

1. PRF# PRF# 59345-ND7
2. Project Title Development and Understanding of Mixed Lyotropic Liquid Crystals
3. P.I. Name, Affiliation Michael Fisch, Kent State University
4. Co-PI (if any), Affiliation: None

#### Narrative Report for PRF# 59345-ND7

This project has only slowly progressed this past year. I started talking to faculty members in Chemistry, Physics and Chemical-Physics soon after I obtained the grant, and the topic of the research as well as the funding was well advertised. However, due to a very precipitous decrease in graduate students at the University I was unable to find a full-time student how could work on the project. A student was able to work for a few hours, but due to university regulations was unable to work even 20 hours/week, and ultimately stopped working. This fall (starting with the Fall 2019 semester) I have a full-time second year graduate student, Christina Robb who is working on her PhD in Physical Chemistry. In the past few weeks we have used dye to make samples and continues studies of rod-like magnetic particles that we will use in combination with the dye for our first mixed system. Christina has also completed cleanroom training and the steps to make sample cells for this experiment. I anticipate the experiments beginning in earnest in the next few weeks.

Because I did not have students working, I took no summer salary and will be requesting a one-year extension of the grant after next year. There have been some expenses for chemicals and starting this semester tuition and a stipend for Ms. Robb.

The lack of a student, despite abundant funding was a surprise. I anticipated that with the number of students interested in soft condensed matter on the campus it would not be easy, but not impossible. This has been an impetus to be even more proactive in attending seminars and making certain I am not unknown to the students. Research is an essential component of a graduate student's education. I have tended to focus on tasks so that the student can work on learning, studying and advancing the science rather than the often-tedious parts of any research project. During the past year, there has been other research on mixed lyotropic liquid crystals that has suggested new ways to obtain dispersion of the two moieties. This will help the research expand further and faster. I also will be able to dedicate more time to research moving forward. My college has a new dean and there is a push for research, and I will be teaching fewer courses moving forward.