may, but need not, serve on the General Examination Committee and Thesis Committee but will review and must ultimately approve the decisions of these committee as satisfying the requirements for the doctoral degree. My proposed Program Committee includes the following three individuals.

Eric von Hippel is Professor of Management of Innovation in the Technological Innovation and Entrepreneurship group at Sloan. He currently serves as my Faculty Advisor and directly oversees my research and coursework at Sloan. A pioneer in innovation research, von Hippel is particularly important to my research as one of the world's most respected and highly cited social scientists studying FLOSS.

Mitch Resnick is the LEGO Professor of Learning Research and head of the Lifelong Kindergarten group at the MIT Media Laboratory. He also serves as the academic head of the Program in Media Arts and Sciences. Resnick is also a faculty co-director of the MIT Center for Future Civic Media where I have worked as an affiliate and researcher over the last two years. In addition to his important work on learning, Resnick's research is closely involved with issues of communities, collaboration, and technology design that bear strongly on my work.

Thomas W. Malone is the Patrick J. McGovern Professor of Management at the MIT Sloan School of Management and the founding director of the MIT Center for Collective Intelligence. He was also the founding director of the MIT Center for Coordination Science and one of the two founding co-directors of the MIT Initiative on "Inventing the Organizations of the 21st Century." Malone's work at the Center for Collective Intelli-

gence, in particular, brings together methods from empirical social science and technology design.

4 Requirements

4.1 Courses

Course requirements include the required courses for a degree the Technological Innovation and Entrepreneurship group at Sloan and a doctoral degree in MAS and include:

- 15.342J: Organization & Environments
- 15.347J: Doctoral Seminar in Research Methods I
- 15.348: Doctoral Seminar in Research Methods II *or* 15.349J: Qualitative Research Methods
- MAS.921: PhD Pro-seminar in Media Arts and Sciences
- A course exploring issues of peer production and FLOSS (e.g., MAS.967/Fall 2008)
- A course on theory and design of technological systems for cooperative work (e.g., 16.499)

4.2 Generals

The General Examination will be modeled after the Media Arts and Science program's general examinations. The examination will cover three academic areas that the student will draw upon in thesis research in four separate examinations — three written, one oral. One of the three written components serves the purpose of the BPS second-year paper. The three areas are chosen in consultation with the Faculty Advisor and must be approved by the Program Committee.

The first area serves the role of the second year paper and will focus on technological innovation with a strong focus on user, open, and distributed innovation. It will be represented in greater depth than the other areas and will represent the area of specialization for the student's thesis research. The second area will include a disciplinary foundation for the student's research as a social scientist and will represent one of the "minors" in the Behavior and Policy Sciences area at Sloan (e.g., sociology, economics, psychology or political

science). The third area will represent a technical area in Media Arts and Sciences and will focus on issues related to technology design and evaluation.

The examination will be conducted by a three-person General Examination Committee consisting of specialists in the three areas of the exam, selected by the student in consultation with the Faculty Advisor. The examination will be chaired by the Faculty Advisor. The student will submit a proposal to the Program Committee including: signed approvals of the three General Examinations Committee members (including biographical information for members); a short description for each of the three areas; a plan of study (including a reading list) for each of the three areas.

The General Examination will have separate oral and written components. In the oral component, the student will be examined in person by all members of the examining committee plus the full Program Committee who are full members of the General Examination Committee for the purpose of the examination. The oral examination typically lasts three hours. The session begins with a presentation (at most 30 minutes), after which the committee members ask questions to evaluate the student's knowledge, understanding, and ability to think through issues and problems in the three selected areas. Examiners can also ask questions from related and surrounding fields.

For the written component, the student will write a paper of publishable quality in the area of specialization. Additionally, the student will be examined using two 24-hour "take-home" examinations in each of the two related areas (with questions posed by the committee members responsible for each of those areas). The oral component can take place either before or after the written components are completed, at the discretion of the committee chair.

The student must complete and pass all components of the General Examination within six months of the program committee's approval of the proposal. The committee can issue a "conditional pass," requiring the student to satisfy additional requirements (such as taking and passing a specific course). If the student fails any component, they can re-take the component, but must do so within the following semester, and can re-take it only once.

4.3 Dissertation Proposal

After passing the General Examination, students can begin preparation of their thesis proposal. The first step will be the creation of a Thesis Committee. The Thesis Committee

will be chaired by a Thesis Advisor who must be a faculty member at the student's department of registration (normally the student's Faculty Advisor). The Thesis Advisor and the other members of the Thesis Committee — two or more Readers — are subject to review by the Thesis Advisor and the Program Committee. The committee should contain at least one member from both Sloan and MAS. This committee will oversee work on the dissertation proposal and dissertation under the supervision of the Program Committee.

The proposal must be presented at a "proposal critique" at least one year before the student's completion of the thesis. The proposal should present a plausible argument for a specific approach to a well-defined problem, with the intention of making an original and significant contribution to knowledge in the field. The proposal should include: the hypothesis, the background for the thesis contribution, the theoretical approach, the method of evaluating the work, the expected results, and a proposed time line for the project.

The thesis proposal must be approved by the Thesis Committee, then presented at a "proposal critique." A primary purpose of this critique is to ensure that the student gets critical feedback before proceeding further with thesis research. The critique will consist of: a 20-to-30-minute public presentation by the student; open questions from the community; a private session with the full thesis committee plus the the Program Committee. Based on feedback at these sessions, the Thesis Committee can require additional changes to the thesis proposal and resubmission to the Program Committee.

The critique must be completed within six months after the approval of the proposal by the Thesis Committee and at least one year before the completion of the thesis.

4.4 Dissertation

The standard for a doctoral dissertation is that it be a substantial, significant, and original contribution to knowledge. The dissertation may take the form of the familiar book-style or consist of a number of essays (often three) which may be jointly authored.

The PhD thesis will be considered complete when the student has presented a public oral defense of the work and submitted a thesis document signed and approved by the Thesis Committee.

References

- Benkler, Y. (2002). Coase's penguin, or, linux and the nature of the firm. *Yale Law Journal* 112(3), 369.
- Coleman, G. and B. M. Hill (2004a, July). How free became open and everything else under the sun. *Media/Culture Journal* 7(3).
- Coleman, G. and B. M. Hill (2004b). The social production of ethics in debian and free software communities: Anthropological lessons for vocational ethics. In S. Koch (Ed.), *Free/open Source Software Development*.
- Hill, B. M. (2003, May). Literary collaboration and control.
- Hill, B. M. (2007). *Cooperation in Parallel: A Tool for Supporting Collaborative Writing in Diverged Documents*. Masters thesis, Massachusetts Institute of Technology, Program in Media Arts and Sciences.
- von Hippel, E. (2005). *Democratizing Innovation*. Cambridge, Massachusetts: The MIT Press.
- von Krogh, G. and E. von Hippel (2006, July). The promise of research on open source software. *Management Science* 52(7), 975–983.