I think one reason why science and engineering are seen as nearly synonymous, or at least as two sides of the same coin, by the general public is the lack of distinction between an engineer and a scientist. In many cases, people who were known (and continue to be remembered) as scientists functioned principally as engineers.

One example of this can be seen in the reading “Radar: Defense and Offence,” which details the development of radar technology during World War II. According to this reading, radiolocation was developed both from a scientific perspective as well as an engineering perspective at the same time during the war due to the British military’s intense interest in the subject. One example of this rapid development cycle can be seen in how the magnetron was developed “in commercial and university laboratories rather than in service laboratories,” but was nonetheless quickly picked up by the military and “adapted for operational use” (Hartcup 26). The theoretical knowledge of short wave radio and how to generate microwaves and the applications for this new knowledge developed in-step with one another.

The men who applied the knowledge of electromagnetic radiation to the radar in military applications (men who we would today say were acting as engineers) were nonetheless regarded at the time as scientists. For example, the team that developed the use of microwave radar on the coast of Britain “was composed of scientists who would all eventually become Fellows of the Royal Society” (Hartcup 27). Although, scientists by trade, these team were not involved in theoretical work, but rather the application of technology and even used their radar to track a submarine from the coast. Thus, they were acting as engineers. One explanation for this crossover between science and engineering, could be the increased need for applications of technology during the war. If engineers in various fields were not numerous enough—or if there were not any engineers at all in a new field—it would have been necessary to bring in scientists to develop the technology for the war effort.

Andrew, I like how you talk about the importance of science knowledge for engineers to be able to understand the system they are working with. I agree that without science, engineers can only rely on trial and error and maybe a little practical experience. They need science in order to make informed predictions and decisions based. I think the struggle to balance theoretical knowledge with practical experience, as discussed in the MIT reading, continues to be a problem today. Programs like ours focus heavily on project experience, but I think sometimes our projects are lacking in theory. On the other hand, much of the theory we learn is difficult to apply to a brief project that is not too in-depth and specialized.

Shelby, I agree that throughout history, there has been a lot of blurring between the role of engineer and scientist. I think the difference is more defined today, probably due to a greater amount of specialization in different fields. I wrote about how in the case of radar, scientists filled the role of engineers because there were no engineers who had knowledge of radar. In the text, there are numerous instances of people referred to as scientists clearly acting as engineers by working on the practical applications of radar and testing its use for defense. Because the technology was so new, only the scientists who had been researching high-frequency electromagnetic waves had enough knowledge about radar to work on its military applications.

Fernando, I like your story about using physics to calculate a jump. I think it can be difficult to draw the line between engineering and science. The main differentiator that I used in my response was that engineering involves *application*, whereas science does not. The difference becomes especially blurred in cases where people who are regarded as scientists fill the role of an engineer. This was especially true with regard to the development of radar during WWII in Britain. Scientists who had studied high frequency electromagnetic radiation were employed to develop its application toward defense purposes. These “scientists” deployed radar systems and tested their effectiveness at detecting ships and aircraft.

Tyler, I like how you say that both scientists and engineers use the scientific method. I think this is very true. Engineers use their theoretical knowledge to make a prediction about how a particular design will perform. They also often run tests, either at scale or with the real thing in extreme conditions, to verify their model and make sure the results match their predictions. I like how you differentiate between the two by saying that engineering has a physical outcome whereas science has a theoretical one. The differentiation that I used was the engineering is the application of science, but I almost like your version more.

Joseph, I find it interesting how you talk about engineering in the context of fitness and nutrition. It is an application of science that I hadn’t considered before. I was saying that engineering is the application of science. However, as you point out nutritionists and personal trainers also apply science. Should we call them engineers. Rather it seems like another differentiation that I’ve read, that engineering has a physical outcome whereas science has a theoretical one, is better. Applying this to your situation, Personal training and nutrition would be neither science nor engineering because the outcome is in terms of changes in the human body, similar to doctors.

Timothy, your point about how engineering and scientific accomplishments complement each other is very interesting. Previously, I had only really thought about how science could lead to new engineering achievements. What we often see is that as a new field becomes better understood by scientists, such as nuclear physics or electromagnetic radiation, engineers move in and work out new applications for the scientific discoveries, such as the atomic bomb and radar. However, as you point out, there can also be a two-way conversation, perhaps similar to the technological “dialogue” that Pacey talks about in our text. Engineering accomplishments can encourage scientific research.