



DATA SHEET
2013-2015

RESEARCH AWARDS

NSF Centers of Research Excellence in Science and Technology
9/12-8/17 (\$5,000,000)

CREST-CyberShARE Center of Excellence II

A. Gates with D. Pennington, N. Villanueva-Rosales, C. Tweedie, A. Velasco, V. Kreinovich,

NSF Broadening Participation Research in STEM Education Program
9/1/13-8/31/15 (\$297,550)

Increasing STEM Participation and Success Rates of Latino Youth Using Culturally Relevant Immersive Technologies

A. Gates with D. Tillman and A. Song

NSF Centers of Research Excellence in Science and Technology
2/1/2014-1/31/2019 (\$355,938)

Subcontract-NMSU grant: Interdisciplinary Center of Research Excellence in Design of Intelligent Technologies for Smartgrids (iCREDITS)

A. Gates UTEP Lead with C. Kiekintveld

National Science Foundation
10/10-9/14 (\$1,000,000)

I3: A Cyberinfrastructure and Communication-Based Model to Foster Innovation that Broadens Participation in STEM Fields through Institutional Integration

D. Natalicio (PI), A. Gates, P. Witherspoon, B. Flores, and E. Freudenthal

NSF CI-TEAM Diffusion Project
9/1/11-8/31/15 (\$1.2M)

The Virtual Learning Commons: STEM Research Communities Learning about Data Management, Geospatial Informatics, and Scientific Visualizations

D. Pennington with N. Villanueva-Rosales, S. Salamah, L. Eschegoyan, and P. Golding

National Socio-Environmental Synthesis Center (SESYNC)

9/1/2013-8/31/2015 Amount: Costs for three working meetings with 12 national and 3 international participants.

Teaching and Employing Model-Based Reasoning in Socio-Environmental Synthesis (EMBERS)

D. Pennington with A. Danielson

NSF Advanced in Biologic Informatics
7/1/2014-6/31/2017 (\$174,792)

Transforming Biodiversity Analysis with Landscapes, Automation, and Provenance

D. Pennington with J. Beach and A. Stewart



NSF Geosciences Education
9/1/2012-8/31/2015 (\$111,500)
Diversity and Innovation for Geosciences in Texas (DIG Texas)
L. Serpa with D. Pennington

NASA ACCESS
2/1/2011-8/31/2014 (\$200,000)
Earth, Life and Semantic Web (ELSeWeb): An Earth observation-driven, Semantic Web system for computational modeling of the impact of changing environments on health and disease
D. Pennington with N. Villanueva-Rosales

National Science Foundation, Hazard SEES
(Pending) 06/2015 - 05/2019 (\$3,000,000)
Hazard SEES: Transnational Infrastructure and Natural Disaster
Aaron Velasco with D. Pennington, V. Kreinovich and others.

NSF Office of Polar Programs Arctic Observing Network
5/2009 – 8/2015 (\$400,471)
Arctic Observing Networks: Collaborative Research: Sustaining and amplifying the ITEX AON through automation and increased interdisciplinarity of observations
C. Tweedie

NSF Office of Polar Programs Arctic Observing Network/ Arctic Logistics Program
2/2013 – 1/2016 (\$333K + 334,825 + 262,555)
Maintenance and development of the Arctic Research Mapping Application and Arctic Observing Viewer
C. Tweedie

US/AID
3/2012 – 2/2015 (\$997,313)
Supporting university partners across the Pacific
S. Sowards, W. Hargrove, C. Tweedie, V. Lougheed, H. Meuwsen

NSF Office of Polar Programs Cyberinfrastructure
9/2012 – 8/2015 (\$924,074)
Collaborative Research - Development and innovation of the Barrow Area Information Database (BAID): A cyberinfrastructure that supports arctic science, outreach and education.
C. Tweedie, A. Gaylord, J. Collins

NSF Biology
11/2012 – 10/2018 (\$5,880,000)
Jornada basin LTER Vi
D. Peters et al. C. Tweedie

Bureau of Ocean Energy Management and the U.S. Fish and Wildlife Service
7/2013 – 6/2016 (\$1,638,838)



Barrow Area Information Database Coastal Decision Support Tool

C. Tweedie, A. Gaylord, W. Manley, L. Nelson

NSF Office of Polar Programs Arctic Observing Network

8/2014 – 8/2015

AON Collaborative Research: Sustaining and amplifying the ITEX AON through automation and increased interdisciplinarity of observations

C. Tweedie

NSF Office of Polar Programs Cyberinfrastructure

9/2014 – 8/2016 (\$300,000)

Antarctic and Arctic Data Consortium (a2dc) Research Coordination Network: Scientific Research Support and Data Services for the Polar Community

J. Pundsack, P. Morin, C. Tweedie

NSF Division of Environmental Biology/ Microsoft

6/2014 – 5/2016 (\$289,696)

EAGER: Science in the time of big data

D. Peters, K. Havsted, C. Tweedie, N. Villanueva-Rosales, O. Fuentes

NSF Division of Earth Sciences

9/2010 – 8/2013 (\$150,000)

Sustainability on the border: water, climate and social change in a fragile landscape

W. Hargrove et al. C. Tweedie

PUBLICATIONS

There have been numerous publications, including several book chapters, almost 30 journal publications and over 50 conference papers.

Student thesis and dissertations are as follows:

Aaron Cervantes, M.S. (IT). Project. *Ontologies: A Semantic Approach to Model CAPTCHAs*, 2013.

Nicholas del Rio, Ph.D. (CS). *A Declarative Domain-Independent Approach For Querying And Generating Visualizations*, 2013.

Aida Gándara, Ph.D. (CS), *A Semantic Web-based Methodology for Describing Scientific Effort*,. 2013.

Lillian Torres, M.S. (CS). Project. *A graphical interface for the Earth, Life and Semantic Web model*,. 2014.

Sergio Celis, M.S. (Geophysics), *Evidence of Active Rifts in The Southwest United States Using Geophysical Inversion of Seismic Data*, 2014.



Aline Jaimes, PhD. (ESE), Furthering our understanding, and assessing the effectiveness of scaling patterns and controls of land-atmosphere carbon, water, and energy exchange in a Chihuahuan Desert Shrubland with novel cyberinfrastructure. 2014.

Christine Laney, PhD. (ESE), Toward new data and information management solutions for data intensive ecological research. 2013.

Leonardo Lerma, MSc. (Comp.Sci), Towards analytical techniques for optimizing knowledge acquisition, processing, propagation, and use in cyberinfrastructure. 2014.

Geovany Ramirez, PhD. (CS), Multi-dimensional emotion recognition from geometry and color information. 2014.

Lillian Torres, M.S. (CS). Project. *A graphical interface for the Earth, Life and Semantic Web models.* 2014.

Sandra Villarreal, PhD. (EEB), International Polar Year Back to the Future: Changes in arctic ecosystem structure over decadal time scales. 2013.

Undergraduate Research Projects:

Lorna. A. Bustillos, B.S. (CS) sophomore, *Exposing research group information using Semantic Web,* 2014.

Erick Garcia, B.S. (CS) sophomore, *A dynamic approach for annotating research efforts,* 2014.

Ana Villegas, B.S. (CS) senior, *Semantic-based data integration and exchange for a research group.* 2014.

Gabriel Hlgareda, B.S. (CS) senior, *A tool for the extraction of semantics across databases.* 2014.

Joshua Grajeda, B.S. (CS) senior, *Visualization of Provenance,* 2014.

Joshua Hicks, B.S. (CS) senior, *A semantic approach for matching grant opportunities with researchers,* 2014.

Karina Valtierra, B.S. (CS) senior, *A Virtual Geocaching Backend: Data Integration with a Content Management Framework.* 2014.

Alla Dove, B.S. (CS) senior, *A Scalable Data Management System for Ecological Research,* 2013.

Julian Lopez, B.S. (CS) senior, *Ontology-driven data integration,* 2013.

Robert Muñoz, B.S. (CS) senior, *Virtual Geocaching through GIS Services,* 2014.

Elizabeth Lopez, B.S. (CS) senior, *Ontology-driven data mashups,* 2013.

Jorge Berumen, B.S. (CS) senior, *VIIRS data for the people,* 2013.

Graduated students from iLink are currently working at: Wright-Patterson Air Force Base, Microsoft, El Paso Intelligence Center, NRAO Very Large Array, Hewlet-Packard, Charles Schwab, Defense Information Systems Agency, General Motors, United Services Automobile Association, University of Texas at El Paso.



TECHNOLOGIES

- Expertise Connector: A portal for finding expertise on campus through faculty, professional staff, and center profiles; Expertise Connector also facilitates the creation of communities of practice on campus.
- Virtual Learning Commons (VLC): a Web environment in which researchers can discover, organize, and discuss digital resources found on the Web
- Earth, Life and Semantic Web (ELSeWeb): models future species distributions under scenarios of climate change
- MetaShare: a data management system
- Data Reporting System: project data collection system
- Workflow-driven Ontology: approach for defining scientific workflows annotated with provenance and based on ontologies
- DBOWLizer tool: a tool for extracting ontologies from databases
- Visko: a framework that supports the answering of visualization queries for generating visualizations by specifying what visualization is needed rather than how to build the visualization.
- Model Fusion: an approach for combining different Earth models using joint inversion techniques, in particular accuracy-estimating techniques that lead to geophysically reasonable estimates and more accurate model fusion results.
- CARP Methodology: a methodology for sharing documentation about scientific research over the Semantic Web.
- Multiple Objective Optimization technique: a technique that enables the capability to combine linear and non-linear problems, homogeneous data sets, and different statistical properties of error associated with each dataset.
- Low-power, wireless, high resolution programmable camera to capture digital programs in the arctic tundra, Chihuahuan Desert and tropical forest landscape
- BAID-Internet Map Server (production) allows GIS-interactivity with more than 700 data and information layers, including more than 12000 research sites dating back to the 1940's.
- BAID for Google Earth (production) - allows BAID research site data to be viewed in Google Earth.
- BAID time slider (production) – allows for simultaneous web-based viewing of time series aerial and satellite imagery for northern Alaska.
- BAID Instrument Browser (production) - allows map visualization and interactivity with informational and other data associated with more than 350 instruments in the Barrow area in northern Alaska.
- Barrow SAR viewer (production) - allows map visualization and interactivity with near real time space-borne synthetic aperture radar acquired for the Barrow area.



- Site choice tool - a Geographic Information System processing routine that uses a series of parameterized decision and optimization algorithms to identify and prioritize site selection for ecological and environmental research and instrument placement (prototype).
- Phenology Analyzer – software to analyze plant and landscape phenological trends from time series digital photography (production).
- Arctic Observing Viewer (production) – web mapping application and information system for the U.S. arctic observing network.
- Phenocam multistation (prototype) – a novel camera and mini climate system for observing.
- R-Hyperspec (prototype) – automated data processing, visualization, and QA/QC tool for proximal hyperspectral remote sensing.
- Jornada database (prototype) – semantic-ready database for a multi-parameter environmental observing platform on the USDA Jornada Experimental Range.

EDUCATION AND TRAINING

The center has hosted a number of events, including the Centennial Open House, GK-12 events from Valle Verde Early College High School, “STEAM Opportunities for Collaboration” (included involvement from researchers at UT Dallas and UT Austin), and “Working with DoD.” The center also hosted visits from numerous middle and high schools, e.g., Eastwood High School, Sanchez Middle School, Del Valle High School, Clint ISD, and others.

In the area of training, the center held a workshop called “Sharing Quality Data” to train students on data management and discovery approaches. In addition, the center offered student development workshops, including three workshops in Mexico to disseminate our work in Cyberinfrastructure and pursue international collaborations.

AWARDS, HONORS, AND SPECIAL RECOGNITIONS

Ann Gates, 2014 The University of Texas at El Paso Distinguished Achievement Award for Research

Ann Gates, 2013-2014 Outstanding Performance Award in Securing Extramural Funding from UTEP’s Office of Research and Sponsored Projects

Ann Gates, 2014 Millionaire Sponsored Projects Award for Sponsored Research Expenditures over one Million Dollars in Fiscal Year 2013 from UTEP’s Office of Research and Sponsored Projects

Ann Gates, 2013 Millionaire Sponsored Projects Award for Sponsored Research Expenditures over one Million Dollars in Fiscal Year 2012 from UTEP’s Office of Research and Sponsored Projects

Deana Pennington, 2014 UTEP Office of Research and Sponsored Projects Research Faculty Fellow

Deana Pennington, 2013-2014 Outstanding Performance Award in Securing Extramural Funding from UTEP’s Office of Research and Sponsored Projects

Deana Pennington, 2011-2012 Outstanding Performance Award in Securing Extramural Funding from UTEP’s Office of Research and Sponsored Projects

Vladik Kreinovich, Excellent Paper Award, 11th International Symposium on Management Engineering ISME’2014, Kitakyushu, Japan, July 2014



Vladik Kreinovich, Best Student Interval Paper Award (for a paper co-authored with a student), Joint World Congress of the International Fuzzy Systems Association and an Annual Conference of the North American Fuzzy Information Processing Society, Edmonton, Canada, June 2013

Craig Tweedie, 2013-2014 Outstanding Performance Award in Securing Extramural Funding from UTEP’s Office of Research and Sponsored Projects

Elsa Tai, Best Presentation Award, 2015 AAAS Emerging Researcher National Conference, “A Software Engineering Approach to Analyze Student Success Data Collected from Disparate Sources.”

COLLABORATIONS

Cyber-ShARE established new collaborations with two centers and other groups:

- NMSU’s Interdisciplinary Center of Research Excellence in Design of Intelligent Technologies for Smartgrids (iCREDITS)
- UTEP’s Center for the Advancement of Space Safety and Mission Assurance Research
- Geothermal Development Company, Kenya: analyzing data from controlled source and passive seismic deployments for geothermal prospecting
- Icesi University and Colombia University, Colombia: Acquired data for analysis of 3-D models of the country of Colombia and have established working relationship with colleagues at these universities.
- Other collaborations include: AmeriFlux, Boastal Impact Assessment Program, National Ecological Observatory Network, Spectral Network, USAID Indonesia, and USDA Jornada Long-Term Ecological Research Program.

STUDENT DATA

In the 2014 reporting period, Cyber-ShARE funding and leveraged funding supported 67 students. In 2013, 53 students were supported. The charts that show the breakdown of the students by race/ethnicity and gender, as well as the national numbers are shown in Figs. 1-4.

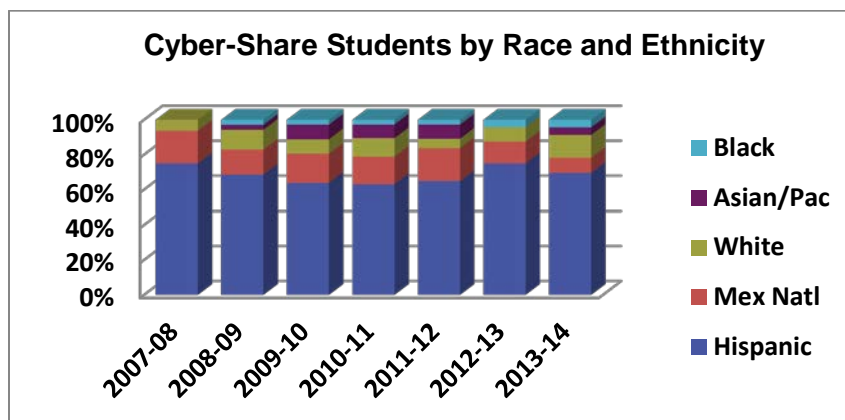


Fig. 1: Distribution of Cyber-ShARE students by race and ethnicity since the start of the grant.

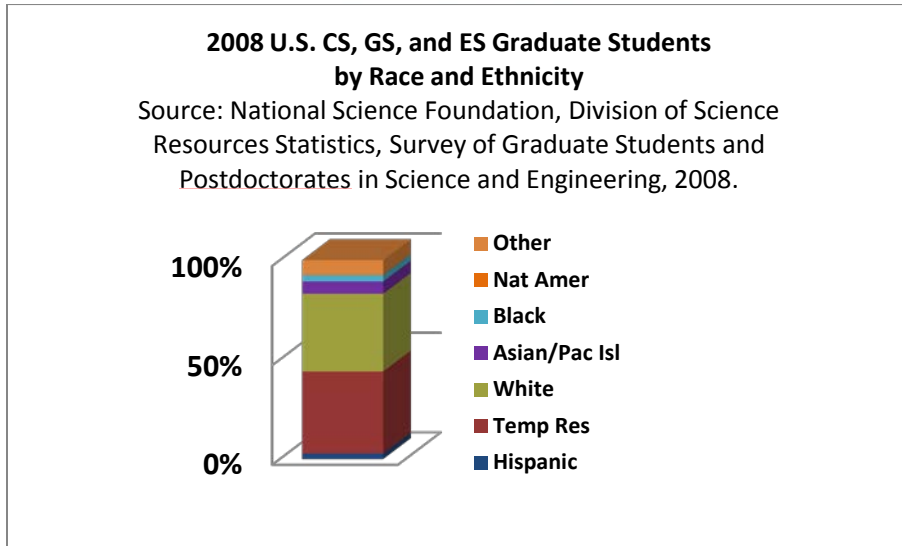


Fig. 2: The national distribution of graduate students by race and ethnicity.

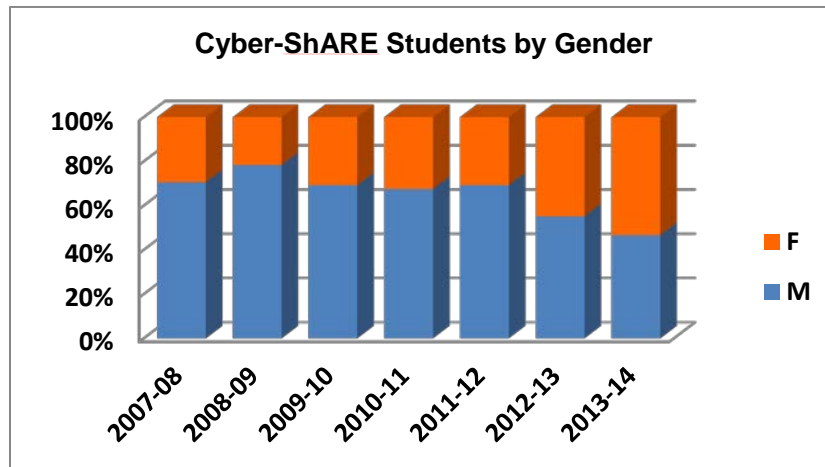


Fig. 3: Distribution of Cyber-ShARE students by gender since the start of the grant.

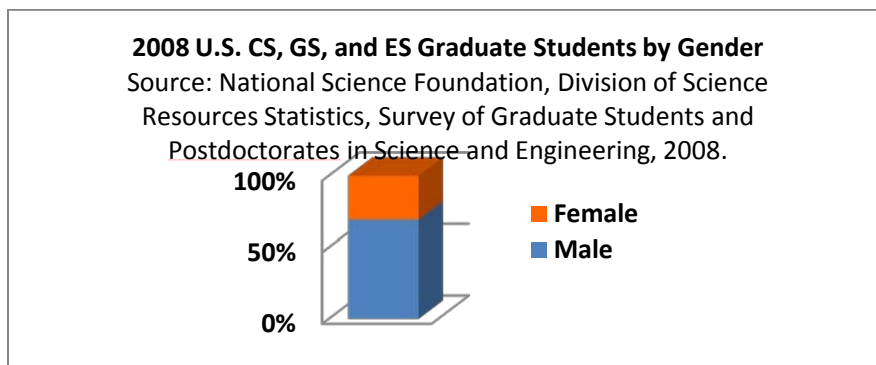


Fig. 4: The national distribution of graduate students by gender.