**My Expectation:**

I entered the RET expecting to learn new things but I also thought I would know a little something about the topic of research. I had dabbled in engineering as an undergraduate and had considered biomedical engineering as a master’s degree but I still had a fear of ‘looking dumb’ in front of both the researchers and my teaching peers. I tried to calm my fears by telling myself it’s only six weeks and that being a flexible, easy-going person were great strengths coming into the RET. There was definitely a steep learning curve, but I was never made to feel unintelligent for asking questions. Each day my comfort level grew as a ‘teacher researcher’ and I realized the researchers were also there to learn something new and that being a teacher gave me a different perspective.

**Challenges Faced:**

Once we knew the topic of research our first challenge was to find out as much as we could about this field. Many of the research articles were overwhelming to read at first but our primary investigator, Dr. Xue Han, and our post-doc student, Jiamin Zhuo, did an excellent job at starting us with as basic information as possible and they were always happy to answer any of our questions. Another challenge was trying to find out how we could best help the research team. Through discussion with Jiamin, my lab partner and I saw a great need for a mouse behavior box that was better suited for their research. We proposed our idea to the research team and they thought a new behavior box would be a great project for us. We found out at the end of the RET that prior to our arrival, Dr. Han and Jiamin had discussed us taking on a much smaller task and they were impressed that we recognized a larger need and were able to make big strides toward meeting this need in such a short amount of time. Coming to terms that we would not be able to fully finish the behavior box during the 6 weeks was also challenging, however we were reassured that research and development is rarely swift and that our presence there helped Jiamin move ahead with his research sooner than anticipated.

**The Research:**

Optogenetics is a relatively new branch of science that focuses on how we can better understand the brain. Before optogenetics, much of what we learned about brain functions was discovered by dissecting dead tissue or by permanently severing connections in live organisms. The new method for studying brain function allows us to target specific types of brain cells and use a particular wavelength of light to act as an optical pacemaker to either trigger or suppress the firing of a neuron. Brain cells must be genetically altered in order for them to become responsive to light. A few types of algae are known to have a photo response when exposed to certain wavelengths of light. The DNA for this photo response can be isolated and then implanted into a virus that will carry the DNA to a particular type of brain cell. Once the brain cell receives the new genetic code it creates photoreceptors which now make this cell responsive to light. The ability to isolate brain function on the cellular level is a tremendous breakthrough and may lead to new treatments for brain disorders such as depression and Parkinson’s disease. A TED talk by Dr. Ed Boyden simplifies the importance of this field of research at <http://www.ted.com/talks/ed_boyden.html>.

**Influence on Teaching:**

I found the pedagogy sessions on technology and teaching the 21st century learner to be the most influential to my teaching. My school is in a brand new building with access to all sorts of educational technology. The RET has encouraged me to be playful with this technology and given me ideas of how to best incorporate it in to my lessons. In addition, I now see myself playing an active role in researching how educational technology, in particular virtual education, impacts the learning of science.