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# From Fundamental Physics to the Private Sector

**Year**

1999

**Description**

This is a case in which universities who traditionally have collaborated in research find themselves unable, or unwilling, to collaborate as they move into the commercial market. This failure in collaboration comes at the expense of providing a more cost effective (and probably more environmentally friendly) service to the medical world and, ultimately, the public.

**Body**



## Part 1

Most research projects in nuclear physics necessitate the use of particle accelerators. Because the number of accelerators is quite limited and because a single project may require tens to hundreds of physicists, scientists from competing institutions frequently collaborate.

Six particular nuclear physics research groups from Huge University, Technological University, Ivy University, Private University, Popular University, and Selective University are no exception; in fact, these groups, especially Huge, Ivy and Selective, share a long history of collaboration.

Furthermore, nuclear physics experiments are rarely conceived with a practical application in mind; therefore, physicists are driven solely by the curiosity of how matter is put together. Consequently, the nuclear physics community does not have the machinery in place to convert the ideas developed in academia for the private sector.

In July 1994, an article in *Popular Cross Disciplinary Research* outlined the possibility of using laser techniques often employed in accelerator physics to revolutionize conventional magnetic resonance imaging (MRI). According to the article, this technique would allow doctors to use MRI to observe brain function in a noninvasive manner. Should this technology be applied to human subjects, it would require the patient to inhale a special, laser-treated gas, which could then be monitored via MRI.

Several universities believed that this new technology could be quite lucrative and applied for funding to research this new technique. The National Institutes of Health (NIH) immediately saw promise in this new MRI technique and funded nuclear physics groups from the six universities that traditionally collaborated. Researching the new technique, however, did not require the use of a national laboratory, nor did it require tens to hundreds of scientists. Consequently, each of the six universities conducted independent research with the hope of producing new, marketable MRI techniques and hardware.

Huge University and Ivy University emerged as the leaders in the new field, matching each other patent for patent. Since the group at Ivy spearheaded the collaboration that wrote the original article in *Popular Cross Disciplinary Research*, they claimed the first patent, which secured the rights to the idea of using the technique for medical imaging.

Unfortunately, the new technique was still far from practical, given the state of the art. It required the use of two large, expensive, difficult-to-maintain lasers that could be operated only by experts. Huge had discovered that several classes of atoms, including the atoms that composed the gas necessary for the MRI technique, could be prepared using a rather counterintuitive choice of lasers. This new class of lasers

is far cheaper and much easier to operate and maintain, making the ideas discussed in the article practical. Because this choice of lasers required a new understanding of the physics involved, the group at Huge was granted a patent for using the lasers to treat atoms in this particular way.

Groups at Ivy U. and Huge U. each began building an apparatus that would produce the specially treated gas to be used for the new MRI technique. Ivy finished first and patented its new machine. Huge finished a few months later, but its machine had the added capability of being able to produce and deliver the gas with the same machine. Huge also received a patent.

Both groups continued to work diligently on their research. Ivy employed the new class of lasers to prepare their gas in the method patented by Huge. Huge used the laser-treated gas to perform MRI experiments on rats. Ivy's results suffered severely because it did not employ Huge's patented delivery system, vaulting Huge into the forefront of this new field. It is instructional to note that to date, neither university has infringed upon the other's patent because patents only protect against commercial uses and not against research uses.

At present, NIH is prepared to fund a start-up company formed by members of the Huge group. However, the Huge group cannot form a company that markets the new MRI technique. If it were to do so, it would be violating Ivy University's patent. The Huge group, however, could create a company that would sell its new machine to other institutions.

Ivy is in a similar predicament. It cannot produce an MRI machine to be sold to hospitals, unless it either uses a sub-par delivery system and sub-par lasers at a much higher cost or violates Huge U's patents.

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## Discussion Questions

1. Given that the two institutions are unwilling to license patents to each other, does the Huge group have a moral obligation to society to accept the start-up money for a company and mass produce this MRI technique for hospitals? Does it matter that the patents are held by universities (i.e., entities that are reluctant to sue to protect their patents)?

2. What obligation(s) does either institution have to NIH, given that NIH intended its funding to be used to help humans?

3. Which takes precedent - the lives of humans who could benefit from this technique or the issues of intellectual property? If one says that intellectual property is more important, then how does one justify keeping this treatment from those who could benefit from it? Conversely, if lives of humans are more important, then how does one persuade scientists to continue to pursue similar avenues of research, given that their only compensation is the intellectual property that they gain?

4. Is it ethical for the Huge group to form a company that manufactures machines that prepare and deliver the gas needed to perform the new MRI technique and then sell these systems to another company or institution, knowing that the buyer probably will infringe upon Ivy University's patent?

5. If Ivy should decide to commercially produce new MRI systems that abide by Huge University's patents, is it ethical to provide a machine with sub-par performance, with a substantially higher cost, and which only experts in physics can operate? Would it matter if the cost were so high that only the rich could benefit from the new technique?

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# Part 2

Not to be outdone, Ivy attempted to claim the rights to another important procedure. The gas used for inhalation lost its unique properties too quickly to be used in humans unless its container were properly coated for storage. The coating procedure was developed during the days of nuclear accelerator experiments and by this time had become a widely used technique among several divisions of physics and chemistry experiments.

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## Discussion Questions

6. The process of patenting an idea can be quite costly. Some ideas are never patented because they are not cost effective. Does the Ivy Group have the moral

right to patent an idea well after it became public knowledge among physicists and chemists who are not experts in this particular field?

## Notes

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