



The Pulsar Search Collaboratory

Your discovery is here!

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The Pulsar Search Collaboratory (PSC) project is a partnership between the National Radio Astronomy Observatory in Green Bank, WV, West Virginia University.

BACKGROUND

In the summer of 2007, the Green Bank Telescope was shut down for a track replacement. We used this extended maintenance period to carry out a drift-scan search for new pulsars: while the telescope was immobilized, we collected data as the sky drifted overhead. We received 1500+ hours of observing time and collected 130 terabytes of data!



With the help of scientists and staff at NRAO and WVU, high school students in West Virginia and neighboring states are searching this data looking for new pulsars! We call the project the Pulsar Search Collaboratory, or PSC.

PSC Students perform the tasks associated with pulsar data analysis and have the responsibility of returning results to the home repository of the PSC. They document their work, share results with other students around the state, and have the opportunity to present their work at an annual symposium.

GOALS AND OBJECTIVES

1. Advance high school science teachers' and students' understanding of the nature of science and the relationship between science and technology.
2. Prepare teachers to implement authentic research with students.
3. Promote student use of information technologies.
4. Build collegial scientific partnerships between schools around the state.
5. Increase student interest in and awareness of STEM career pathways.

IT RESOURCES

- **Simulations:** Project CLEA "Radio Astronomy of Pulsars" software simulates pulsar observing sessions with a radio telescope. <http://www3.gettysburg.edu/~marschal/clea/CLEAhome.html>
- **Online collaboration and documentation tools:** Google Sites. www.pulsarsearchcollaboratory.org
- **Custom data reduction software and database**
- **Real-time online classes and communication with students via PresenterChat 2.0**
- **The Green Bank Telescope:** 22 Hours of telescope time has been awarded each year for follow-up observations.

PROGRAM ELEMENTS

Summer Institutes. The PSC kicks off each year with a three week workshop in Green Bank, WV. The first two weeks are solely for the teachers. During this time, they attend an astronomy mini-course and learn techniques on introducing astronomy into the classroom. The last week of the workshop, a select number of students join their teachers in Green Bank. The teachers lead activities for the students in radio astronomy, radio frequency interference, and pulsars.

Classroom. Teachers and student mentors introduce the PSC to their classes and complete hands-on activities. Students are then invited to join the PSC. PSC teams conduct original research by analyzing data from the GBT with the expectation of discovering new pulsars and characterizing changes in previously-known pulsars.

Both teachers and students receive graduate and undergraduate credit, respectively, for their participation in the PSC.

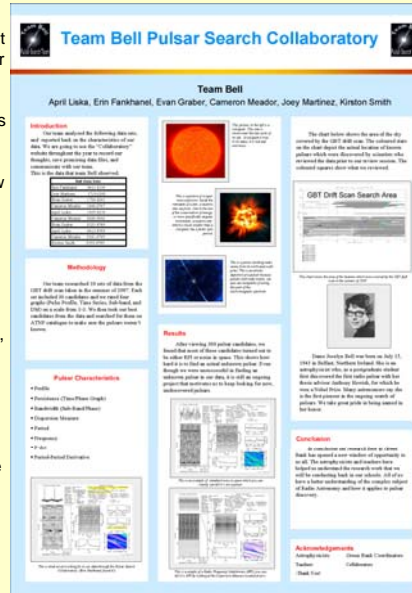
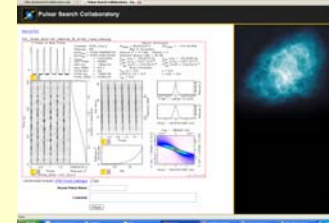
Annual PSC Pulsar Seminar at WVU. Student Teams will present their research, hear talks by professional astronomers, tour the STEM colleges at WVU and participate in fun STEM related activities each spring at a PSC Seminar! Teachers and School Counselors will attend as well.

Diagnostic Pulsar Plots

Our survey covered 2,876 square degrees of the sky. We divide the sky into small pieces, called *pointings*, to search for new pulsars. Students use a unique software package to search the data at each pointing to look for new pulsars. Since we do not know if a pulsar exists at each location, we guess at different search parameters.

The search algorithm produces diagnostic plots, which are available on the PSC database, for the students to analyze.

At left, a screen-shot of the PSC database. <http://psrsearch.wvu.edu>



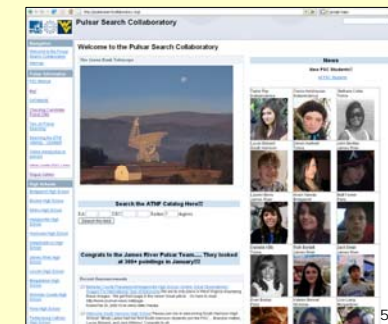
Research Poster created by student team in summer 2009.

PARTICIPANTS

- 20 high school science teachers and 30 high school student mentors participate in summer training at NRAO, Green Bank, WV each year.
- Up to 100 high school students may join the PSC each year.
- N=83 and counting active members.
- 20 School Counselors will attend NRAO Open House.



Clockwise from top: 1. 2009 PSC Teachers and Students at the NRAO. 2-4. Student leaders at the controls of the Green Bank Telescope. 5. Screenshot of the PSC Website.



For More Information: www.pulsarsearchcollaboratory.org
www.gb.nrao.edu/epo/psc.shtml



This ITEST Project is funded in large part by a grant from the National Science Foundation.

<http://www.nsf.gov>