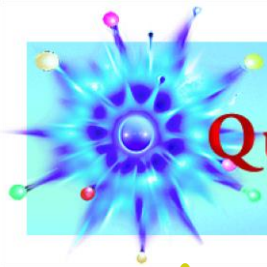# QuarkNet

The QuarkNet Collaboration
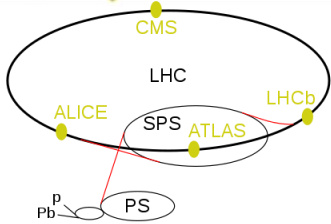

quarknet.org

Teacher Professional Development
HEP Broader Impacts

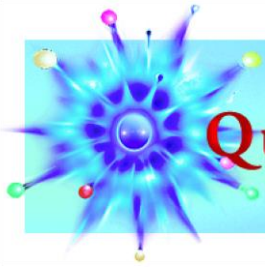# The QuarkNet Collaboration

Particle Physics: Our Home

Experiments of long duration with large datasets

Large international collaborations

Distributed work over many institutions

**QuarkNet shares these characteristics
that help make us a dynamic, unique & transformative
teacher professional development (PD) program.**

2

QuarkNet Collaboration Review

Presentations

Organization & Connections - M. Bardeen

Key Program Components:

> **Center Workshops - S. Wood**

> **Data Camp, Coding Camps 1 & 2 - A. LaMee**
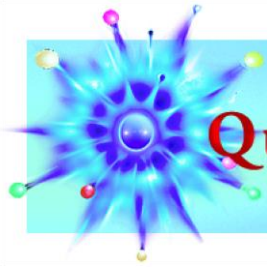
> **Data Activities Portfolio - D. Roudebush**

> **Physics Masterclasses - K. Cecire**

Broadening Participation - S. Wood

Outcomes-based Evaluation: Results and Plans - K. Race
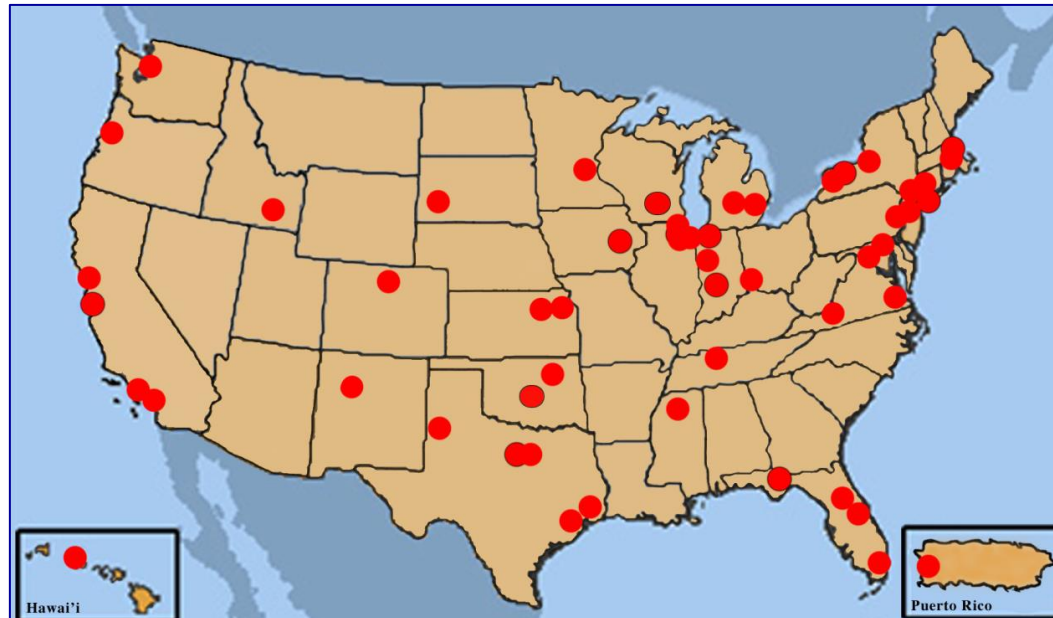
Resources & Funding – M. Wayne
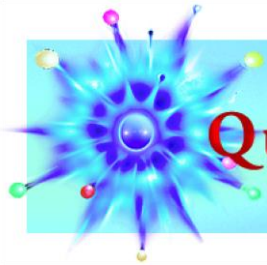
Organization & Connections

The QuarkNet Collaboration

A Network of 52 Local & Regional Centers . . .

QuarkNet is funded by NSF to University of Notre Dame & by DOE through Fermilab.

4

Organization & Connections

The QuarkNet Collaboration

with National Leadership & Coordination

National Office
Co-PIs
Staff supported at
University of Notre Dame
or Fermilab

5
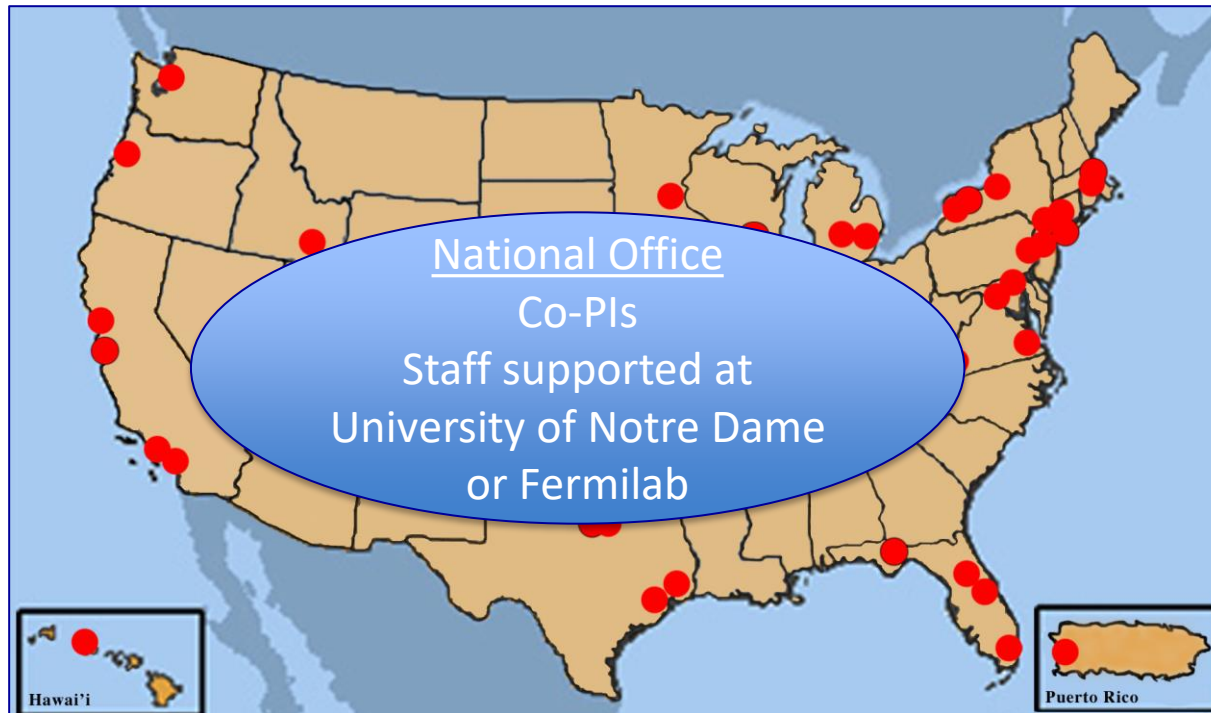
QuarkNet

Center Organization

Centers: Heart of the Program

Initiated by 1-2 particle physicist mentors

Joined by 1-2 lead teachers

With, on average, 5 associate teachers

QuarkNet: A Long-Term National Program

Based on **3** successful PD program types:

Research internships (Year **1**) (**2** centers)

Research-based workshops (Year **2**)

Physics alliance workshops (Year **3+**) (**50** centers)
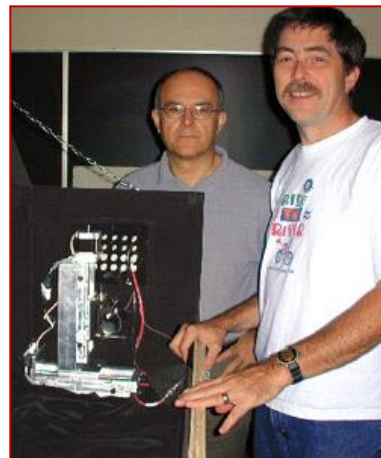
National PD Framework

Engagement with Scientific Investigations

- **Access to online HEP datasets**
- **Center Workshops**
- **Cosmic Ray Studies**
- **Data Activities Portfolio**
- **Data Camp & Coding Camps**
- **Masterclasses for students**
- **Ongoing support**
- **Fellows Program**

8

National PD Management

National Staff

Staff Teachers

Education Specialists

Cosmic Ray Team

Fellows

IT Staff

Administrative Assistant

External Evaluator

National PD Management

Who We Are

Co-PIs

Marge Bardeen

Angela Fava

Morris Swartz

Mitch Wayne

Staff Teachers

Ken Cecire (NSF)

Spencer Pasero (FNAL)

Shane Wood (NSF)

And 41 Fellows (NSF)

Anne Zakas, Admin (NSF)

Education Specialists

Adam LaMee (NSF)

Deborah Roudebush (NSF)

Jeremy Smith (NSF)

IT Staff

Joel Griffin (NSF)

Tom McCauley (NSF)

Edit Peronja (FNAL)
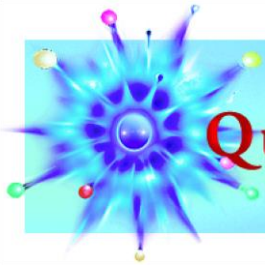
Cosmic Ray Team (FNAL)

Mark Adams, Coordinator

Dave Hoppert, Detector Tech

What We Do

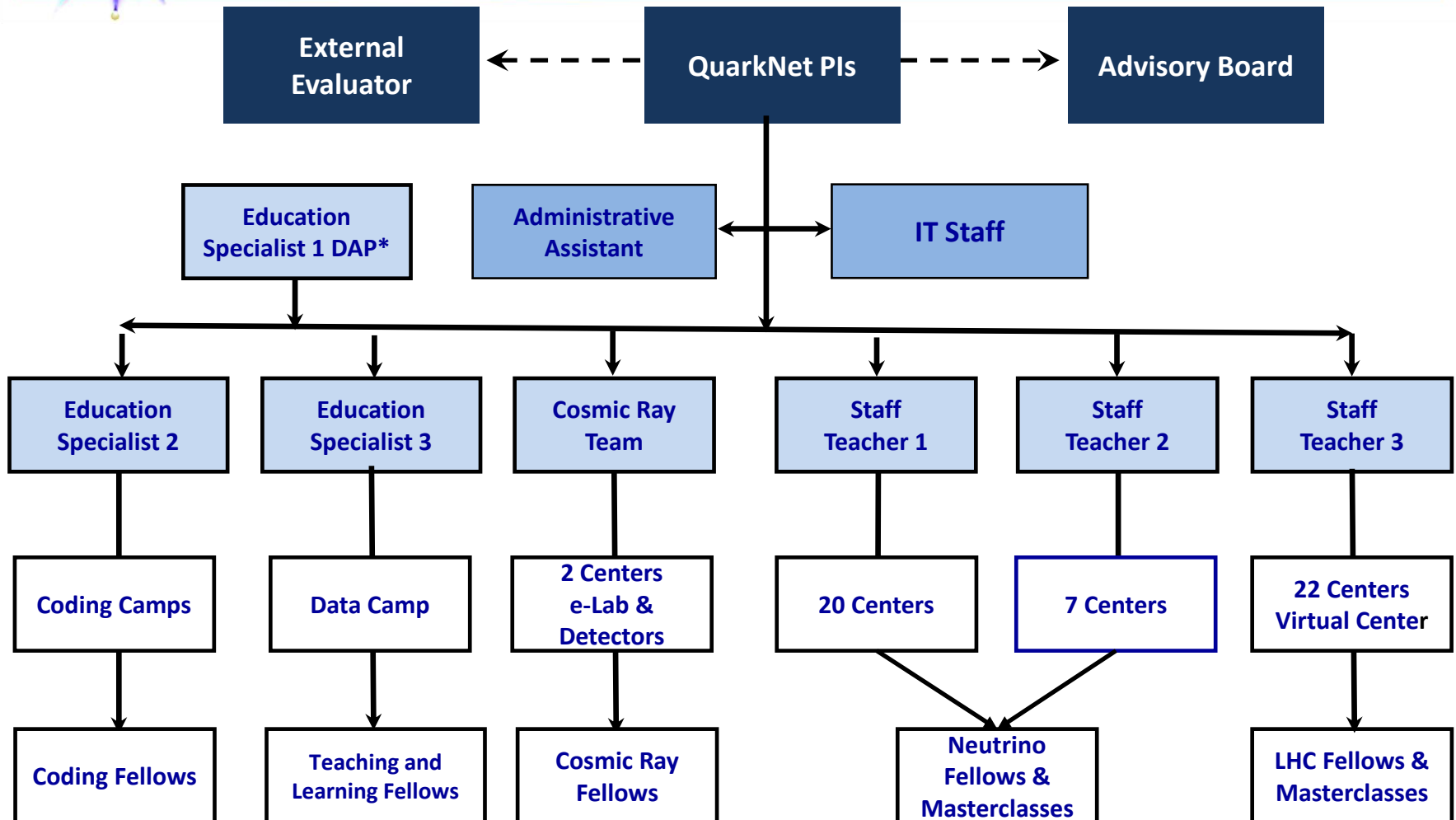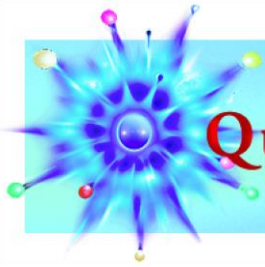- **Provide assistance for planning and implementing effective center activities.**

- **Create resources and tools, maintain the Web presence, and support teachers using resources.**

- **Organize workshops and special opportunities.**

- **Support QuarkNet fellows.**

- **Participate in dissemination and broader impact activities.**

- **Manage funds.**

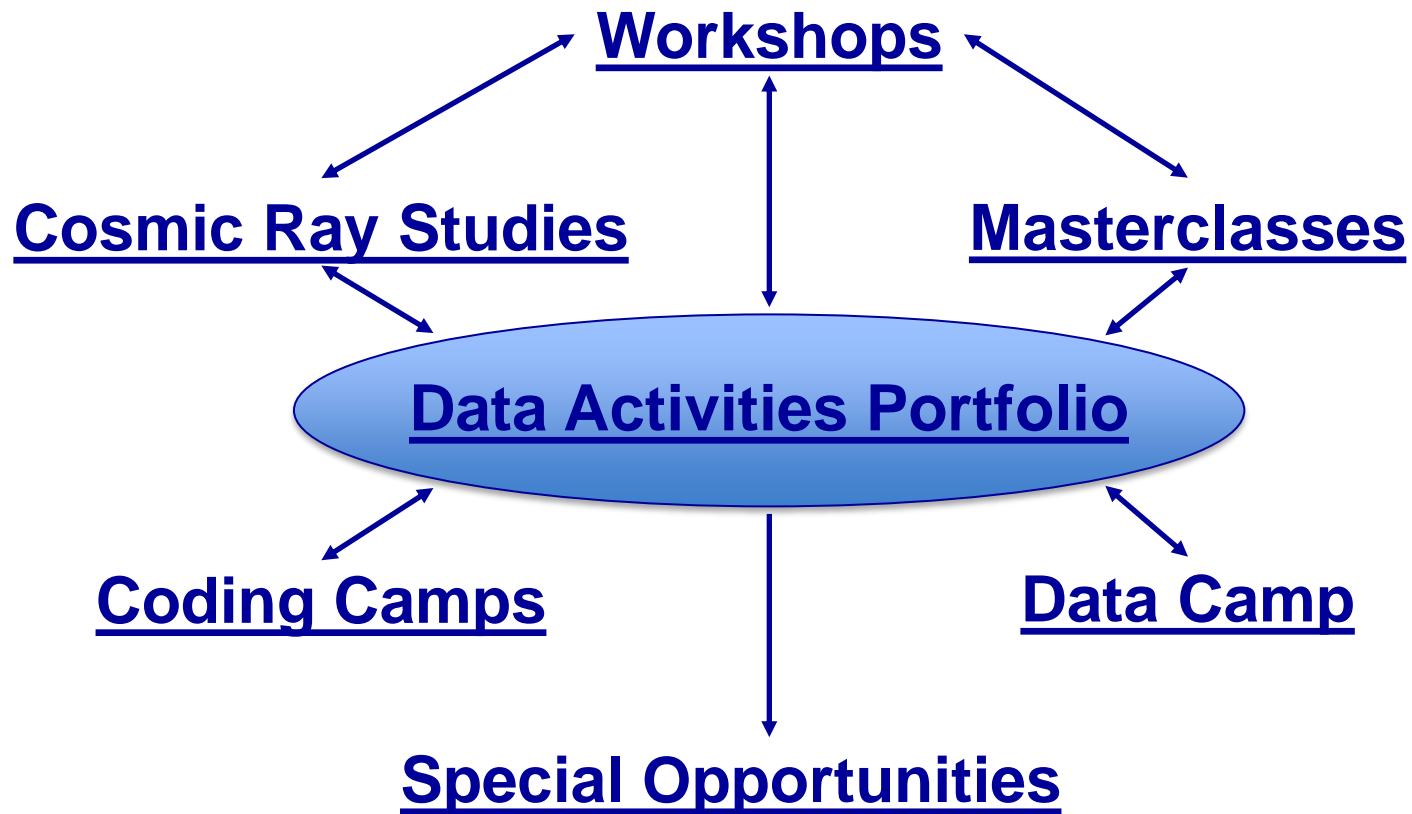- **Prepare reports for funding agencies.**

QuarkNet Collaboration

QuarkNet organizational chart:

- **QuarkNet PIs** connects to:
  - **External Evaluator** (dashed arrow)
  - **Advisory Board** (dashed arrow)
  - **Administrative Assistant** ↔ **IT Staff**

- **Education Specialist 1 DAP*** branches to:
  - **Education Specialist 2** → **Coding Camps** → **Coding Fellows**
  - **Education Specialist 3** → **Data Camp** → **Teaching and Learning Fellows**
  - **Cosmic Ray Team** → **2 Centers e-Lab & Detectors** → **Cosmic Ray Fellows**
  - **Staff Teacher 1** → **20 Centers** → **Neutrino Fellows & Masterclasses**
  - **Staff Teacher 2** → **7 Centers** → **Neutrino Fellows & Masterclasses**
  - **Staff Teacher 3** → **22 Centers Virtual Center** → **LHC Fellows & Masterclasses**

12   ***Data Activities Portfolio**

Program Connections

QuarkNet

Workshops

Cosmic Ray Studies

Masterclasses

Data Activities Portfolio

Coding Camps

Data Camp

Special Opportunities

Program Connections

Workshops & Special Opportunities

Cosmic Ray Studies

Masterclasses

Center Program

Coding Camps

Data Camp

Data Activities Portfolio

14

Program Connections

Staff Teacher

Fellows　　　　　　　　　　**Masterclass Leaders**

Center Program

Coding Camps Leaders　　　　**Data Camp Leaders**

Cosmic Ray Team

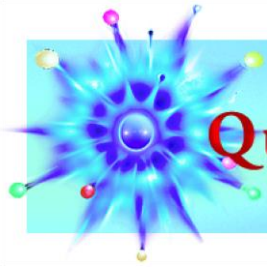**QuarkNet**

Program Connections

Bringing Center Participants Together

Data Camp & Coding Camps

Special Opportunities

- **Lead Teacher Camp**
- **Fellows Camp**
- **QuarkNet Educational Discussions (QED)**
- **Friday Flyer**
- **International Muon Week**
- **World-Wide Data Day**

16

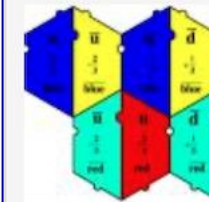# Closer Look at Key Programs

Professional Development Programming

Workshops at Centers

Data Camp & Coding Camps

Data Activities Portfolio

Masterclasses

Broadening Participation

Quark Workbench 2D/3D
Students use Standard Model rules to build hadrons and mesons from quarks.

17