

DOE / SANDIA TRIBAL ENERGY – INTERNSHIP PROGRAM

Immersion of future leaders into
renewable energy



Fall 2011

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,
for the United States Department of Energy under contract DE-AC04-94AL85000.





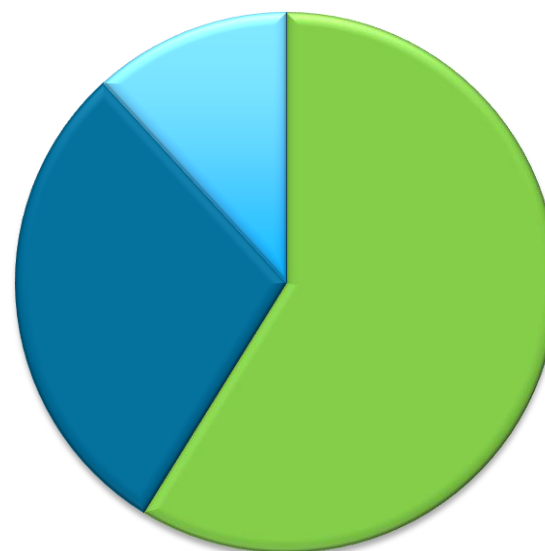
Intern Gathering at Southwest RE Conference, Flagstaff, AZ

Pictured: Suzanne Singer, Gepetta Billie, Sandra Begay-Campbell, Carson Pete, Terry Battiest, Prestene Garnenez

2002 - 2011

- **23 undergraduate & graduate interns** have participated.
 - **14 different tribal affiliations**
 - **12 different majors**
- **30% of the interns** were converted to year-round status
 - **13% of the interns** were hired as FTEs or Sandia contractor

Type of Work for Past Interns



■ Tribal related work

- Tribal Energy Consultant
- Navajo Tribal Utility Authority
- AZ RE Community College
- RE Technical Company
- Inst. Of American Indian Art
- Udall Foundation
- NM Council of Gov't

■ Non-tribal Engr/Science work

- Sandia Nat'l Laboratories
- Lawrence Livermore Nat'l Labs
- Lockheed Martin
- INTEL

■ Seeking Employment

- 2011 Summer Graduates

Graduation Rate of All Interns



■ Enrolled Students

■ Graduated



Deborah Tewa (Hopi)

BS - Indigenous Studies, Northern Arizona University

Her research focused on tribal off-grid PV systems and tribal RE systems.

Pictured at Sandia's PV Laboratory, NM:
Deborah Tewa (certified electrician & solar installer)

“While I had worked with photovoltaic systems for several years including my experience at NativeSUN, the internship complemented my prior work ‘in the trenches’ and has been a gratifying experience. “



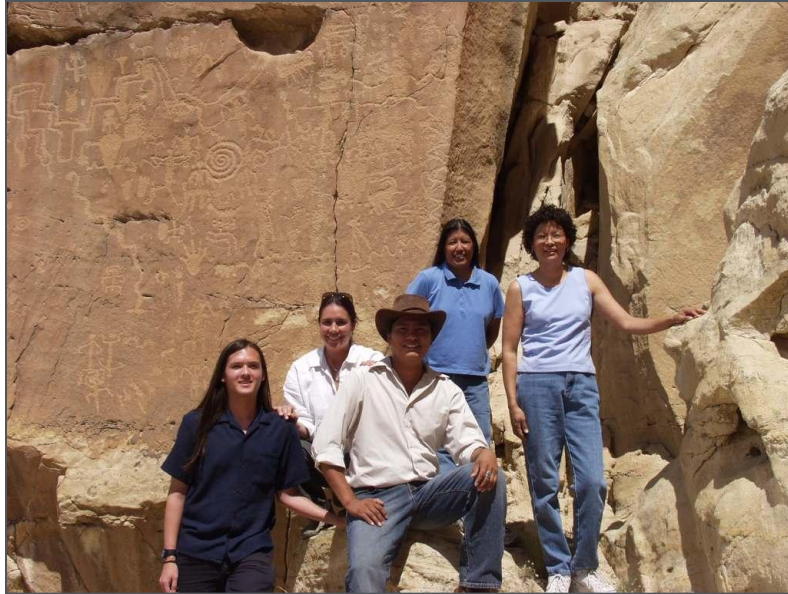
Pictured at Navajo - Monument Valley, UT:
Keith Candelaria, Velissa Sandoval & Shawn Tsabetsaye.

Keith Candelaria (San Felipe/Jemez), BS - Environmental/Earth Science, Dartmouth College
His paper entitled, *"Native American Renewable Energy Approaches: Navajo Tribal Utility Authority and NativeSun."*

Velissa Sandoval (Navajo/Zuni), BS - Electrical Engineering
Her paper entitled, *"Women Champions in Solar Energy."*

Shaun Tsabetsaye (Zuni) is a graduate student in electrical engineering, University of New Mexico, BS – Electrical Engineering. His paper entitled, *"Navajo Tribal Utility Authority: Electrification Demonstration Program - Developing a Sustainable Tribal and Rural Co-operative Solar Program"*.

“Native Americans believe that the sun, wind, and geothermal waters are all gifts from the Creator. As people use these resources today, they should always remember to give thanks for all that is provided.”



Pictured at Hopi Tribe Petroglyph:
Benjamin Mar, Jennifer Coots, Colin Ben,
Deborah Tewa, & Sandra Begay-Campbell.

Benjamin Mar (Cherokee), BS – Electrical Engineering, Worcester Polytechnic Institute
His paper entitled *"Navajo Tribal Utility Authority: Photovoltaic Hybrid Operation and Maintenance Process for a Sustainable Program"*

Jennifer Coots (Navajo), MBA – Finance, University of New Mexico, BA Finance
Her paper entitled *"A Decade Of Changes To An Alternative Power Source For A Rural Utility."*

Colin Ben (Navajo), MA – American Indian Studies, University of Arizona. His paper entitled *"Researching Renewable Energy Systems Available to Indian Country"*

Deborah Tewa (Hopi), BS - Indigenous Studies, Northern Arizona University.
Her research focused on DOE's Solar Reliability Database for Off-grid PV systems.

"With our diverse backgrounds, we shared our perspectives as well as analyzed situations through different points of view whether cultural, technical or financial."



Pictured at Hopi Old Oraibi Village: Tanya Martinez, Deborah Tewa, Sandra Begay-Campbell, and Jennifer Coots.

Tanya Martinez (Mi'KMaq) Power Engineering graduate student, University of Massachusetts – Lowell, BS - Electrical Engineering.
Her paper entitled *"Remote Monitoring System Design - Sustainable Systems For The Navajo Tribal Utility Authority"*.

Deborah Tewa (Hopi) BS - Indigenous Studies, Northern Arizona University.
Her paper entitled *"NativeSUN: A Model for Sustainable Solar Electric Systems on Indian Lands"*.

Jennifer Coots (Navajo) MBA - Finance, University of New Mexico.
Her research focused on the tribal housing mortgage finance for renewable energy systems.

"Tribal Nations do have unique cultures that must be considered for any government project and it increases the success of the project when that awareness is there."



Pictured at Navajo Nation - Monument Valley, UT:
Thom Sacco, Terry Battiest, Jonathan Biron,
Sandra Begay-Campbell, Lani Tsinnajinnie & Debby Tewa

Terry Battiest (Choctaw)

MS – Telecommunications, University of Colorado – Boulder, BS - Industrial Engineering
His research focused on the Navajo Nation's Internet-to-the-Hogan Project.

Jonathan Biron (Sault Ste. Marie Tribe of Chippewa)

BS – Biosystems Engineering, Michigan State University
His paper entitled, "*Tribal Renewable Energy Integration: An Analysis of Current Tribal Infrastructure*"

Lani Tsinnajinnie (Navajo/Filipino)

BS – Environmental Science & Native American Studies, University of New Mexico Her paper entitled "*Benefits of Renewable Energy for Native Nations from the Environmental and Native Perspectives*"

“...it has given me insight to what I want to do professionally...”



Pictured at Navajo Nation's Canyon De Chelly, AZ:
Debby Tewa, Thom Sacco
Cherylin Wilson, Nick Johnson & Terry Battiest

Terry Battiest (Choctaw)

MS – Telecommunications, University of Colorado – Boulder
BS Industrial Engineering
His paper, "*Navajo Tribal Utility Authority Solar Program System Data and O&M Initiative*"

Nick Johnson (Three Affiliated)

BS – Mechanical Engineering
University of Colorado – Denver
His paper, "*Sustainability of Small Wind Turbines on Native American Tribal Lands*"

Cherylin Wilson (Navajo)

BS – Biology, AS – Environmental Science
Oklahoma Panhandle University.
Her paper, "*The Ecological Effects of Native Wind Energy Projects*"

"Since day one, I have felt like a valuable member of the team, which is important because not only am I learning a great deal, I also feel like I am contributing to the group."



Pictured at Navajo Nation, AZ:
Gepetta Billie, Amanda Benavidez,
Carson Pete & Suzanne Singer

Gepetta Billie (Navajo)

MS – Regional & Community Planning; BA – Envr. Planning & Design, UNM, AS – Civil Engr Tech, SIPI

Amanda Benavidez (Taos/San Juan/Isleta)

MS – Regional & Community Planning, University of New Mexico; BA – Business Administration
Her paper entitled, *"Renewable Energy and Energy Efficiency Initiatives on the Laguna Pueblo Reservation"*

Carson Pete (Navajo)

MS – Mechanical Engineering; BS – Mechanical Engineering, Northern Arizona University
His paper entitled, *"North Leupp Family Farms Project – Sustainable Agriculture Systems Using Photovoltaic Cells and Small Wind"*

Suzanne Singer (Navajo)

PhD – Mechanical Engineering; MS – Mechanical Engineering, University of CA, Berkeley; BS – Mech. Engr

“This internship has allowed me to learn and see first hand what it means to plan and build sustainably on Native lands. “



Pictured: Prestene Garnenez,
Sandra Begay-Campbell & Gepetta Billie
(not pictured Suzanne Singer)

Gepetta Billie (Navajo)

MS – Regional & Community Planning; BA – Environmental Planning & Design, University of New Mexico, AS – Civil Engineering Technology, SIPI
Her paper entitled, *"Renewable Energy: Planning for Sustainability & Self-Determination for the Navajo Nation"*

Prestene Garnenez (Navajo)

MA – Urban Planning, University of California – Los Angeles; BS – Biology, New Mexico State University
Her paper entitled, *"Green Gas Stations: A Guide for Tribally Owned Gas Stations"*

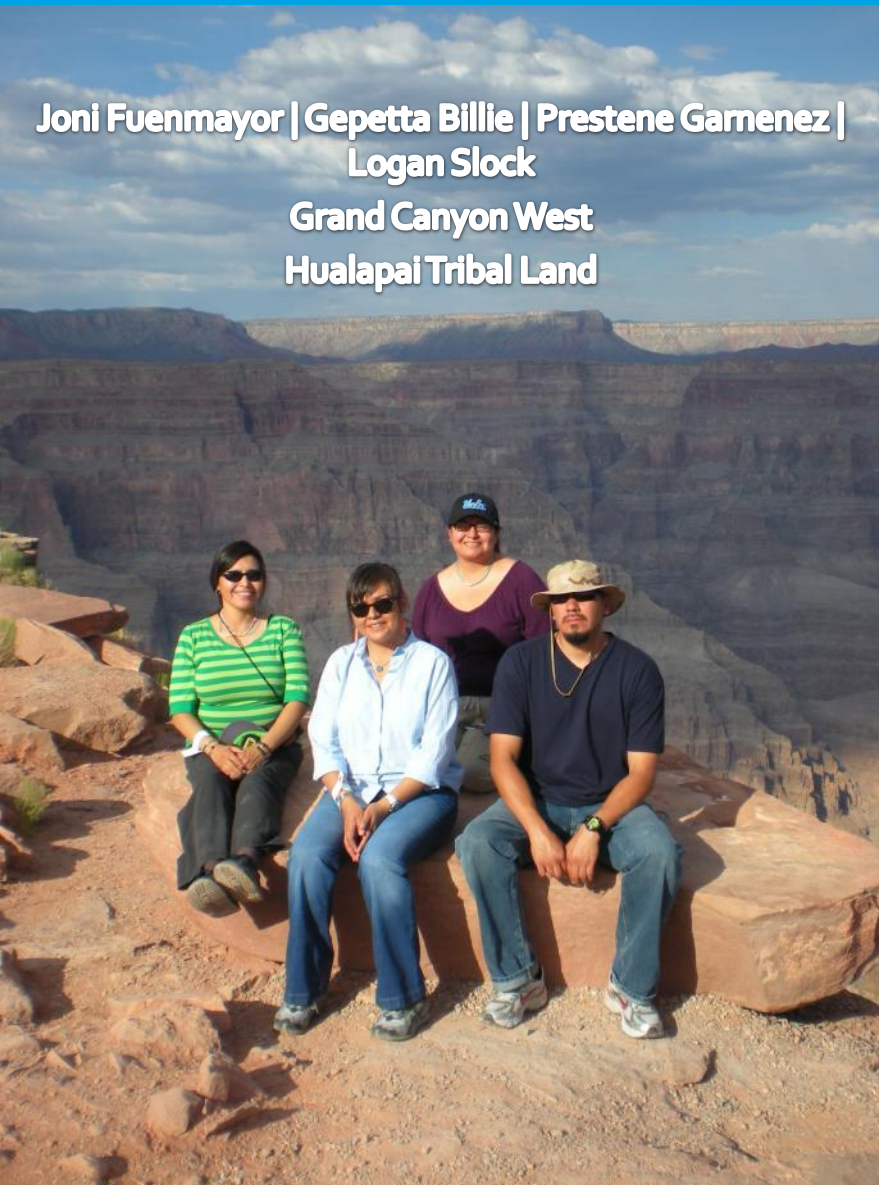
Suzanne Singer (Navajo)

PhD – Mechanical Engineering; MS – Mechanical Engineering, UC-Berkeley; BS – Mechanical Engineering, University of Arizona

“I think what I learned that is important in all the tribes we visited, is the importance of ‘ownership’ of the project. If you’re investing part of what you have - your time, money, energy, pride - into these projects, [then] the projects can be successful, long-lived and sustainable.”

**Joni Fuenmayor | Gepetta Billie | Prestene Garnenez |
Logan Slock**

**Grand Canyon West
Hualapai Tribal Land**



Joni Fuenmayor (Navajo)

AAS – Energy Systems, Navajo Technical College, Crownpoint, NM
BA – Studio Art, Dartmouth College, Hanover, NH
Her paper entitled: *“What’s in 880 Watts? An Exploration of the Basic Electrical Power Connections between a Residential PV System and an Appliance”*

Gepetta Billie (Navajo)

MS – Community & Regional Planning, UNM; BA – Environmental Planning & Design, UNM; AAS – Civil Engineering Technology, SIPI
Her paper entitled, *“Tribal Green Building: A Sustainable Approach to Addressing the Housing Crisis in Indian Country”*

Prestene S. Garnenez (Navajo)

MA-Urban Planning, University of California, Los Angeles; BS-Biology and minor in Mathematics, New Mexico State University
Her paper entitled: *“Renewable Energy in Indian Country: Working to Build a Sustainable Community Using Renewable Energy Resources in Hualapai Nation”*

Logan Slock (Hopi/Choctaw)

BA – Liberal Arts with a main focus in environmental studies, Johnson State College, Johnson Vermont
His paper entitled: *“Achieving Overall Betterment of Energy Resource Use in Tribal Communities”*

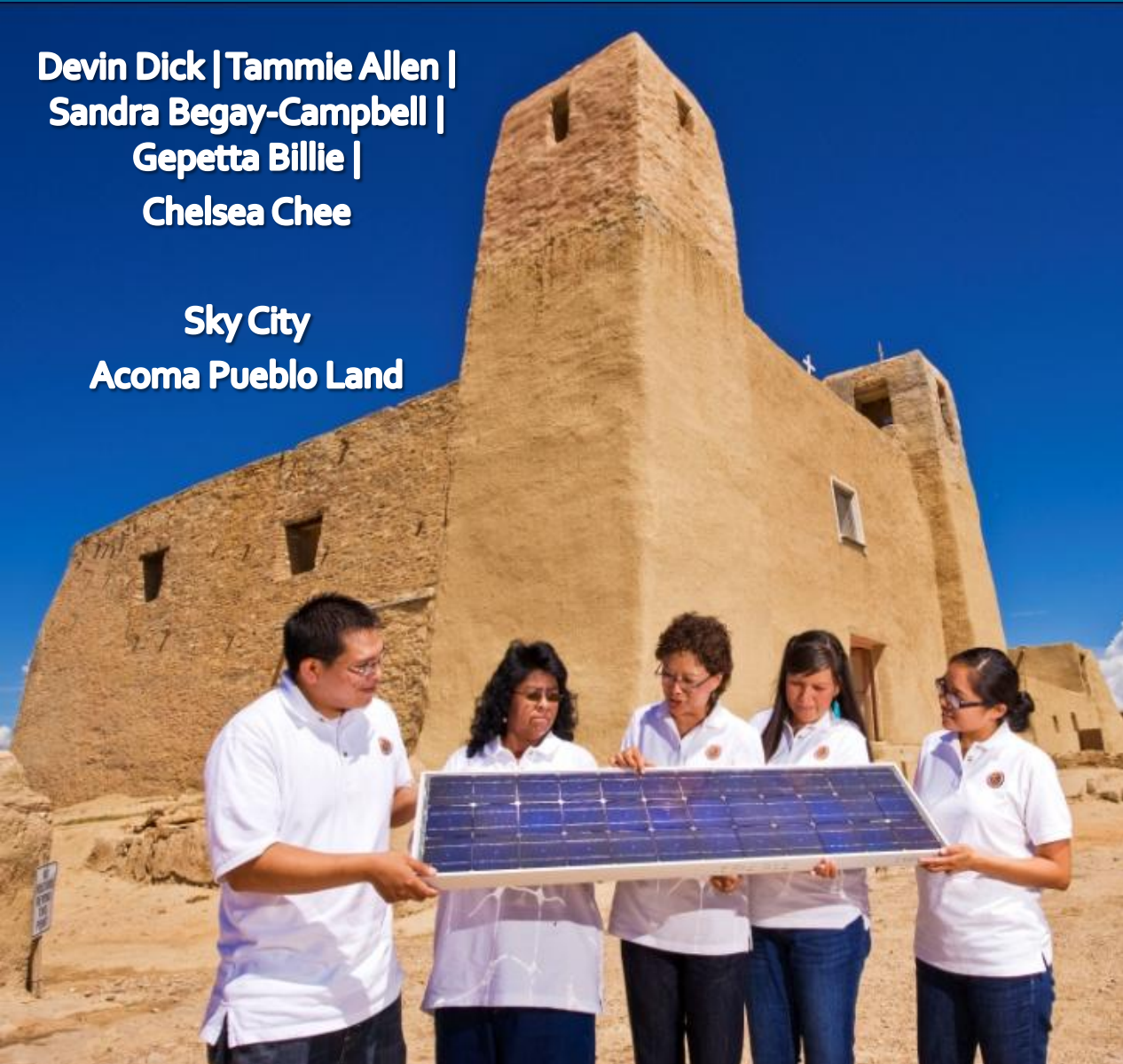
2011 TEP/Sandia Student Interns



Energy Efficiency &
Renewable Energy

**Devin Dick | Tammie Allen |
Sandra Begay-Campbell |
Gepetta Billie |
Chelsea Chee**

**Sky City
Acoma Pueblo Land**



Tammie Allen (Jicarilla Apache)

MS – Community & Regional Planning, UNM;

BA – Art, College of Santa Fe

Her paper entitled: *“Using Renewable Energy For Economic Development: Off-Grid Ecotourism on the Ramona Band of Cahuilla Mission Indian Reservation”*

Gepetta Billie (Navajo)

MS – Community & Regional Planning, UNM; BA – Environmental Planning & Design, UNM; AAS – Civil Engineering Technology, SIPI

Her thesis entitled *“Addressing Renewable Energy Development at the Local Level by Learning How to Plan through Green Building: An Example of Community-based Planning on the Navajo Reservation”*

Chelsea Chee (Navajo)

MS – Community & Regional Planning, UNM; BS – Environmental Planning & Design, U of AZ

Her paper entitled: *“Energy Efficiency and Renewable Energy Benefits Agua Caliente Band of Cahuilla Indians via Implementation at Their Indian Canyons Trading Post”*

Devin Dick (Navajo)

AAS – Energy Systems, Navajo Technical College, Crownpoint, NM

His paper entitled: *“Suggested Alternatives’ For Navajo Tribal Utility Authority: Utilizing Excess Power Generated By Stored Hybrid Units”*