

2017 Summer Research Experience for Teachers

Mission

To strengthen STEM teaching through intensive research collaborations among PreK-12 teachers, university and college scientists and Ph.D. and undergraduate students

This summer's program is an extension of the successful 2016 pilot program. In December 2016, an article was published (pps. 8-9) in UNC Charlotte's College of Liberal Arts & Sciences [Fall-Winter 2016](#) issue of *Exchange* magazine. Also, CTI has published the process evaluation work conducted on this scientist-graduate student-teacher innovative model, including in [Marcus' Jones lab](#) and [Susan Trammell's lab](#).

Outcomes for PreK-12 Teachers

- (1) Develop a deeper understanding of best practices in scientific research
- (2) Explore the research process, including creating research questions and consulting literature
- (3) Conduct hands-on experiments in an active research lab
- (4) Analyze and present data in an effort to draw conclusions
- (5) Develop a plan for sharing research experience with students and colleagues

Outcomes for Ph.D. and Undergraduate Students

- (1) Develop mentoring skills centered on scientific technique and communication
- (2) Enhance scientific communication skills through collaboration with teachers
- (3) Help teachers create a plan to demonstrate cutting-edge science in the classroom

1. **Susan Trammell** (Physics, UNC Charlotte) is offering a 4-week experience for 6 teachers in her research laboratory at UNC Charlotte. Susan will have two Ph.D. graduate student mentors to provide safety, technical and conceptual support for teachers.

Dates: 19 June to 30 June 2017, for 4 hours/day. Specific hours to be scheduled among research team members for teachers.

Team: Six (6) teachers will be selected to work with Susan and two Ph.D. graduate students.

Stipend: Each teacher will receive a \$500 stipend for successful completion of the 2-week experience.

Activity: According to Susan, “During this 10-day experience, you will work in a lab side-by-side with graduate students who are conducting research projects. This experience will give you a chance to get your hands dirty and really understand how scientific research is done. You will help design and conduct experiments and analyze data. In addition, you will learn how scientists communicate their results. You will have the opportunity to share your research experience with other CTI fellows when we return to seminars in the fall.”

2. **Marcus Jones** (Chemistry, UNC Charlotte) is offering two (2) 3-week experiences for 4 teachers in his research laboratory at UNC Charlotte. Marcus will have two Ph.D. graduate student mentors to provide safety, technical and conceptual support for teachers.

Dates: Team A (2 teachers): 19 June to 7 July 2017, for 4 hours/day. Specific hours to be scheduled among research team members.

Team B (2 teachers): 10 July to 28 July 2017, for 4 hours/day. Specific hours to be scheduled among research team members.

Team: Four (4) teachers total will be selected to work with Marcus and two Ph.D. graduate students. 2 teachers on Team A and 2 teachers on Team B.

Stipend: Each teacher will receive a \$750 stipend for successful completion of the 3-week experience.

Activity: According to Marcus, “Teachers will work alongside two Ph.D. graduate students to study how interactions between metal and semiconductor nanoparticles could help to develop more efficient solar cells and light-emitting diodes. Participants will work in my lab and undertake their own research projects, generating real data and, hopefully, contributing to our understanding of these materials.

3. **Tom Schmedake** (Chemistry, UNC Charlotte) is offering a 3-week experience for 2 teachers in his research laboratory at UNC Charlotte. Tom will have one Ph.D. graduate student mentor to provide safety, technical and conceptual support for teachers.

Dates: 10 July to 28 July 2017, for 4 hours/day. Specific hours to be scheduled among research team members.

Team: Two (2) teachers will be selected to work with Tom and a Ph.D graduate student.

Stipend: Each teacher will receive a \$750 stipend for successful completion of the 3-week experience.

Activity: According to Tom, "This project will focus on the synthesis of new materials for flexible electronic device. Our research group focuses on addressing the need for new materials that could be used for flexible displays and photovoltaics. The teachers participating in this project will synthesize and purify a new candidate compound during the first week. During the second week, the focus will be on characterizing the optical and electronic properties of the compound. During the third week, we will try to incorporate the new material into a functioning electroluminescent device."

4. **Erland Stevens** (Chemistry, Davidson College) is offering a 3-week experience for 2 teachers in his research laboratory at Davidson College. Erland will have one undergraduate mentor to provide safety, technical and conceptual support for teachers.

Dates: 26 June to 14 July 2017, for 4 hours/day. Specific hours to be scheduled among research team members.

Team: Two (2) teachers will be selected to work with Erland and an undergraduate student.

Stipend: Each teacher will receive a \$750 stipend for successful completion of the 3-week experience.

Activity: According to Erland, "Teachers will use new chemical reactions to synthesize molecules with promise for use in making new drugs. These syntheses are modular, facilitating the teachers having a meaningful research experience over the course of three weeks in the lab. The teachers will perform the experiments, isolate and purify the products, and use instrumentation to confirm the identity of the final compounds. My hope is that this work will not only provide teachers with hands-on scientific practice, but opportunities to innovate and bring back new demonstrations for their students in the classroom."