TRibal Earth Science and Technology Education (TRESTE) Project

Blackfeet Community College Country

Fond du Lac Tribal and Community College Country

Sinte Gleska University Country
Who is TRESTE?

Principals
- Universities Space Research Association (USRA)
  http://www.usra.edu/
- Sinte Gleska University (SGU)
  http://www.sinte.edu/

Leadership Team
- Universities Space Research Association
  • Don Perkey, Director, USRA Earth System Science Program and Professor, Atmospheric Science Department, University of Alabama in Huntsville
  • Maury Estes, Urban and Environmental Planner, Researcher in the Land-Surface group at the NSSTC
  • Mona Miller, Evaluation Specialist and Project Administrator
- Sinte Gleska University
  • Leland Bordeaux, Vice-President for Academic Affairs and Professor of Math and Math Methods for Elementary Education Teachers
  • James Rattling Leaf, Land and Natural Resource Developer, Sicangu Policy Institute
  • Peggy Tilgner, Professor of Science Education
Who is TRESTE?

Collaborating Organizations

- Environmental Systems Research Institute, Inc. (ESRI) - http://www.esri.com/
  • Ann Johnson, ESRI Higher Education Solutions Manager
- NativeView - http://www.sinte.edu/nativeview/
  • James Rattling Leaf
  • Eugene Napier, Chief, Native American Activities Project, USGS Earth Resources Observation and Science (EROS) Data Center

Eight Partner Tribal Colleges and Universities
# Who is TRESTE?

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<tr>
<th>College/Location</th>
<th>Point of Contact</th>
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<tr>
<td>Blackfeet Community College</td>
<td>Terry Tatsey</td>
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<tr>
<td>Browning, Montana</td>
<td><a href="http://www.bfcc.org/">http://www.bfcc.org/</a></td>
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<td>Fond du Lac Tribal &amp; Community College</td>
<td>Jason Kennedy</td>
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<td>Cloquet, Minnesota</td>
<td><a href="http://www.fdl.cc.mn.us/">http://www.fdl.cc.mn.us/</a></td>
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<tr>
<td>Fort Berthold Community College</td>
<td>Kerry Hartman</td>
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<tr>
<td>New Town, North Dakota</td>
<td><a href="http://www.fbcc.bia.edu/">http://www.fbcc.bia.edu/</a></td>
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<tr>
<td>Little Priest Tribal College</td>
<td>Jan Bingen</td>
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<td>Winnebago, Nebraska</td>
<td><a href="http://www.lptc.bia.edu/">http://www.lptc.bia.edu/</a></td>
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<td>Oglala Lakota College</td>
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<td>Pine Ridge, South Dakota</td>
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<td>Sitting Bull College</td>
<td>Gary Halvorson</td>
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<tr>
<td>Fort Yates, North Dakota</td>
<td><a href="http://www.sittingbull.edu/">http://www.sittingbull.edu/</a></td>
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<td>Turtle Mountain Community College</td>
<td>Audrey Lavallie</td>
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<tr>
<td>Belcourt, North Dakota</td>
<td><a href="http://www.turtle-mountain.cc.nd.us/">http://www.turtle-mountain.cc.nd.us/</a></td>
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<tr>
<td>United Tribes Technical College</td>
<td>Mike Collins</td>
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<tr>
<td>Bismarck, North Dakota</td>
<td><a href="http://www.uttc.edu/">http://www.uttc.edu/</a></td>
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What is TRESTE’s Goal?

Promote the use of NASA Earth science data and products in the classroom thereby helping faculty inspire undergraduate students to careers in Earth system science, the physical sciences, and related fields of science and engineering.
What are TRESTE’s Objectives?

To enhance the utilization of Earth system and physical science concepts in the TCU science (e.g., chemistry, physics, astronomy, biochemistry, computer science, life sciences) teacher’s classroom through integrating the system approach to Earth science and the Native American cultural view

To increase the utilization of spatial thinking in the classroom practice of TCU science teachers and students through promoting use of NASA’s data products and Earth system science research for teaching and learning needs

By working with participating TCU science-teaching faculty, to develop “observational”, hands-on, problem-based teaching methods to draw students into the excitement of Earth system and the physical sciences
How do we attain our objectives?

- **Develop Earth System Science Case Studies**
  - Merge NASA data and technology with the Problem-Based Learning method

- **Hold Annual Workshops**
  - Training
    - GIS
    - Problem-based learning
    - Earth system science
    - Remote sensing and image processing
  - Present and discuss case studies
  - Share insights and lessons learned

- **Project Resource**
  - NASA funding
  - Observational equipment
  - ESRI GIS software
  - NASA and other remotely sensed data
What is the role of partner TCUs?

Integrate physical science-based, Earth system science processes into existing and/or new courses

✓ Identify courses in which case studies will be used

✓ Help develop and use course case studies

- Employ satellite images and GIS techniques in case studies
- Employ Problem-Based Learning (PBL) techniques
- Employ instrument package data in case studies
  • Thermometer
  • Digital Thermometer
  • IR Thermometer
  • Soil Thermometer
  • Sling Psychrometer
  • Barometer
  • GPS Receiver
  • Compass
  • Precipitation Gauge
  • Instrument Shelter
What have we done?

First Workshop Held

- 4-6 January 2006
- U.S. Geological Survey’s EROS Data Center in Sioux Falls, SD

Workshop Topics

- Project Goals and Objectives (Don Perkey)
- Introduction to Problem-Based Learning (Peggy Tilgner)
- Issues/Challenges (Maury Estes)

- Topics for case studies
- Need for GIS training
- Obstacles for success (e.g., Faculty release time, institution support)
- Definition of success
What have we done?

Topics (Continued)

- Project Management Issues (Mona Miller)
  - How do we stay connected and develop a successful team?
    > Monthly telecons
    > Project bulletin board
    > Website
    † Teaching boxes
  - Discuss date for 1st Annual Technical Workshop
What have we done?

Results

- Open discussion about the project, the different interests and goals of the project at each school, and the general concerns and issues at tribal colleges and on tribal reservations. Among some of the interests and concerns expressed by the faculty include:
  - Developing curriculum that would increase physical science in the classroom, introduce problem-based learning and spatial thinking
  - Leveraging current NSF TCUP projects yet not overlapping
  - How to effectively increase the number of students involved in STEM at TCUs
  - GIS and remote sensing training and workshops
  - Establishing a library of curriculum development material, case studies, and resources from partners on the project
  - Extending the project to include K-12 and the tribal community
What have we done?

Results (Continued)

- Case studies

  - Landscape changes, e.g., changes in flora, fauna, decision support for land management, Native American history
  - Climate change
  - Water quality
  - Energy, including, alternative energy sources
  - Weather, severe storms, significant changes including droughts, heat waves
  - Public health/Infectious diseases
  - Native view on intelligent design
What have we done?

Results (Continued)

- Metrics for Evaluation
  - Faculty development
  - Student input, e.g., increased interest in STEM, pipeline
  - Curriculum input, e.g., number of courses developed, revised
  - Outreach input, e.g., K-12 schools, tribal community
What have we done?

Results (Continued)

- Action Items

  • Next Workshop
    > 1-3 June 2006 at United Tribes Technical College in Bismarck, North Dakota

  • Setup Monthly Telecon
    > 1st Tuesday of each month – 12:30 CST
    ‡ 1st telecon 7 February
What is next?

✓ Develop First Case Study

- Decide on topic
- Determine Earth system science concepts to emphasize
- Identify NASA and other data supporting the topic
- Develop GIS component
- Put in Problem-Based Learning format
- Include Native American context

✓ Develop Website for Communication and Shared Resources

✓ June Workshop

- Training
  - Earth system science concepts
  - GIS
  - Remote sensing
- Present first case study using Problem-Based Learning methods
Questions