NANOGrav-PIRE

SmartStart Evaluation Newsletter

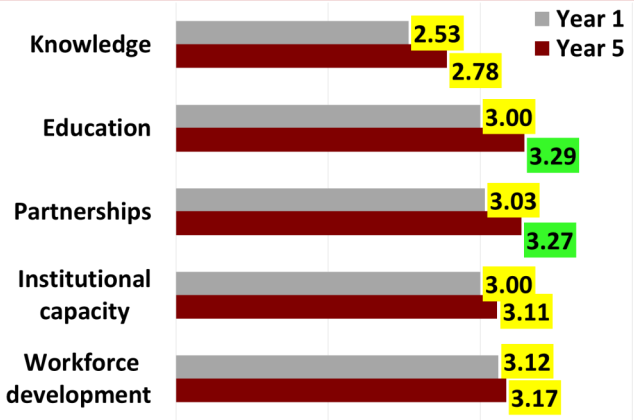
Volume 5 Quarter 4 August 2015

This newsletter presents summative findings from the WVU PIRE Project: 2010-15

Overview of the WVU NANOGrav-PIRE Project

Achievement of Project Goals

Participants rated PIRE project goal achievement each year (on a scale of 1-4). By year 5, **Knowledge**, **Education** and **Partnerships** had the greatest gains and participants felt the project *excelled in achieving* the **Education** and **Partnerships** goals.



Excelled	3.26 – 4.00
Well	2.51 – 3.25
Somewhat	1.76 – 2.50
Not at all	1.00 – 1.75

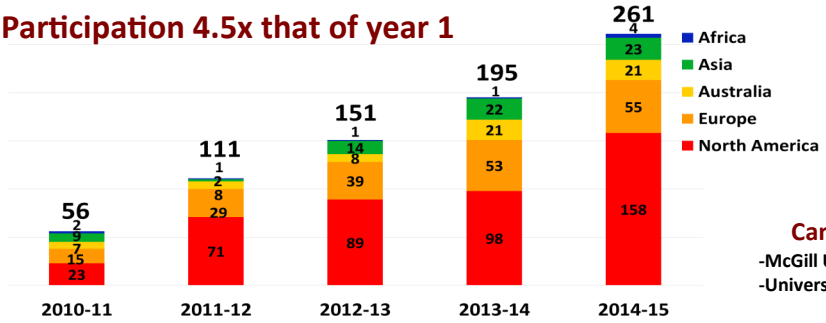
PROJECT GOALS

Goal 1: **Knowledge**
Goal 2: **Education**
Goal 3: **Partnerships**
Goal 4: **Institutional Capacity**
Goal 5: **Workforce Development**

PIRE Project Participation

Individual participation has greatly increased from year 1 to year 5 by the following: 2x in Africa, 2.5x in Asia, 3x in Australia, over 3.5x in Europe, and nearly 7x in North America.

Participation 4.5x that of year 1



NANOGrav Institutions

NANOGrav, which began in 2007 with 9 institutions, now includes 18 institutions: 16 in the US and 2 in Canada.

US Institutions:
- Arecibo Observatory
- Cornell University
- Franklin & Marshall College
- Jet Propulsion Laboratory/Caltech
- Lafayette College
- Montana State University
- National Radio Astronomy Observatory
- Oberlin College
- Penn State University
- Universities Space Research Association
- University of Southern California
- University of Texas Rio Grande Valley
- University of Vermont
- University of Virginia
- University of Wisconsin
- West Virginia University

Canadian Institutions:
- McGill University
- University of British Columbia

Project Activities

Major PIRE project activities have included 6 international and 7 domestic science meetings, 6 international student workshops, and 24 science seminars during the five years of the project.

Activity	Started in:	# meetings	Reach/impact
Student Workshops	2010	6	123 participants
Research Abroad Experience	2010	N/A	29 students
International Science Meeting	2010	6	464 participants
Spring Science Meeting	2011	4	175 participants
Fall Science Meeting	2012	3	123 participants
Science Seminars	2012	24	63 participants

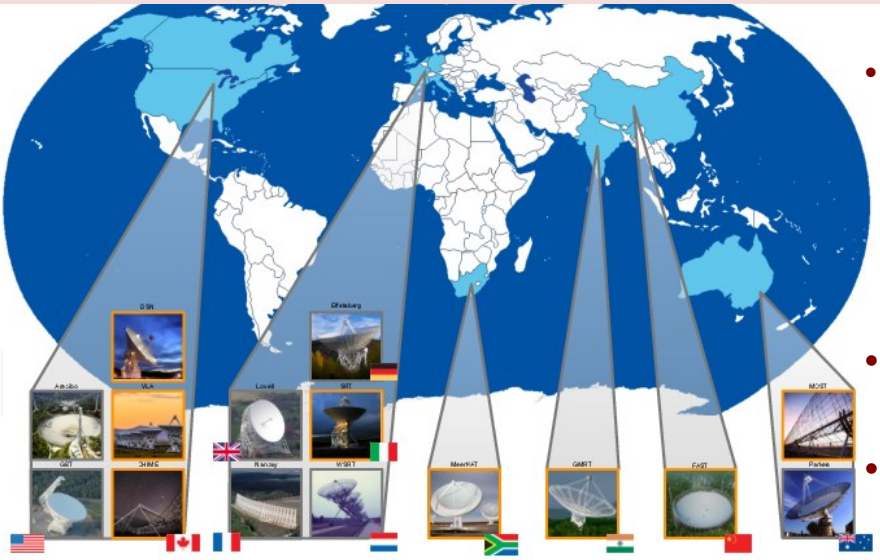
"Opportunities granted to me through this project have confirmed my decision to pursue a PhD in astrophysics directly after graduation."

1,120 participants in activities

Accomplishments of the PIRE Project

Over the life of the PIRE project there have been many significant achievements in collaboration, infrastructure, and data collection . The figure below illustrates the synchronized data collection of telescopes around the globe and significant accomplishments are listed.

- **Software & hardware development and sharing**
- **29 student research exchanges between 8 countries**
- **Tripled participation of countries, institutions, and individuals**
- **International agreements, strategic planning and outreach plan**



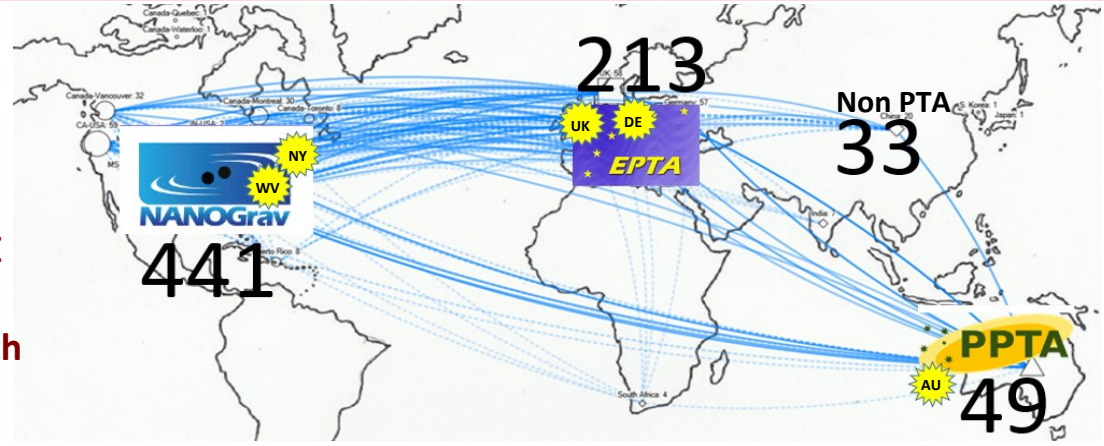
- **Collaborative:**
  - **Decision-making**
  - **Data management**
  - **Surveys & data release**
  - **Second PIRE proposal (11 countries, 41 institutions)**
- **15 Telescopes working together**
- **Put GW detection, using Pulsars, "on the map"**

International Collaborations

PIRE partners have collaborated on numerous publications from 2010-15. NANOGrav collaborated the most with 441 publications. Researchers from West Virginia and New York were the top collaborators.

Key:
= top collaborators
#= number of collaborations by PTA

"Traveling as an exchange student through NSF PIRE has allowed me to make significant connections with collaborators abroad."



Evaluation Recommendations

Strategic Planning

- Work with the International PTA to develop a global mission and goals.
- Resolve IPTA membership issues.
- Recruit more underrepresented participants into the PTAs.
- Set realistic expectations for data sets, develop agreements and increase communication regarding data release.
- Continue the international data challenge.
- Continue tracking collaborations and students' career paths.
- Create an organized and visible list of projects for students.
- Maintain a student-oriented focus and integrate discussions with senior members.
- Listen/respond to students' requests to have more involvement, clearer communication, understanding of where the IPTA is going, and concerns about use of data and publishing.

Research Abroad

- All PTAs should prepare students to participate in research abroad.
- Incorporate cultural and linguistic preparation.
- Plan and communicate with mentors ahead of time.
- Provide opportunities for students who have gone abroad to talk about their experience.

As the IPTA grows larger, more visible, and moves closer to reaching scientific milestones, members should recognize they are becoming leaders in the astrophysics community.

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SMARTSTART EVALUATION AND RESEARCH