### Center for Internet Augmented Research and Assessment



Miami-Dade County Public Schools Information Technology Directorate October 25, 2004 Heidi Alvarez, Associate Director of CIARA Co-PI, AMPATH Co-PI, CHEPREO

FLORIDA INTERNATIONAL UNIVERSITY

http://www.ciara.fiu.edu



## **Presentation Agenda**

- About CIARA
- Science Research over Advanced Networking
  Infrastructures
- •Center for High Energy Physics Research & Educational Outreach at FIU
- SpaceDOG NASA International Space Station Pilot
- Cyberinfrastructure
- Next Steps





# CIARA is...

### RESEARCH



## COLLABORATION



### SCHOLARSHIP







## **About CIARA**

- Enhance Educational Outreach with ITR discoveries
- Assess effectiveness of applied IT research
- Target individuals not usually involved in IT
- Innovative academic model







### Impact on Education and Research

- Multidisciplinary/ Multicultural dialogue
- Links those without traditional access
- Bridges geographical & cultural boundaries









## Science Research over Advanced Networking Infrastructures













## World-class Scientific Instruments

Gemini-South Optical Observatory NRAO telescopes La Serrena, Chile



Arecibo Radio Antenna, Puerto Rico University of Puerto Rico



## **Gemini Observatory**

- Telescopes in Chile and Hawaii
- Data Center in Canada



- Remote observation from partner sites
- Educational Outreach via AMPATH
- Tracks deep space activity









#### http://www.gemini.edu/pio/



#### Gemini Announces Virtual Tour v 2.0!

With exciting new activities and improvements, the latest version of the Gemini Observatory Virtual Tour is now available!

More information here

#### MEDIA RESOURCES

Image Gallery | Press Releases | Video | Media Coverage Archive | Facts and Figures | Media Contacts

#### EDUCATION & LOCAL OUTREACH

StarLab | StarTeachers | Image Gallery | Journey Through The Universe | FamilyAstro

#### EDUCATION & PUBLIC RESOURCES

Desktop And Electronic Presentation Images | Newsletter Archive | Video | Live View of Gemini North

### World-class

### **Scientific Instruments**

Atacama Large Millimeter Array (ALMA)

Atacama plains in Chile



Pierre Auger Observatory *Malargüe* 





#### ASTRONOMY

- Highest resolution technique available to astronomers tens of <u>micro</u>arcseconds
- Allows detailed studies of the most distant objects

#### GEODESY

- Highest precision (few <u>mm</u>) technique available for global tectonic measurements
- Highest spatial and time resolution of Earth's motion in space for the study of Earth's interior
  - Earth-rotation measurements important for military/civilian navigation
    Fundamental calibration for GPS constellation within Celestial Ref Frame

The Very-Long Baseline Interferometry (VLBI)

#### Technique

#### The Global VLBI Array

(up to ~20 stations can be used simultaneously)



An Inter-regional grid enabled Center for High Energy Physics Research and Educational Outreach at FIU

High Energy Physics
Educational Outreach
Cyberinfrastructure





CENTER FOR HIGH ENERGY PHYSICS RESEARCH & EDUCATION OUTREACH





#### **CHEPREO HIGH ENERGY PHYSICS**

- Activities extend to CERN's research program
  - Int'l Lab located in Geneva, Switzerland
  - World's largest particle physics centre
- LHC accelerator
- CMS experiment







#### **CHEPREO EDUCATION AND OUTREACH**

- Raise involvement in science and research
- Engage students in active learning and mentoring
- Build collaborative communities in schools
- Motivate students to pursue careers in science
- Facilitate discovery and innovation











#### **PHYSICS LEARNING CENTER**

- Increase exposure to educational resources
- Promote collaboration of students and teachers
- Provide experience for grads and undergrads
- Develop tutoring programs and workshops









## **CHEPREO MDCPS Resources**

- The NSF subcontract to M-DCPS provides support for science clubs run by physics teachers. \$3,000 and \$5,000 is included in years 2 and 3 for the activity.
- <u>High School Teachers</u>: providing them with the best pedagogic tools, content updating, and research opportunities to improve their ability to instruct, excite, and inspire their students to pursue scientific careers.
- <u>High School Students</u>: providing them with the contacts and opportunities for science success while inspiring them towards science careers through identifying techniques and methodologies that will ensure their success.



## CHEPREO MDCPS Resources

## Cont. (1)

- <u>Establishment of Modeling Workshops in Miami</u>: provides pedagogic reform and content updating for physics and math high school teachers in South Florida.
- <u>Establishment of a QuarkNet Center</u>: creates a collaboration of high school physics teachers centered around high energy physics research. [Separately funded.]
- <u>High School Science Club Support</u>: invigorates physics in high schools while serving as the focal point for science career recruitment.



## CHEPREO MDCPS Resources Cont. (2)

- <u>Community of Scholars</u>: diverse, integrated activities for teachers, students, academics, physicists to share knowledge and build support for all participants.
- <u>Test-bed Schools</u>: selected for intensive education research to insure project exceeds planned objectives.
- <u>Web-based Resources</u>: extensive resources to support teachers and students in the project's activities.



## **Test-Bed Schools**

- American 305-557-3770 18350 NW 67 Ave., Hialeah 33015
- Miami Coral Park 305-226-6565 8865 SW 16 St., Miami 33165
- Barbara Goleman 305-362-0676 14100 NW 89 Ave., Miami 33018
- Varela, Felix 305-752-7900 15255 SW 96th St., Miami 33196
- Miami Southridge 305-238-6110 19355 SW 114 Ave., Miami 33157
- Miami Palmetto High School, 305-235-1360, 7460 SW 118 Street, Pinecrest, FL 33156
- Palmetto Middle School (305) 238-3911 7351 SW 128 Street, Pinecrest, Florida 33156 (NASA program only)



### Space Development and Operations Grid (SpaceDOG)

- Real time data flow from space for educational outreach application
   Involvement of Miami-Dade County
   School children with International Space
   Station Researchers
   Telemetry grid service
- Telemetry grid service



Ames Research Center Earth Science Division



## Cyberinfrastructure

Advanced Networks, Computer Grids and Internet Technologies







#### **Application Grid Laboratory for Science Multidisciplinary Research in Physics, Astrophysics, Biology and Astronomy**



http://www.ivdgl.org/grid2003



#### **International Virtual Data Grid Laboratory**

- Computing, storage and networking resources
- Testing and validation of grid technologies
- Influences future of data grids



#### http://www.ivdgl.org/projinfo



## FIU On iVDGL



research • collaboration • scholarship

### UltraLight



#### An Ultrascale Information System for Data Intensive Research



## UltraLight

- Explores cutting-edge network technology
- Grid computing and data infrastructure
- Support for LHC-HEP and eVLBI-Astronomy
- Nat'l / Int'l e-Science Collaborations





## **The AMPATH Network**

- Cutting-edge multimedia technology
- Supports extensive digital archives
- Distributed processing of data
- Interconnects R & E networks





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www.ampath.net



## **AMPATH PoP**

Technology Center of the Americas



The AMPATH Point-of-Presence (PoP) is located in the NAP of the Americas, where Terremark Worldwide has donated space.







AMPATH



terremari

### **Internet2 on the Abilene Network**

- 10,000 times faster than a DSL or cable modem
- Advanced optical transport technology

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Enabling new generation internet applications





I N T E R N E Ta

### National LambdaRail



For more information regarding NLR see http://www.nlr.net or contact info@nlr.net

- Optical infrastructure for scientific collaboration
- Boosts research across the southeast

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http://www.nationallambdarail.org



## Florida LambdaRail

- Connectivity to NLR in Jacksonville
- Advanced R & E network and knowledgebase
- Member of the National Lambda Rail network





#### http://www.flrnet.org



## Next Steps

- Discuss current advanced networking plans
- Review timeline
- Review budget to connect the testbed schools
- Review available funding sources
- Secure dedicated funding
- Connect testbed schools
- Pilot CHEPREO and SpaceDOG programs
- Assess Effectiveness of programs
- Make Improvements as needed
- Expand to other schools



# Thank You! heidi@fiu.edu http://www.ciara.fiu.edu

