Engineering Ethics

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Engineering is not only about using brick and metal to build physical towers: the basis of engineering is the *ideas that engineers have.* Just as burning and looting buildings is immoral, so is stealing the ideas of another and calling them your own.

In this paper, we will discuss a hypothetical case developed in *Intellectual Property Rights: A Student's Guide*, by Chin Yee Ng at MIT. The full story is at `<http://web.mit.edu/ethics/www/projects/ipr-scen.html>`, so we will merely summarize the situation.

There are three graduate research assistants working under a professor on cutting–edge research, which is funded in part by the NSF and an industrial sponsor who hopes to be the first company to capitalize on the technology when it reaches maturity. These three students, Zhu, Harris, and Blum are excited about this technology and it seems natural that they should start their own company after graduation to bring their academic research to commercial fruition.

What does this have to do with engineering ethics? The question at hand is "who owns the intellectual property rights to the results of the research?" and "who can use them?" Can the three graduate researchers ethically start their own company using the information and methods they learned in the lab? Does the industrial sponsor have any special rights to the technology? How should the students proceed? These are the questions we will address using the information we found on the MIT web site `<http://web.mit.edu/ethics/www/projects/ipr-index>`.

What do these students need to consider in order to respect the intellectual property right of the industrial sponsor? First of all, the students should find out what agreements were made between the laboratory and the sponsors. The documents concerning the agreements should provide the details.

The second concern is the existing intellectual property portfolio in the laboratory, such as patents that have been granted to the laboratory and "licensing agreements in force." The students also have to respect the confidential information that the sponsoring company has given to the students for the research. [1]

Where can they go to obtain answer on this topic? To get information on all of the agreements between the laboratory and the sponsoring company, they should go to the office which negotiated the sponsorship. Next, to obtain information on the intellectual property portfolio of the laboratory, they should visit the office in charge of licensing research information at the college. Lastly, the principal investigator of the laboratory can provide good information on intellectual property generated in the laboratory since he would have had experience with the sponsoring company.

Does the NSF's requirement for public disclosure conflict with the industrial sponsor's need for confidentiality? According to Ng's research, in any case in which there are both industrial and government sponsors, the government's requirements for the release of information always outweighs the industrial sponsor's need for confidentiality. Also, most universities are tax–exempt, and to retain this status, the government requires that they "openly disseminate" any research results. [1]

The three graduate students have gained lots of experience in the years of doing research in the laboratory. How much of this experience and knowledge is theirs to use in a commercial setting? Is the industrial sponsor justified in trying to prevent them from using some of this knowledge?

The students are generally free to use whatever knowledge they gained in the laboratory. The industrial sponsor would only be justified in preventing them in two cases: patent infringement; and company confidential information. If the students want to continue using a patented technology, they must attain the proper licenses for its use. If the industrial sponsor shared company confidential information — trade secrets — with the students, for example, with a non–disclosure agreement, the students must respect that confidential information. With the exception of patent infringement, the students are free to use whatever they learned in the laboratory. [3]

What are the rights and responsibilities of Zhu and his colleagues? As a starting point to determine the scope of their obligations to both the school and the sponsor, Zhu and his colleagues should refer back to any agreements they signed before beginning the research. At MIT, for instance, anyone involved with research must sign an agreement to "disclose promptly and assign to MIT all rights to" all intellectual property that they "conceived, invented, authored or reduced to practice." This includes intellectual property "developed in the course of or pursuant to sponsored research, ... resulting from the significant use of MIT funds or facilities, ... or resulting from a work–for–hire funded by MIT." Other research facilities probably have similar documents. [2]

Student researchers are usually obligated not only to disclose all of their findings to the school, but also to turn over the rights to all of their findings. They are, however, most likely allowed to retain copies of all such items for their own personal use. Furthermore, they may be obligated to report all additional findings that result from their research in the lab. Aside from their responsibility to the school, they are also responsible for upholding any confidentiality agreement between the commercial sponsor and the school regarding trade secrets or other proprietary information the sponsor may have divulged before or since the research began. [3]

How would the scenario outlined above be treated differently if Zhu and his colleagues were working in a commercial company doing the same research and development work? Had Zhu and his colleagues been working in a commercial company they would most likely have signed a non–compete or non–disclosure agreement upon being hired. Since private companies rely on trade secrets and patents to become and remain competitive, they are generally very protective of their intellectual property. Under such agreements, any intellectual property that an employee discovers or creates while working for a company, belongs to that company (with some exceptions). Furthermore, an employee who leaves a job is often forbidden to go to work for certain competitor companies until some predetermined time limit has expired. A former employee is also usually legally bound to waive rights to intellectual property he creates or discovers for some predetermined time after leaving a company. Every company maintains different policies, however, and just as with the research scenario, the rights and responsibilities of Zhu and his colleagues would depend on the specifics of any agreements that they signed upon or since entering employment.

Ethics are very important for engineers: both legally and morally. It is important to be aware of legal requirements regarding professional conduct and property rights. Engineers have tremendous power to create; it is their moral obligation to use that power for good instead of evil. Often when a decision cannot be decided on legal ground alone, the engineer must search his individual values and do what is right. Is it right to help develop chemical weapons? Is it right to steal ideas? Some of these decisions have legal ramifications, you may get caught and punished. In this sense, “getting caught” can be devastating. For example, if an engineer unknowingly uses a patented algorithm in his software, his company could be sued for millions and driven to bankruptcy.

Some professional organizations have codes of ethical behavior. For instance, IEEE has a ten–point "Code of Ethics." Unfortunately, it leaves a lot of uncertainty. The only statement that applies to this situation is: "to avoid read or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist." It doesn't address any sticky intellectual property issues, only mentioning: "to credit properly the contributions of others." This leaves a lot of uncertainty to the engineer. He must take responsibility to investigate the legal ramifications and to search his soul to find what is morally right. [4]

To summarize, the three researchers are free to start their own company and use the fruit of the research provided that they: abide by any prior agreements made by the sponsor and research lab; honor any proprietary information provided by the industrial sponsor; and properly license any patents related to the research.

BIBLIOGRAPHY

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