TEACHER LEADERS IN RESEARCH BASED SCIENCE EDUCATION: K-12 TEACHER RETENTION, RENEWAL, AND INVOLVEMENT IN PROFESSIONAL SCIENCE. S. K. Croft[1], S. M. Pompea[1], and C. E. Walker[1]. [1]NOAO, 950 N. Cherry Ave, Tucson, AZ 85719. scroft@noao.edu, spompea@noao.edu. cwalker@noao.edu.

Introduction: Teacher Leaders in Research Based Science Education (TLRBSE) is a K-12 teacher professional development program that has been created at the National Optical Astronomy Observatory (NOAO) in Tucson, AZ. It integrates several prominent trends in American science education, including the use of technology in the classroom, the development of inquiry-based science curricula closely modeling professional science practice, teacher retention and renewal, and the creation of communities of science learners consisting of both teachers and students. The project has reached a certain level of maturity, having run for four years as the Research Based Science Education (RBSE) project that emphasized bringing research and scientific data into the classroom, and two years as TLRBSE that adds a teacher retention and renewal component. RBSE was a set duration project funded by the National Science Foundation (NSF) separately from the general NOAO budget (also funded by NSF). TLRBSE was approved as a project that would transition from a fully NSF-funded project to a fully NOAO-funded project over a period of five years. We are currently half-way through that transition. Incorporation of the TLRBSE program as part of the NOAO core program assures its continuation into the future.

Description. TLRBSE has national scope. Nearly one hundred and twenty teachers from thirty four states and Puerto Rico have participated in the program. Most of our teachers are still active in the program, using research-based science education in their classrooms in one form or another. TLRBSE is designed to give middle and high school science teachers experience in working on real earth and space science research projects with professional scientists using professional, world-class telescopes. The teachers are also trained in research-based pedagogy so that they can effectively take these research projects into their classrooms to share with their students and colleagues. Our teachers begin the program with a semester-long graduate-level distance-learning course. The course of instruction is divided between science content, inquiry-based pedagogy, leadership skills, and training on image processing software and specialized techniques relevant to our research projects. Classroom interaction is intense, emphasizing collaborative activities to help build community between the teachers. The next step is a two-week on-site training workshop in Tucson that includes a week's observing at Kitt Peak. The teachers run the big telescopes themselves. The data they gather is added to an archive available to all TLRBSE participants. They work on specific problems with professional scientists and report the results of their work to their fellow teachers at the end of the workshop. In this way the teachers model the process that they will subsequently take into the classroom.

After the workshop, the teachers return to the classroom to instruct their students in the same projects, software, and data processing techniques that they have learned to use. New data are provided to the teachers and their students by periodic CD-ROMs mailings and by online archives. Once the students are familiar with the data and processing techniques, they are encouraged to develop research projects of their own. Students write papers describing their projects and submit them for review by our scientific staff and publication in our own RBSE Journal. The teachers also spend two years mentoring inexperienced teachers. Contact between teachers in the program is maintained via a listserv and meetings at national NSTA conventions.

For more information, visit our web site at: http://www.noao.edu/outreach/tlrbse/

Additional Information: NOAO is operated by the Association of Universities for Research in Astronomy (AURA), Inc. under cooperative agreement with the National Science Foundation.