

2012

ISLAND SUSTAINABILITY CONFERENCE

April 18-19, 2012 • Hyatt Regency Guam



Energizing GREEN Communities

Environment | Education | Energy | Society | Culture



Center for
**ISLAND
SUSTAINABILITY**

2012

ISLAND SUSTAINABILITY CONFERENCE

April 18-19, 2012 • Hyatt Regency Guam

This Conference was made possible
through funding from University of Guam,
Office of Naval Research (ONR), and
U.S. Department of Energy.



Center for
**ISLAND
SUSTAINABILITY**



U.S. DEPARTMENT OF
ENERGY



SPECIAL THANKS TO OUR CONFERENCE SPONSORS:



GRESKO

Table of Contents

UOG Center for Island Sustainability	02
Pre-Conference Activities	04
Green Dream Homes Competition	
Student Essay Competition	
Conference Agenda	06
Featured Speakers	07
Plenary Panels	07
Presentation Descriptions	10
Hyatt Breakout Sessions Map	21

Conference Steering Committee Members

Dr. Robert A. Underwood

Conference Chair

Lorilee Crisostomo

Guam Energy Office

Evangeline D. Lujan

BSP Guam Coastal
Management Program

Dr. Mary Y. Okada

Guam Community College

Dr. John Peterson

UOG Center for Island Sustainability

Artemio S. Perez

Guam Power Authority

Tom Quinata

BSP Guam Coastal
Management Program

Elvie Tyler

UOG Center for Island Sustainability

Sam Walker

UOG Center for Island Sustainability

Antonio Endaya, Francisco

Palacios, and Alison Hadley

UOG Center for Island Sustainability

Martha Suez-Sales

UOG School of Business and
Public Administration

Manny Hechanova

UOG PIP/TADEO

Cathleen Moore-Linn

UOG Integrated Marketing
Communications

Norman Analista

UOG Director
Development & Alumni Affairs

David Okada

UOG Chief Planning Officer

Louise Toves

UOG Executive Assistant
to the President

Larry Gamboa

Pacific Post Secondary
Education Council

Dr. Alexander Kerr

UOG Marine Laboratory

Dr. Aubrey Moore

UOG College of Natural and
Applied Sciences

Conference Staff

UOG Green Interns



Center for ISLAND SUSTAINABILITY



The Mission of the University of Guam Center for Island Sustainability (CIS) is to create and implement renewable and sustainable technologies that are suitable for island use and communities, will incorporate indigenous aspects and alternatives, and allow for replicable research and adaptation to meet the needs of the region's island communities in the areas of *Environment, Economy, Society, and Education*.

Our goal is to educate, demonstrate, and provide opportunities for everyone to become an engaged and informed part of our society and environment and therefore become active citizens for the island.

In 2009, under the leadership of UOG President Dr. Robert A. Underwood, the CIS was established to address critical questions that Pacific islands are currently and will increasingly be facing with regards to global climate change; alternative, renewable, and sustainable energy solutions; peak oil; bio-security; and indigenous people's rights.

Through the CIS, UOG is strategically poised to be the preeminent model for sustainability in the Western Pacific. The research-based directives of the CIS incorporate teaching, training, and expertise into all of its projects with the goal of maximum impact across the region.

The CIS is leading change through its outreach, hands-on demonstrations, and alternative energy models that are designed to educate

students and the general public about the negative and positive realities our island communities face. It is incumbent upon UOG to lead this change in giving students the skill-sets necessary to address and find indigenous solutions to the many challenges our region faces.



Our Unique Pacific Islands

Pacific islands are some of the most remote places on Earth, and yet are often the most profoundly impacted by the effects of global climate change, pollution, and other environmental issues. Ever since humans first made the Pacific islands their home, sustainability and environmental respect and knowledge of their immediate environment and its rich natural resources were integral components of Pacific cultures and economies.

UOG's Commitment

UOG is committed to the conservation and management of our limited resources and the implementation of alternative energy sources while minding the broader impacts on our physical and societal environments. With the emphasis on indigenous, island-focused sustainability, the CIS will create and provide opportunities for research-based models of renewable and sustainable energy management.

Adopting new technologies, strategies, and social ideals requires a sea change in behavioral attitudes. Technical fixes need to be suitable and socially and culturally acceptable to fit the local context. Acceptance emerges primarily from educational engagement. Having begun the UOG Green initiative with energy conservation and recycling, we have

expanded our focus to include behavioral change strategies and are pursuing opportunities for alternative energy research and island-wide energy audits that will result in better solutions for the island community.

As a University, we feel strongly that the next generation needs to be prepared with the knowledge about our relationship with our environment, to be aware of the social impacts global climate change is having and will have on island communities, and to learn about the limited resources that we must manage.



CIS PROGRAMS

Western Pacific Coral Reef Institute (WPCRI)

A collaborative regional partnership with the mission to protect and preserve coral reefs of Micronesia through multidisciplinary basic and scientific research, which is then directly applied towards and used for management, training, and educational purposes. The WPCRI Management Committee includes representatives from the University of Guam, the territorial government, academic, and non-governmental institutions from Guam, CNMI, and the Micronesia Region. WPCRI has funded research projects in the Republic of the Marshall Islands, Palau, the Federated States of Micronesia, CNMI, and Guam. It also offers scholarships to UOG students who are pursuing undergraduate degrees in Biology or a graduate degree in Environmental Science or Biology and provides assistance towards student travel for conferences or for participation in regional field study exercises.

Regional Assistance Development (RAD)

The purpose of RAD is to develop a regional workforce that will have the education and ability to install and maintain renewable energy equipment that is best suited for small island environments. The Center for Island Sustainability (CIS) aims to recruit one individual from the Republic of Palau, the Republic of the Marshall Islands, and from the Federated States of Micronesia to become a part of this program and receive the relevant education and on the job training in Guam over the course of nine months. Once they have completed their training, these individuals are expected to take their knowledge and expertise to their home island and serve as their area's regional trainer.

Micronesia Bio-Security Plan (MBP)

In preparation for the military buildup on Guam and the Commonwealth of the Northern Mariana Islands (CNMI), the Department of Defense (DOD) has taken an unprecedented step of funding a proactive effort to evaluate the risks to Micronesia that are associated with the introduction and/or spread of potentially invasive species and to make recommendations as to how these risks can best be eliminated or minimized through the creation of a Micronesia Bio-Security Plan (MBP).

As part of a Cooperative Agreement with the Department of the Navy, the University of Guam is taking the lead in organizing a team of scientists and managers specializing in bio-security and/or natural resource management in the Pacific region to contribute to a peer review of the draft MBP sections and develop a Strategic Implementation Plan to support the MBP.





Green Dream Homes High School Competition

April 6, 2012 | University of Guam School of Business & Public Administration



Left Photo (L-R): Second Place Winner Harvest Christian Academy represented by student Richard Lee and Teacher Brandon Pagarido with Elvie Tyler, UOG Sustainability Coordinator, and Francisco "Kiko" Palacios, UOG Energy Technician.

Above Photo: First Place Winner, George Washington High School students.

Bottom Photos: Green Dream Home entries.

The Green Dream Homes Competition was developed by Francisco "Kiko" Palacios, an Energy Technician at the University of Guam's Center for Island Sustainability (CIS). The competition is designed to engage the island's youth in sustainability through less-traditional means; allowing for full imagination and creativity with a few guidelines and rules.

The students were given the task to create and design a sustainable home model or drawing which can be done in groups or individually, and they are expected to research true sustainable building practices and techniques under the guidance of their instructors. The students were given several months to research, develop, and fully design their model or drawing for the competition. The models were then brought to UOG for public display and final judging.

The judges included UOG, GCC and Guam Energy Office representatives, as well as an engineer and an architect whose expertise are used to judge the technical aspects and feasibility of the models. The winners are displayed at the Island Sustainability Conference. There is also a "Viewer's Choice" award given to the public's favorite model. This year's competition is the first of its kind here on Guam, but it has received a great deal of praise and many have requested to make the competition an annual event for the island's high schools.

1st Place: George Washington High School

2nd Place: Harvest Christian Academy

3rd Place: Simon Sanchez High School

Viewer's Choice: Academy of Our Lady of Guam



Student Essay Contest

Thoughts And Insights From Regional Emerging Sustainability Scholars On Sustainable Island Communities

April 6, 2012 | University of Guam School of Business & Public Administration



What is a “sustainable island community?” This is the thought-provoking question answered by six young Regional Emerging Sustainability Scholars from U.S. and U.S. affiliated Pacific colleges and universities in their essays as part of a competition to represent their institution at the 3rd Annual Conference on Island Sustainability.

These scholars’ insights are stories of their small island communities rich in tradition and culture, learning to live in harmony with finite resources while heavily relying on external resources (for fuel, food commodities, and other modern amenities) and act as a starting point for the work ahead and towards a “sustainable island community.”



SEVERINO P. ALFOREZA II
Northern Marianas College

Severino is an 18-year old, first year Natural Resources Management major at the Northern Marianas College on the island of Saipan, CNMI. His field of study has broadened his knowledge and experience of the natural environment and he most appreciates the marine ecosystem, particularly near-shore and coastal resources. Severino is extremely interested in learning more about the environment and keeps an open mind to all environmental topics.

VINCENT VAN DER GOUWE
Kapiolani Community College

As an avid diver and marine life enthusiast, Vincent van der Gouwe is at home in the Pacific islands. Combining his background in graphic design and storytelling with his interest in interactive and hands-on education, Vincent strives to implement more engaging curriculum in Hawaii’s schools to truly give meaning to the Hawaiian proverb “Ma ka hana ka ‘ike” (In Working One Learns). Vincent pursues a degree in Environmental Studies with a minor in Hawaiian language and Hawaiian studies.



DESTINY GEORGE
College of the Marshall Islands

Destiny is a 19-year old student at the College of the Marshall Islands.

NO
PHOTO
AVAILABLE

ELSEI TELLEI
Palau Community College

Elsei Tellei is a 19-year-old Palauan student at Palau Community College. She will graduate with an A.S. Degree in Liberal Arts in Spring 2013 and intends to pursue a bachelor’s and graduate degree. Elsei is considering a career in the field of International Business or Law. Both an islander and an avid paddling sports enthusiast, she is deeply concerned with the effect of human development and weather patterns on sea levels and specifically, the livelihood of Palau’s most valuable resources, its coral reefs.



ANGELBURT IGERERA
College of Micronesia – FSM

Angelburt is a 26-year old Yapese student at the College of Micronesia - FSM. He will complete his B.A. degree in Elementary Education next fall and an A.S. in Marine Science. In Spring 2013, he plans to continue his graduate studies at the University of Guam. Upon completion of his studies, Angelburt plans to return to the FSM and take leadership roles in education, both at the state and national levels.



LARRY GAMBOA - Facilitator
Pacific Postsecondary Education Council (PPEC)

Larry has served as the Project Director for the PPEC for six years and has 20+ years of experience in higher education as a staff, faculty, and administrator. He received a BBA in Management and Finance/Economics, an MA in Human Resource Management, a Master of Business Administration, and is a Senior Professional in Human Resources (SPHR) and a Certified Program Planner (CPP). His interest areas include organizations, culture, human resources, leadership, and training and development.

ASOMALIU LOTOVALE
American Samoa Community College

Asomaliu is 48-years old and is currently both a student and staff member at the American Samoa Community College. Asomaliu will complete her A.A. degree in Spring 2013. She intends to continue her education in Library Science while working as a Library Associate at the American Samoa Community College.



AGENDA, Wednesday, April 18, 2012

TIME	ACTIVITY				
8:00am	SIGN IN AND CONTINENTAL BREAKFAST, INTRODUCTION & WELCOMING REMARKS <ul style="list-style-type: none"> Robert A. Underwood, President, University of Guam The Honorable Ray Tenorio, Lt. Governor of Guam John Peterson, Ph.D., Assistant Vice President, University of Guam 				
9:00am	OPENING PLENARY - Global Sustainability Strategist, Dr. Martin Blake				
10:30am	PLENARY PANEL - Creating Guam's Energy Plan: A Collaborative Effort Panel: Joaquin Flores (GPA), Lorilee Crisostomo (GEO), Captain John V. Heckman, Jr. (Commanding Officer-NAVFAC), Henry Taitano (Economic Advisor-Governor's Office), Misty Conrad (NREL)				
11:45am	LUNCH SPEAKER - Robert Adams, U.S. Department of Energy Weatherization Works on Guam Too				
BREAKOUT SESSION A					
Time	Energy	Economics	Education	Natural Resources	Regional Topics
1:00 - 2:00pm	Creating Energy from Waste <i>Presented by Steffran Neff (Location: Santa Rosa Room)</i>	Reducing Transportation Petroleum Use on Islands <i>Presented by Caley Johnson, National Renewable Energy Laboratory (Location: Grand Ballroom B)</i>	Making a Difference in Our Environment Via Service Learning, Community Service and Having Fun in the Classroom! <i>Presented by Melanie Mesa Blas (Location: Santa Rita)</i> How to Save Money at Home and Work by Reducing Resource Consumption <i>Presented by Allison Rutter (Location: Grand Ballroom C)</i>	Guam Waterworks Authority Overarching Sustainability <i>Presented by Martin Roush (Location: Grand Ballroom A)</i>	Implementing Sustainable Development in Island Tourism <i>Presented by Frank Haas (Location: MVV)</i>
BREAKOUT SESSION B					
Time	Energy	Economics	Education	Natural Resources	Regional Topics
2:15 - 3:15pm	Waste to Energy: Busting the Myths of Yester Year <i>Presented by Scott Haase, NREL (Location: Grand Ballroom B)</i>	Smart Grid: Program Lift Off <i>Presented by John J. Cruz, Jr., P.E. (Location: Grand Ballroom A)</i> I Bike Guam Sustainable Tourism for Guam: Connecting Guam's Tourists Centers by Bike. <i>Presented by Thomas Renfro and Darryl Taggerty (Location: Santa Rosa Room)</i>	AquacultureHub: A Unique Social Network and Aquaculture Training On-Line Learning (Atoll) <i>Presented by Tetsuzan Benny Ron (Location: MVV)</i>	A Community-Led Watershed and Coral Reef Restoration Initiative in Guam <i>Presented by A.J. Shelton III (Location: Grand Ballroom B)</i> Concrete Steps to Reducing Fuel Consumption: A Practical Approach for Individuals and Businesses <i>Presented by Keith Felix Calvo Cruz, Sales & Marketing Manager, TrackMe! Guam (Location: Santa Rita Room)</i>	
BREAKOUT SESSION C					
Time	Energy	Economics	Education	Natural Resources	Regional Topics
3:30 - 4:30pm	Community Based Programs to Deal with WASTE <i>Presented by Mayor Melissa Savares (Location: Grand Ballroom C)</i>	3:30-4:00pm Low Impact Development <i>Presented by Julie Shane, P.E., NAVFAC Marianas (Location: Grand Ballroom A)</i> 4:00-4:30pm Sustainable Design Element <i>Presented by Armand Cayan, P.E. (Location: Grand Ballroom A)</i>	Education for Sustainable Environments: A Review of Recent Literature <i>Presented by Yukiko Inoue-Smith (Location: Santa Rosa)</i>	Guam's Aquifer & the Myth of Sustainable Yield: How to Make Sure There is Enough Water for Everyone <i>Presented by Dr. John W. Jenson, Professor of Environmental Geology, Water & Environmental Research Institute of the Western Pacific, University of Guam (Location: Santa Rita Room)</i>	Looking Within for Solutions and Looking Without for Critical Engagement - in Greening Micronesia and Pacific Islands' Communities <i>Presented by Unaisi Nabobo-Baba, Ph.D. (Location: Grand Ballroom B)</i> Sustainable Soil Management in Micronesia <i>Presented by Robert Gavenda, Ph.D. (Location: MVV)</i>
4:30pm	TABLE EXHIBITS				
5:00pm	GRADUATE SESSION (Sponsored by: GRESCO, Johnson Controls Inc. and Brown and Caldwell) and RECEPTION				

AGENDA, Thursday, April 19, 2012

TIME	ACTIVITY				
8:00am	SIGN IN AND CONTINENTAL BREAKFAST				
8:30am	HIS EXCELLENCY PRESIDENT JOHNSON TORIBIONG, REPUBLIC OF PALAU				
9:00 - 10:00am	PLENARY SPEAKER - Sustainable Island Tourism, Dr. Hiroshi Kakazu				
10:00 - 10:50am	PLENARY PANEL - Corporate Social Responsibility: Roadmap to Sustainable Communities Panel: Kathy Sgro (Payless), Unaisi Nabobo-Baba, Ph.D. (UOG), Quentin Koch (United Airlines), Ronal M. Young (Security Title)				
11:00 - 11:50am	PLENARY PANEL 2 - Thoughts And Insights from Regional Emerging Sustainability Scholars on Sustainable Island Communities Panel: Regional Sustainability Scholars				
11:45am	LUNCHEON SPEAKER - Mr. William Neswith, NASEO				
BREAKOUT SESSION A					
Time	Energy	Economics	Education	Natural Resources	Regional Topics
1:00 - 2:00pm	<p>Solar Energy Cover Systems For Landfill Closures – A Sustainable Alternative Approach to Traditional Subtitle D Landfill Closures <i>Presented by Mark Miller, P.E. (Location: Grand Ballroom A)</i></p> <p>Elimination of Sludge from Wastewater Treatment Plants, or Development of Sludge as an Energy Resource: Which is better? <i>Presented by Joseph D. Rouse, UOG, WERI (Location: Santa Rita Room)</i></p>	<p>Increasing Community Input Into Island Development: The Role of Appreciative Inquiry and Team Selection In Strategic Planning Process For Multiple User Zones <i>Presented by Tetsuzan Benny Ron*, Malia Chow, Joseph Paulin, Donna Ching, University of Hawaii Aquaculture Program, University of Hawaii at Manoa (Location: Grand Ballroom B)</i></p>	<p>Education and Our Natural Environment <i>Presented by Edwin Reyes, WPCRI Manager, Dr. Laura Biggs, and Elaina Todd, WPCRI Curriculum Specialist, UOG Western Pacific Coral Reef Institute in Conjunction with Pacific Marine Resource Institute. (Location: MVV)</i></p>	<p>Agroecology for Island Sustainability <i>Presented by Charles Aiseam, Jessica Nanguata, Mario Martinez, and Mari Marutani Tropical Agricultural Science Program, Agriculture and Life Science Division, College of Natural and Applied Science, University of Guam (Location: Santa Rosa)</i></p>	<p>1:00 - 1:30pm Improving Livelihoods in the Outer Islands Communities of the Marshall Islands Through Solar Electrification <i>Presented by Arieta Gonelevu (Location: Grand Ballroom C)</i></p> <p>1:30 - 2:00pm Farming on Guam <i>Presented by Bill McDonald (Location: Grand Ballroom C)</i></p>
BREAKOUT SESSION B					
Time	Energy	Economics	Education	Natural Resources	Regional Topics
2:15 - 3:15pm	<p>An Island Adrift in a Tidal Wave of Consumerism - Analysis on Solid Waste Generation Effected by the population growth and social lifestyle on Guam <i>Presented by M.H. Golabi, Kirk Johnson, Takeshi Fujiwara, and Eri Ito (Location: Santa Rosa Room)</i></p>	<p>Logistics (Feasibility Study Re: Alternative Energies) <i>Presented by Ian Catling (Location: Santa Rita Room)</i></p>	<p>Knowledge@Guam Team <i>Presented by Cooperative Extension Services: Peter Barcinas, Nicolas Yasuhiro, Nacrina San Nicolas (Location: MVV)</i></p>	<p>A View of the Wetlands in the Mariana Islands <i>Presented by Bob Gavenda (Location: Grand Ballroom A)</i></p>	<p>Micronesia Challenge <i>Presented by Evangeline Lujan (Location: Grand Ballroom B)</i></p> <p>Status And Management of Coral-Reef Ecosystems Across Micronesia <i>Presented by Dr. Peter Houk, Pacific Marine Resources Institute (Location: Grand Ballroom A)</i></p>
3:30 - 4:30pm	PLENARY PANEL - High School Students - Green Dream Homes Panel: Guam Dream Home High School Students				
4:45pm	CLOSING - Conference Overview - Dr. Hiroshi Kakazu, Dr. Martin Blake, Dr. Robert Underwood				

Featured Speakers



Global Sustainability Strategist | 9:00am, Wednesday, April 18, 2012

Dr. Martin Blake earned his doctorate in business administration from Hull University in the United Kingdom. He holds a working portfolio of board directorships and advisory roles encompassing Asia, Australia, the USA and Europe.

Dr. Blake chairs and advises a multitude of strategic groups, all focused on the development and deployment of energy efficient infrastructure. He also focuses on Corporate Social Responsibility. For more on Dr. Blake visit www.martinblake.com.



Sustainable Island Tourism | 9:00am, Thursday, April 19, 2012

Dr. Hiroshi Kakazu was born on the island of Okinawa. He received his Ph.D. in Economics from the University of Nebraska. He has served as Visiting Research Fellow and Professor to the London School of Economics, the East-West Center (Fulbrighter), the University of Hawaii, the University of the Philippines (Japan Foundation) and others. He is currently the Chairman of the Board of Trustees, Meio University.

He is the author of *Island Sustainability: Challenges and Opportunities for the Pacific Islands in a Globalized World* (Trafford Publishing, Canada, 2009) among other publications. Nissology, the study of small islands, is the focus of his life's work.



His Excellency Johnson Toribiong, President of Palau

8:30am, Thursday, April 19, 2012

His Excellency Johnson Toribiong is the eighth president of the Republic of Palau. Toribiong was elected and installed to office in 2009 to serve a four year term. President Toribiong is married to Valeria Andres Toribiong and has two children named Rolel and Sonia. The couple is blessed with five grand children.

Plenary Panels

Creating Guam's Energy Plan: A Collaborative Effort

Panel: Joaquin Flores (GPA), Lorilee Crisostomo (GEO), Captain John V. Heckman (Commanding Officer-NAVFAC), Henry Taitano (Economic Advisor -Governor's Office) and Misty Conrad (NREL). | 10:30am, Wednesday, April 18, 2012

Corporate Social Responsibility: Roadmap To Sustainable Communities

Panel: Kathy Sgro (Payless), Unaisi Nabobo-Baba, Ph.D. (UOG), Quentin Koch (United Airlines), Ronald M. Young (Security Title)vv
10:00-10:50am, Thursday, April 19, 2012

Thoughts and Insights From Regional Emerging Sustainability Scholars on Sustainable Island Communities

Panel: Regional Sustainability Scholars | 11:00-11:50am, Thursday, April 19, 2012

Green Dream Homes

Panel: Guam Dream Homes High School Students | 3:30-4:20pm, Thursday, April 19, 2012

Luncheon Speakers

Weatherization Works on Guam Too | 11:45am, Wednesday, April 18, 2012

Robert Adams, Weatherization & Intergovernmental Program, U.S. Department of Energy

With the rising cost of fuel, it has become difficult for our low-income households to sustain their everyday needs. The Weatherization Assistance Program (WAP) is able to assist our low-income households to reduce energy costs by improving the energy efficiency of their homes while ensuring their health and safety. The program has assisted many homes

throughout the U.S. and its Territories by replacing heating and/or cooling systems, changing out inefficient refrigerators and much more. The Guam WAP program replaces inefficient refrigerators, window air conditioners, light bulbs, showerheads, faucet aerators, and much more. Since its inception on Guam in 2009, the program has provided weatherization services to more than 600 households.

William Neswith, NASEO | 12:00 noon, Thursday, April 19, 2012

Poster Presentations | 4:30pm, Wednesday, April 18, 2012, 2nd Floor

Service Learning with GCC Ecowarriors Presented by: *Joni Kerr*

The Guam Community College Ecowarriors' motto is 'Learn, Lead, Protect'. Guided by this maxim, the Ecowarriors expanded into a student organization at GCC and have integrated service learning into our activities. This provides options for students enrolled in courses that require service learning. In the course of providing service, students learn about the organization and make connections to their coursework. Service learning has the potential to enhance the learning process, and encourage individuals to continue giving back to the community long after the project is completed. Through this process, the Ecowarriors hope to promote learning and stewardship of the environment. (*Grand Ballroom Lobby*)

Sustainability Isn't a New Idea: Teaching Ancient Hawaiian Ahupuaa Using Virtual Reality

Presented by: *Tetsuzan Benny Ron, Yoko Yamamoto, Sharon LePage, Carlso Andrade, Barbara McLain.*

The loko ia was a sophisticated fish husbandry compare with that of the original peoples of the Pacific. The loko ia has been part of an integrated management system call Ahupuaa. The ahupuaa was a defined potion of land and water from the mountain to the sea (mahuka to makai) while including woodland on top and mala (agriculture zone) on the lower region.

Second Life (SL) is one of the largest and considered as the most advanced virtual worlds, which is implemented by many higher educational institutions. SL is a 3D immersive online world for simulation of concepts, an online learning environment, and the space for an avatar-based education.

There is a need for creating a replica of ancient/conceptual Ahupuaa system in Second Life. One of the major aspects of traditional Hawaiian culture is land division. Ahupuaa contained various important aspects of ancient Hawaiian cultures such as a land, water, and ocean regulations, and stewardship of the land and its resources. SL can provide the immersive experience, a category of experiential learning. The power of immersive experience is much greater than learning from literature and visiting historical and preserved sights in real life. We can integrate these components of real life and intersect with the immersive 3D virtual space to produce an active online learning environment

A Photovoltaic System as a Supplemental Power Source for a Tropical Farm: A Case Study in

Aquaponics at UOG Triton Farm Presented by: *Jed Henson, Antonio Endaya, and Mari Marutani*

UOG Triton Farm is an integrated farm that demonstrates a small agricultural enterprise for Pacific islanders. The farm consists of three components, aquaculture (aquaponics), horticulture (fruits, vegetables and ornamentals), and animal production (egg layers). Among the three, aquaponics needs the most electrical energy in its operation using aeration pumps and re-circulating water pumps. Improvements are needed to reduce the cost of energy to maintain sustainable operation of our aquaponics system. In 2011, a battery-less (net metered) solar power system was installed to lessen the amount of electric power needed from GPA to run the air pumps for the aquaponics at the Triton farm by the Technical Assistance and Sustainable Instruction Program (TASI). The photovoltaic (PV) system generates electrical power by converting solar radiation to supplement some GPA energy to reduce the cost of power bill. However, to record the amount of power generated by the PV system, the current set-up requires site visits and manual record keeping of the wattage harvest and CO2 savings from the system. Next step is to establish an automatic record keeping system and computer data storage, which will allow accurate and speedy data dissemination to public by Internet. This video presents installation stages and the amount of energy harvested by the photovoltaic system.

Graduate Session | 4:30pm, Wednesday, April 18, 2012, Grand Ballroom Foyer

Sponsored by: GRESCO, Johnson Controls Inc. and Brown and Caldwell

A focus on the future generations and future workforce. The conference will include a Graduate Student Session that will provide students with an opportunity to discuss their research interests and backgrounds with those who are established in the scholarly and business world. This will allow for a type of mentoring relationship to develop between students and community role models, while also giving the students an idea of what types of opportunities are available to them and providing the community role models the opportunity to get to know their potential workforce.

Table Exhibits | 4:30 noon, Wednesday, April 18, 2012, Grand Ballroom Lobby and 2nd Floor

- Guam Power Authority
- Johnson Controls, Inc.
- Brown & Caldwell
- Guam Coastal Management Program
- Guam Energy Office
- GRESCO
- Guam Community College
- UOG Center for Island Sustainability
- DAWR - Department of Agriculture
- Guam Environmental Protection Agency - Water Division
- Solcom / M.E. International , Inc.

Presentation Descriptions - Breakout Sessions A, Day 1

Creating Energy from Waste – Success Stories.

Presented by Steffran Neff | 1:00-2:00pm, Santa Rosa Room

There are many different waste streams that are generated in each and every community around the world. What if we could take that waste and generate energy? This concept is not science fiction, but engineering reality. Communities around the world have been converting waste-to-energy for decades. This paper will discuss real life examples of successful waste-to-energy systems and explore the potential waste streams on Guam that could be viable for conversion to energy including solid waste, wastewater, landfill gas, and fats, oils, and grease.



Steffran Neff, *Managing Engineer for Brown and Caldwell's Guam Operation and National Leader in BC's Sustainability Group, is a chemical engineer with more than 21 years of experience in the environmental consulting field. Her background has followed the evolution of the sustainability movement. She started by performing environmental compliance audits and pollution prevention planning which evolved into environmental and asset management systems auditing and program development. She has worked with many types of organizations to develop level of service goals that include sustainability and energy efficiency metrics and facilitates project business case evaluations incorporating triple bottom line analysis into decision-making.*

Reducing Transportation Petroleum Use on Islands

Presented by Caley Johnson, National Renewable Energy Laboratory | 1:00-2:00pm, Grand Ballroom B

Transportation is key to reducing an island's petroleum consumption because it constitutes about half of that consumption, holds many low-cost opportunities for reduction, holds opportunities for incremental reduction, and provides many ancillary benefits along with reduction. Increasing rideshare is one such low-cost opportunity, which can be facilitated through websites, strategic parking lots, and employee rideshare programs. Increasing the use of buses and water taxis can be done by using new technologies to make buses more predictable and through innovative marketing campaigns. Improving traffic flow through coordinated traffic signals, left-hand turn lanes, mandates to remove accidents from traffic, and other means can improve drive-cycle fuel economy by up to 35%.

Governments throughout the world have used legislation to improve the fuel economy of their vehicles, and driver education can save a substantial amount more by teaching drivers how to drive and maintain their vehicle properly. Alternative fuels are limited on islands, but waste-grease biodiesel can be cost-effective, and electric vehicles can use less petroleum than a 30 mpg sedan long as the petroleum-fueled power plants are more than 22% efficient. Petroleum-reducing projects should be prioritized based on cost, quantity of displacement, time frame, and the popularity amongst residents.



Caley Johnson *is a transportation market analyst for the Market Transformation Center at the National Renewable Energy Lab. In this role, he assesses the economics of advanced fuel and transportation technologies and notifies key groups of stakeholders when a given technology would be profitable for them. He also monitors the adoption of these technologies into local economies through the Department of Energy's Clean Cities program. Prior to working for NREL, Caley was a project manager in the U.S. Environmental Protection Agency's Climate Protection Partnerships Division. He has a BA degree in biology from the University of Colorado and a Master of Environmental Management degree from Yale University with a focus on Economics.*

Making a Difference in our Environment with Service-Learning and Community Service and Having Fun in the Classroom

Presented by Melanie Mesa Blas, teacher at Simon Sanchez High School | 1:00-2:00pm, Santa Rita Room

Active learning, student teaching, empowerment, and activities within the community are components of my Marine Biology class. Ideas to transform your classroom into a committee that generates ideas and puts them into action will be presented. Easy ways to get students out of the classroom, excited, and on field trips will be shared. Organizations that can help you with ideas and activities will be presented. Includes a brainstorming session: "What can you do? How can you make the world a better place, starting today?"



Melanie Mesa Blas has lived on Guam for 16 years. She has taught in public schools for 17 years, and is teaching Marine Biology at Simon Sanchez High. Melanie earned her Masters Degree in Education from the University of Guam in 2011. As a product of the California public school system and a mother of two young boys, Melanie realizes the importance of teaching her students about finding ways to make the world a better place. From volunteering at community events to teaching elementary school students, her students spread the word about life in the ocean and how we can protect our ocean resources. Melanie's students participate in grassroots campaigns on the internet using Facebook, Twitter, email, and text. She has worked with PEW Environmental Group, Humane Society International, Shark Defenders, and PETA (People for the Ethical Treatment of Animals). Inspired by the previous 2 sustainability conferences and environmentalists, she is a strong advocate of community service and service-learning and knows that everyone has the power to make a difference. Quote from the movie, "The Lorax" (2012) "Unless someone like you cares a whole awful lot, nothing's going to get better. It's just not.... Change the way things are."

Guam Waterworks Authority Overarching Sustainability

Presented by Martin Roushe, P.E., General Manager of GWA | 1:00-2:00pm, Grand Ballroom A

I am the strongest believer in water conservation, bio-solids management, and aggressive power management programs. With the world economy as it is I would like to focus on economic suitability of island utilities. My goal is to demonstrate how utility management is one of the most important sectors in the economic health of an island. This presentation will demonstrate why co-generation of power, public education on conservation, maximizing water harvesting, bio-solids management, and developing reclaimed programs, just to name a few, are so vital not only for the environment but also economic vitality.

Developing an effective and efficient organization is also a key to the sustainability of a utility. A utility must focus on building management capacity in the organization. This is done by developing supervisory training programs and management and leadership training programs. Investing in the employees individual capacity is a must, then focus on session planning: Guam Waterworks Authority Overarching Sustainability is Building Leadership Capacity.



Martin Roushe prior to his arrival at GWA he was City Manager of Benson, Arizona Tucson. He possesses over twenty-five years of experience in leadership positions in the public sector in the areas of public works, water utilities, and wastewater utilities. Roushe holds a Bachelor of Science (B.S.) in Electrical Engineering, a Masters of Science (M.S.) in Civil Engineering, from the University of Arizona. Roushe also holds professional engineering licenses in both civil and electrical. Roushe also served as Public Works Director and Utility Director for the Town of Sahuarita in Arizona. Roushe is experienced in development review and public works infrastructure planning and engineering, financing, design, engineering review, project management, and construction management. In the 1990's Roushe also worked for Tucson water, a municipality that serves over 600,000, customers.

Implementing Sustainable Development in Island Tourism

Presented by Frank Haas | 1:00-2:00pm, MVV

Once an island community has embraced the concept of sustainable tourism, the challenge becomes one of implementation. Mandates, incentives, disincentives, pricing, and policy changes are all tools that can be applied in leading a destination on a sustainable path. More specifically, tax policies, land use policies and infrastructure pricing (for things like water, power, and access to sites) have been used to manage environmental impacts in destinations. Applying these tools to the complex issue of sustainability requires an understanding of how they work – and good judgment to avoid unintended consequences. This presentation will explore approaches to the implementation of sustainable policies in a tourism setting and will draw, in part, on a 2006 Hawaii study: Planning for Sustainable Tourism.



Frank Haas is the Dean of Hospitality, Business & Legal Education at University of Hawaii, Kapiolani Community College.

How to Save Money at Home and Work by Reducing Resource Consumption

Presented by Allison Rutter | 1:00-2:00pm, Grand Ballroom C



With the high cost of electricity on Guam, using less energy can easily translate into significant cost savings for any home or business owner. This presentation will discuss how to understand your existing resource use, identify possible areas of excess, and then how to reduce, and sometimes eliminate, sources of water, energy, and other resource use.

Allison Rutter helps architects, building owners, contractors and communities create highly efficient buildings that save both energy and money. Formerly of Rocky Mountain Institute, Allison has worked on projects ranging from community centers in Hawaii to the Empire State Building. She is a former member of RMI's LEED Certification Team, which reviewed and approved LEED projects for certification by the US Green Building Council. Currently, Allison is Principal of Guam Sustainability Solutions LLC, a firm focused on promoting sustainability efforts in the Marianas. She holds a BS in Mechanical Engineering from the University of Portland and is a licensed Professional Engineer in the state of Colorado.

Presentation Descriptions - Breakout Sessions B, Day 1

Waste to Energy: Busting the Myths of Yester Year

Presented by Scott Haase, NREL | 2:15 - 3:15pm, Grand Ballroom B

This presentation will discuss the environmental impact and fundamental economics of waste to energy technology, based on available data from commercially operating WTE facilities in the United States. In particular, it considers life-cycle impacts of WTE as compared to landfill disposal and various forms of electrical generation, as well as WTE impacts on source reduction or recycling programs. In addition, the presentation discusses the economics and potential environmental impact of WTE in Guam, based on existing Guam waste stream characterization data, regulatory challenges unique to Guam, and the results of cost and environmental modeling of four solid waste management operations in the U.S. Virgin Islands. The intent of the presentation is to present information for the consideration of energy and solid waste stakeholders in Guam.



Scott Haase is a Senior Engineer with the National Renewable Energy Laboratory. He has over 19 years experience working with biomass and waste to energy technologies including power generation, combined heat and power, biogas, co-firing, liquid fuels and pelletization. His areas of expertise include resource assessment, conducting on the ground engineering and economic feasibility assessment of biomass and waste to energy projects, environmental and regulatory analysis, technology assessment and sizing, selection of conversion systems, and project development and deployment through various public/private partnerships and financing approaches. Experience with financing options includes power purchase agreements, energy savings performance contracts, utility energy service contracts and enhanced use leases. Scott holds an M.S. in Technology and Human Affairs (Washington University in St. Louis) and a B.S. in Mechanical Engineering (University of Vermont).

Smart Grid: Program Lift Off

Presented by Guam Power Authority: John J. Cruz, Jr., P.E. | 2:15 - 3:15pm, Grand Ballroom A

This presentation will provide an update on Guam Power Authority's Smart Grid Grant Initiative program. GPA has nearly completed the bulk of its systems acquisitions. The presentation discusses: What the Smart Grid Program is and the overarching vision; how the program is managed through a Program Management Office; the expected benefits; potential synergies; and Challenges.



John J. Cruz, Jr., P.E. is the Manager of Guam Power Authority's Strategic Planning & Operations Research Division at Guam Power Authority (SPORD). His work experience includes almost seven years at Hughes Aircraft Company where worked on projects including NASA's Magellan Mission and the radar system B2 long range bomber. He began at Guam Power Authority in 1991. At the Guam Power Authority, his experience includes SCADA/EMS, software development, project management power system engineering studies including long range transmission planning and integrated resource planning, Performance Management Contracting and information technology infrastructure projects. He credits a lot of his success to some talent, a lot of luck, and a great supporting cast.

AquacultureHub: A Unique Social Network and Aquaculture Training On-Line Learning (Atoll)

Presented by Tetsuzan Benny Ron | 2:15 - 3:15pm, MVV

The fastest growing aspect of today's world wide web is the use of social networking sites such as Facebook, to connect people around the globe. To meet the demands of today's tech savvy aquaculture world, the UH Aquaculture Program

Coordinator, spearheaded the development of a new social network -AquacultureHub a unique social network that will allow everyone who has an interest in feeding the world via aquaculture to educate, learn, share and be engaged with other people who have similar interests.



Dr. Tetsuzan Benny Ron is currently serving as the Aquaculture Program Coordinator of the University of Hawai'i (UH), graduate faculty at the College of Tropical Agriculture and Human Resources (CTAHR), faculty member of the Water Resources Research Center (WRRC) and Co-Chair of the USDA-NOAA National Aquaculture Extension Committee.

A Community-Led Watershed and Coral Reef Restoration Initiative in Guam

Presented by A.J. Shelton III, LR Quinata, and RH Richmond | 2:15 - 3:15pm, Grand Ballroom B

Coastal development projects often lead to the destruction of adjacent coral reefs, even when a governmental permitting process is followed. Although regulations may require no environmental net-loss, the replacement of coral reef ecosystem structure and function through mitigation cannot be guaranteed due to deficiencies in habitat assessment tools. A community-based watershed restoration initiative called 'The Humatak Project' was revived in the Fouha watershed in the U.S. island territory of Guam to improve mitigation implementation strategies as well as to raise awareness of local environmental threats and global climate change concerns.



Austin Shelton III is a Ph.D. student in the Marine Biology Specialization Program within the Department of Zoology at the University of Hawaii at Mānoa. He studies coral reef ecology, watershed science, and natural resource management. As part of his dissertation research, Austin is a coordinator of The Humatak Project, a community-led initiative to restore healthy watershed and coral reef conditions in the Fu'a watershed of Umatac. Volunteers of The Humatak Project work to control erosion and decrease sedimentation on coral reefs. Austin is currently a graduate research assistant at the Kewalo Marine Laboratory in Honolulu, Hawaii. His Ph.D. advisor is Dr. Bob Richmond, a former director of the University of Guam Marine Laboratory. Austin is a 2004 graduate of Father Duenas Memorial School. He received his Bachelor of Science degree in Marine Biology from Hawaii Pacific University in 2008.

I Bike Guam: Sustainable Tourism for Guam

Presented by Thomas Renfro and Darryl Taggerty | 2:15 - 3:15pm, Santa Rosa Room

Riding a bicycle is a common personal activity across cultures, ages, purposes and locations. It can be play or necessity, American or Asian, health-promoting or a safety concern, organic or stylish. I-Bike suggests developing byways that residents can share with visitors to our beautiful island and each other for all the right reasons.



Thomas C. Renfro (Left), co-chairman of I Bike, a committee under Guam Cycling Federation. Earned a Bachelor of Arts from the University of New Mexico in 1984. Taught Physical Educational and Science for 20 years both in New Mexico and Guam. Coached the Women's National Soccer team to a silver medal in the South Pacific Games in Suva Fiji, 2003. Has worked in varied occupation including the Santa Fe Opera and a commercial fisherman in Alaska. Born 1959 in Albuquerque, New Mexico. Married to Blanca Renfro with 2 children, Carlos 13 and Micayla 11.

I-Bike co-chair **Darryl A. Borja Taggerty** (Right) studied Development Economics at Georgetown University, and has been an avid cycling tourist since the 1960's. His local career experience is in public policy analysis, federal program administration, constituent casework and noncommercial broadcasting. With his wife Roxanne Lee, Darryl has two sons LeeHan, 8 and LeeAu, 5.

Concrete Steps to Reducing Fuel Consumption: A Practical Approach for Individuals and Businesses

Presented by Keith Felix Calvo Cruz | 2:15 - 3:15pm, Santa Rita Room

TrackMe! Guam has some useful tips on how individuals and businesses can reduce their fuel consumption and their fuel costs. As the price of gasoline is steadily on the rise, individuals and businesses can reduce their impact on Guam's environment while saving money. TrackMe! Guam helps its clients reduce their fuel consumption by 12% to 30%. Although we all strive to develop new technologies and renewable energy resources, the reality is that we are still reliant on fossil fuels. As we make the transition from fossil fuels to greener, more sustainable energy resources, we can easily take steps now to reduce our fuel consumption and our impact on Guam's environment.



Keith Felix Calvo Cruz is the Sales & Marketing Manager at TrackMe! Guam. He is a senior at Stanford University in International Relations and a non-degree student at the University of Guam. He graduated from Father Duenas Memorial School in 2005. He practices sustainability at home with a solar water heater, solar powered air-conditioning, and by composting green waste instead of burning or sending it to a landfill.

Presentation Descriptions - Breakout Sessions C, Day 1

Community Based Programs to Deal with Waste

Presented by Mayor Melissa Savares | 3:30 - 4:30pm, Grand Ballroom C

The Municipality of Dededo has been recycling plastic bottles, corrugated cardboards, aluminum cans, glass, paper and green waste since April 2005. Residents bring bags of plastic bottles to the Astumbo Gym and the Mayor's Office weekly for disposal to authorized recycling facilities. Community partnership with agencies and organizations has made this process of recycling successful in the Dededo village. Project such as "Recycling Art" and composting have been a team effort among many residents. A recent waste oil collection gave residents the opportunity to dispose of used oil collected over many years. The key to this success, is the efforts of all residents living and working together in our Green village of DEDEDO!



Mayor Melissa Savares is the Mayor of the largest populated village on the Island of Guam with nearly 45,000 residents. She focuses on community programs for the youths and their families such as the Dededo Youth Drug, Alcohol & Tobacco Free Summer Camp Program. Under her leadership, the Dededo team began recycling in April 2005. Residents have been recycling aluminum, plastic, cardboards, paper and glass. In Feb. 2012, a pilot program for waste cooking and motor oil was done in partnership with GRESCO Inc., UOG Green Army and the Dededo Mayor's Office.

Low Impact Development

Presented by Julie Shane | 3:30 - 4:00pm, Grand Ballroom A



As an inset into the larger DoD LEED presentation, this presentation on Low Impact Development will include 1) a brief discussion of what LID is; 2) why it's required for DoD projects and good for all projects (presentation emphasis will be a minimum of regulatory references and a maximum of sustainable design advantages); and 3) some examples of LID features, included those at Guam DoD projects and some that should be considered (including maintenance requirements/costs where available).

Julie Shane (Left) is an EV1 Environmental Compliance Engineer at Naval Facilities Marianas. She is the environmental compliance program lead responsible for providing technical consultative assistance and essential environmental engineering guidance to all Navy activities on Guam and the Marianas Islands.

Sustainable Design Element

Presented by Armand Cayan, P.E. | 4:00 - 4:30pm, Grand Ballroom A



This presentation will cover 1) Sustainable design elements for green buildings and how to integrate sustainable design concepts; 2) Leadership in Energy and Environmental Design (LEED) Rating System; and 3) Department of Defense's (DoD's) role in sustainable design with project examples.

Armand Cayan (right) has worked at NAVFAC for over 25 years. He is a registered Professional Mechanical Engineer in Guam and California and is a LEED Accredited Professional.

Education for Sustainable Environments: A Review of Recent Literature

Presented by Yukiko Inoue-Smith | 3:30 - 4:30pm, Santa Rosa Room

Although sustainability has many faces, the most widely used definition of sustainable development involves advancing the social, economic, environmental, and cultural well-being of local and global communities. This presentation focuses on recent publications in the areas of green communities, green companies, and green libraries, with a focus on sustainability. The presentation highlights key points from each publication for discussion. Such dialogue is essential to sustainable



development, which relies on human integrity and responsibility, and on action that will address connections between the environment, the economy, and society.

Yukiko Inoue-Smith, Ph.D., is a professor at the University of Guam, where she teaches educational psychology and research. Her research interests include: education for sustainability; interdisciplinary studies on student learning and development; improving university teaching and learning; online education for diverse learners; and the social context of learning with a higher education focus. Just as strong her passion for teaching, tanka poetry is an area that she has invested much passion and commitment.

Guam's Aquifer & the Myth of Sustainable Yield: How to Make Sure there is Enough Water for Everyone

Presented by Dr. John W. Jenson, Professor of Environmental Geology, Water & Environmental Research Institute of the Western Pacific, University of Guam | 3:30 - 4:30pm, Santa Rita Room

This presentation examines the well-known but obsolete concept of sustainable yield and how we might best apply the principles of the emerging new concept of Sustainable Management to ensure that Guam's water resources will always be able to meet the needs of all of its residents. The presentation begins with a concise introduction to the natural features that make Guam's limestone aquifer unique. It then describes the kinds of hydrological and geological data and analyses that we will need in order to determine how our fresh water source is affected by both natural phenomena (such as storms and droughts associated with El Niño) and human activities (such as pumping and urbanization), and what sort of information we will need as it becomes more challenging to find and develop productive new well fields and protect them from surface contamination. The remainder of the presentation provides an introduction to the analytical framework of Sustainable Management, by which these kinds of basic information about the natural availability and quality of groundwater on northern Guam can be used to then identify the optimum technologies and best engineering approaches, management practices, and public policies to ensure economical and sustainable development of Guam's groundwater resources.



Dr. Jenson is research hydrogeologist and Professor of Environmental Geology at the University of Guam's Water and Environmental Research Institute of the Western Pacific (WERI), where he has worked for the past 19 years. His research encompasses both applied and fundamental aspects of groundwater geology, and his projects have included field and modeling studies of the aquifers of Guam, the northern Mariana Islands, and the atolls of the Caroline Islands. His Ph.D. in geology from Oregon State University includes minors in civil engineering and water resources management, and his academic background also includes a master's degree in applied economics from the University of Michigan and a bachelor's degree in economics from the United States

Air Force Academy. In addition, Dr. Jenson served a total of 30 years active and reserve duty as a US Air Force officer.

Looking within for Solutions and Looking without for Critical Engagement - in Greening Micronesian and Pacific Islands' Communities.

Presented by Unaisi Nabobo-Baba, Ph.D. | 3:30 - 4:30pm, Grand Ballroom B

Qaravi ni Vanua, Qaravi ni Tamata (Fijian) - Manaaki Whenua, Manaaki Tangata (Maori): Caring for the Land, Caring for the People- In this UN Decade (DESD) -2004-2014: sustainable ideas of livelihoods , practices and programs are being looked at and examined, and policy implications are being drawn at various levels to address the "Greening of Pacific Islands environments. This is a kind of misnomer for it presupposes that the anti greening campaign of Pacific Islands is somehow self induced or in born. To a large extent sustainable development needs mindset and lifestyle changes that mere conversations cannot effect. The ideologically driven education, development and thinking of sustaining the Pacific region must question models of education and development which purports unquestionable consumption of our finite planet. This a major undertaking to discursively address in a conference paper however the paper does two things to contribute to this sustainable livelihoods discourse. One it explores a number of ways and strategies Pacific peoples have via indigenous processes and ideas or philosophies of life nurtured and adapted their lives to live sustainably in their islands over millennia. Second is to try to provide educational solutions via curricula at all levels in the islands about how indigenizing the curricula may provide alternative ideas to "the so called global initiative of greening our communities" – the communities which were de-greened largely due to modernity and capitalism's many forces.



Unaisi Nabobo-Baba's career as a teacher, educator, and researcher spans some 23 years in various institutions: in public high school and University. She is currently Associate Professor in Education and assigned to the section on Educational Research, Foundations, and Community Development. Unaisi has done reviews for five journals over the last 10 years and is currently on the editorial board for *Micronesian Educator*. She is author of over 100 articles, book chapters, books, and other professional development materials, articles, reports, curriculum and program evaluation reports, papers and peer reviewed conference presentations over the years. Dr. Una is a current member of the American Evaluation Association, American Society for Anthropology Organization (ASAO) Pacific Association of Teacher Educators, Rethinking Curriculum and Pacific Education Movement, and Australian and New Zealand Comparative Education Association.

Sustainable Soil Management in Micronesia

Presented by Robert Gavenda Ph.D. | 3:30 - 4:30pm, MVV

There are a variety of soils in Micronesia, many of which have noticeable limitations for agricultural and engineering uses. For sustainable agricultural production the maintenance of organic matter in the topsoil is crucial; this is true for the large majority of soils in Micronesia. Loss of topsoil in old volcanic landscapes leads to uncontrollable erosion and eventually to badland formation because extremely low subsoil fertility and toxic levels of soluble aluminum prevent plant establishment. Topsoil degradation leads to a downward spiral of land degradation that is difficult to recover from. Reforestation efforts in western Micronesia need to address soil limitations in order to be successful. Other soil limitations such as high water tables and dense subsoil can make some soils unsuitable for a variety of uses. Uncontrolled burning of grasslands has led and will continue to lead to land degradation. In general, soils in Micronesia are a fragile, non-renewable resource that needs careful management for prolonged sustainability.



Robert Gavenda is a Resource Soil Scientist for USDA-NRCS (US Department of Agriculture, Natural Resources Conservation Service) based on Guam, having transferred there in 2000 after 17 years in Hawaii. His service area covers all of Micronesia. In addition to maintaining accurate soil survey data he assists private landowners and local governments in the use and interpretation of USDA soil surveys. He has worked with soils in a variety of environments but has specialized in tropical soils and has nearly 30 years experience in Hawaii, Micronesia and Latin America. He specializes in soil formation, classification and mapping, and soil behavior and management especially with regards to maintaining or improving soil quality.

Presentation Descriptions - Breakout Sessions A, Day 2

Solar Energy Cover Systems For Landfill Closures – A Sustainable Alternative Approach to Traditional Subtitle D Landfill Closures

Presented by Mark Miller, P.E. | 1:00 - 2:00pm, Grand Ballroom A

As one of the premier consultants in solid waste systems, HDR has led the charge in the creative rebirth of lands once destined to be removed from the community as an asset. We have combined our expertise in solid waste and solar photovoltaic systems to develop an innovative solar concept using exposed geomembrane caps with flexible solar panels (EGSC). This concept incorporates an innovative alternate landfill closure design, enabling the collection of solar energy from a closed landfill surface. Studies on recently completed projects in Texas and Georgia will be presented along with a discussion on potential Guam applications.



Mark Miller's experience spans more than 21 years of project management, programming, engineering and energy systems analysis for many different business sectors including power, utility, industrial, health care, government, and institutional projects. As the Federal Energy Practice Group Leader for HDR, Mr. Miller is currently active in energy master planning, feasibility studies, design development, cost estimating and construction administration for both renewable energy projects involving wind, solar, biomass, geothermal, biogas systems and traditional energy projects such as central heating and cooling plants and cogeneration systems for Federal clients.

Elimination of Sludge from Wastewater Treatment Plants, or Development of Sludge as an Energy Resource: Which is better?

Presented by Joseph D. Rouse | 1:00 - 2:00pm, Santa Rita Room

Biological wastewater treatment yields large amounts of waste sludge, the disposal of which can have adverse environmental impacts. In recent years, though, a novel attached-growth system employing PVA-gel beads as a bio-carrier has demonstrated potential for high-rate biological treatment coupled with near elimination of excess sludge, thus reducing the need for sludge disposal. However, with carbon credits being increasingly of concern, should technologies be developed to reduce the amount of sludge yielded from wastewater treatment plants, or should this sludge be developed as a renewable source of energy, thus reducing our dependency on petroleum fuels? These questions and others are investigated to evaluate the role that treatment plants should play in contributing to the sustainability of our environment -- in addition to producing clean water.



Dr. Joseph D. Rouse is a member of the Water and Environmental Research Institute of the University of Guam. With a background in both academia and industry, he has more than 20 years of experience in research and development of water and wastewater treatment processes and environmental remediation. More specifically, his interests include innovative biological treatment methods for removal of nitrogenous compounds from wastewater and surfactant-enhanced remediation of subsurface environments contaminated with petroleum-based products. Furthermore, on a larger scale, his focus is on the sustainability of wastewater treatment systems including conservation of energy and natural resources in addition to producing clean water.

Increasing Community Input into Island Development: The Role of Appreciative Inquiry and Team Selection in Strategic Planning Process for Multiple User Zones

Presented by Tetsuzan Benny Ron, Malia Chow, Joseph Paulin, Donna Ching, University of Hawaii Aquaculture Program, University of Hawaii at Manoa | 1:00 - 2:00pm, Grand Ballroom B

There is a fast growing movement to increase self-sufficiency and to ensure food security for the people of Hawaii. The workshop provided an opportunity to discuss the future of aquaculture in Hawaii and addressed topics such as sustaining local communities by enhancing locally produced and consumed foods; stimulating job creation while conserving natural and cultural resources, existing and future projects, and implications of aquaculture policies.

A Workshop Advisory Team comprised of cultural advisors, community and stakeholder representatives, and state and federal representatives advised on workshop content and identified potential participants. Invited workshop participants included cultural and Hawaiian fishpond practitioners, community members, farmers, business and food industry representatives, subject matter experts, state and federal agency representatives and marine resources managers.

The Appreciative Inquiry (AI) Strategic Planning Process was utilized in this workshop because organizers wanted to focus on possibilities rather than problems. The important assumption underlying AI is that every living system has a core of strengths or positive core that can be tapped into to provide a sustainable source of positive energy to nurture personal and organizational change.



A basic principle of AI is that, what a group focuses on (i.e., inquires about), tends to grow and expand. So when that group searches for what is working well they can create more successes in their system.

Dr. Tetsuzan Benny Ron is currently serving as the Aquaculture Program Coordinator of the University of Hawaii (UH), graduate faculty at the College of Tropical Agriculture and Human Resources (CTAHR), faculty member of the Water Resources Research Center (WRRC) and Co-Chair of the USDA-NOAA National Aquaculture Extension Committee.

Education and Our Natural Environment

Presented by Edwin Reyes, WPCRI Manager, Dr. Laura Biggs (to be confirmed), and Elaina Todd, WPCRI Curriculum Specialist
1:00 - 2:00pm, MVV

The stewardship of Micronesia's marine resources for current and future generations is critical to the long term sustainability of each island's society and cannot be managed alone by any single federal, state, or local entity and requires that the public be actively engaged in the management of these shared resources. Moreover, environmental literacy is the first step in enhancing the understanding and appreciation of the interconnectedness of people and our terrestrial and marine environments through

learning approaches that encompass our islands' uniqueness. Natural resource agencies across Micronesia consider education and outreach as a common tool useful in driving public engagement efforts as well as developing attitudes and behaviors essential to protecting and preserving our natural ecosystem resources.

In light of this, the Western Pacific Coral Reef Institute, in conjunction with Seagrant, the Guam Department of Education, as well as numerous resource management agencies, have identified strengthening environmental literacy within the content standards for science as a top priority and is critical in addressing the sustainable health of Guam's coral reefs and the resources they provide our community. This long-term concerted approach will first look at the feasibility and assessment of integrating a K-12 environmental literacy curriculum that augments scholastic development as well as boost the various system infrastructures to ensure the effort is sustained throughout the implementation and evaluation phases.



Edwin Reyes is a Certified Grants Specialist and manages the Western Pacific Coral Reef Institute – a cooperative agreement between UOG and NOAA. He is also the Grants Administrator for awards to the Center for Island Sustainability from the Office of Naval Research, US Department of Interior, and the Department of the Navy. In his previous experience, he has worked in the legislative and executive branches of government, and has experience with the judicial branch through the US Department of Justice grants he administered as the Juvenile Justice Specialist. His portfolio of grants extends to previous state-level awards from the US Department of Health and Human services, and the US Department Education. Mr. Reyes is a graduate from the University of Guam.



Laura A. Biggs, Ph.D. was born in Camden, New Jersey. She graduated from Lenape High School in Mt. Laurel, NJ, graduated cum laude with a B.A. in Biology and Education from Manhattanville College in Purchase, NY. She then went on to achieve her Ph.D. in Pharmacology and Toxicology from the University of Utah in Salt Lake City, Utah. In 2009, Dr. Biggs was hired as Assistant Professor of Extension and Education with University of Guam Sea Grant. Since then she has worked to create a Sea Grant presence on Guam through the development of educational curriculum and targeted extension projects. She currently manages UOG Sea Grant and collaborates with local businesses to develop environmental practices in addition to developing a multidisciplinary curriculum entitled 'Navigating Change Marianas.'

Agroecology for Island Sustainability

Presented by Charles Aiseam, Jessica Nanguata, Mario Martinez, and Mari Marutani, Tropical Agricultural Science Program, Agriculture and Life Science Division, College of Natural and Applied Science, University of Guam | 1:00 - 2:00pm, Santa Rosa Room
 Agricultural activities greatly impact social and natural environments in Guam and other Pacific islands. Agroecology is a scientific discipline that applies ecological principles to study, design, and manage productive agricultural systems while conserving natural resources. Management of sustainable agroecosystem is also associated greatly with culture, economics, and society to sustain agricultural production, healthy environments, and viable food and farming communities. This presentation discusses some enabling practices of sustainable agroecosystem for tropical islands including food waste management system in Japan.



Charles Aiseam is a senior in the Tropical Agricultural Science Program in the Agriculture and Life Science Division, College of Natural and Applied Science, University of Guam is graduating in May 2012. Before attending UOG, he received Associate Degree in Agricultural Science from College of Micronesia in 2005. His career interests includes plant pathology, entomology and pest management.



Mari Marutani obtained a Ph.D. in Horticulture from the University of Hawaii at Manoa, Dr. Marutani is currently teaching horticultural science, vegetable production and agroecology at the University of Guam (UOG) as a professor of horticulture and sustainable agriculture. She also conducts research and extension programs on sustainable agriculture including "a small-scale integrated farming system in an insular urban environment," "the plant germplasm conservation, evaluation and distribution project," "the Guam plant extinction prevention program," and "the food waste management project."



Mario Martinez is a junior in the Tropical Agricultural Science Program at Agriculture and Life Science Division, College of Natural and Applied Science, University of Guam. His career interest is to conduct a research project in tropical agriculture at a graduate school and to improve the agricultural system in Guam.

Charles, Jessica and Mario are students in the class AG494G: Agroecology for island sustainability during Spring 2012. Charles, a graduating senior, is presenter. Mari Marutani is a professor of the class.



Jessica Nanguata is a junior in the Tropical Agricultural Science Program in the Agriculture and Life Science Division, College of Natural and Applied Science, University of Guam. She has worked on a project on the Eradication of coconut rhinoceros beetles.

Improving Livelihoods in the Outer Islands Communities of the Marshall Islands through Solar Electrification

Presented by Arieta Gonelevu | 1:00 - 1:30pm, Grand Ballroom C

The Outer Islands Solar Electrification Programme of the Marshall Islands focus on the electrification of rural households, schools and health centers with solar systems that provide basic energy services such as lighting, communications, educational purposes and entertainment. The move towards renewable energy resources for electricity generation in the outer islands stems from Government's high reliance of over 90% on fossil fuels. Currently about 50% of the outer islands population have access to basic energy services. Through the North Pacific Renewable Energy & Energy Efficiency Project (North REP) which is funded by the European Development Fund (EDF10), the rest of the rural households, schools and health centers will be installed solar systems. Each household is expected to pay a monthly tariff of US\$5, but a detailed economical analysis will show the best sustainable tariff rate. Other recommendations in having subsidies, green tax, etc will be explored. To address sustainability issues in such small islands development states, North REP is looking at using other forms of payment to pay for electricity and using existing infrastructure with the women, church and environmental conservation institutions to manage the project at the community level. Ensuring environmental sustainability for such programme will also be highlighted.

Farming on Guam

Presented by Bill McDonald | 1:00 - 1:30pm, Grand Ballroom C

Growing local produce could be a very viable opportunity to "boost" the economy and reduce the "food miles" thereby lowering the carbon footprint. Producing fruits and vegetables on-island is a win-win situation for Guam. Produce can be consumed by local residents, as well as tourists. Most local residents would rather consume fresh fruits and vegetables than imports that have lost much of their nutritional value in transit. Agriculture could also play a vital role in stimulating Guam's economy. With approximately 1.3 million tourists visiting Guam each year (3,200 people/day) there is great potential for feeding them locally grown fruits and vegetables. Tourists would also enjoy the experience of tasting tropical fruits. If certain obstacles are overcome Guam could have a sustainable agriculture industry.



Bill McDonald is the President of the Farmers' Cooperation Association of Guam, Chairman of Guam Southern Soil & Water Conservation District and has been a farmer for 10 years in Agana Heights. He grows and sells bananas, taro, and lemons and also raises and sells tilapia. Bill is active in MCA, GHRA, GVB regarding promotional projects on buying local.

Presentation Descriptions - Breakout Sessions B, Day 2

An Island Adrift in a Tidal Wave of Consumerism - Analysis on Solid Waste Generation Effected by the population growth and social lifestyle on Guam: A cooperative research project between the University of Guam, in Micronesia and the Okayama University in Japan

Presented by Mohammed H. Golabi, Kirk Johnson, Takeshi Fujiwara, and Eri Ito | 2:15 - 3:15pm, Santa Rosa Room

Over the past several decades, solid waste generation and disposal has transitioned from a concern needing a remedy to a crisis of monumental proportions. There is an urgent need to develop a comprehensive solid waste management and recycling plan on Guam to minimize cost and avoid undesirable environmental effects of legal and illegal dump sites and to enable utilization of recyclable as well as green and other refuse as a resource which is currently discarded.

In this paper we present the survey results developed and conducted over the past two years. The analysis of this survey results is expected to help us understand the social behavior and the resident's lifestyle as the first step towards the development of a sound and effective waste management strategy for the island of Guam.



Mohammed H. Golabi received his Baccalaureate degree in Mechanized Agriculture from the Oklahoma State University in Stillwater, Oklahoma. He also received his Master Degree in Agricultural Extension Education and his Ph.D. degree in Soil and Environmental Sciences from the University of Georgia (UGA) in Athens, Georgia. Following graduation from the UGA Dr. Golabi accepted a post-doctoral position in pursue of a research career at the Purdue University in Lafayette Indiana for several years (1991-1995) before he returned to the University of Georgia in 1995 and worked as researcher until 2001. Dr. Golabi came to Guam as an Assistant Professor of Soil Science in 2001 and he is currently serving as an Associate Professor of Soil and Environmental Sciences at the College of Natural and Applied Sciences of the University of Guam. At UOG, his main task is research and during his tenure at UOG, Dr. Golabi have received several federal and local grants for conducting research in the area of soil, natural resources, and environmental science. He is a member of the American Society of Agronomy (ASA), Soil Science Society of America (SSSA), and World Association of Soil & Water Conservation (WASWC).

Logistics (Feasibility Study Re: Alternative Energies)

Presented by Ian Catling | 2:15 - 3:15pm, Santa Rita Room

This is a feasibility study. This is a cost/benefit analysis study, specific to the needs of the island of Guahan. In its simplest form, we will be discussing how much the transition to alternative energies (completely off grid, or use as supplemental energy source) is expected to cost the average household. What are the financial long-term benefits of choosing green energy? What are these costs now, and what are the projected decreases of cost as more people on island get on board? Times are tight. And as much as we would all like to make the transition to green energy, the initial cost, not including overall maintenance through the years, can make people reluctant to make the investment. What this lecture will provide is a means for people to see economic (money) gains by making the transition. This will also inform people of what they expect to lose. Staying on grid, we pay GPA to do everything for us. Alternative energy sources place more responsibility on the owner. So we'll also be discussing rates of deterioration from high salinity in the air as a result of being on an island in the Pacific Ocean. Typhoon Preparedness. We will discuss the cleaning of solar panels and propeller maintenance of wind turbines. Economics is what wins the day. This lecture will demonstrate the monetary/environmental gains of choosing sustainable energy, as well as the added day to day responsibilities that sustainable energies place on us.

Micronesia Challenge Presentation

Presented by Evangeline Lujan | 2:15 - 3:15pm, Grand Ballroom B

In 2006, at the Eighth Conference of the Parties to the Convention on Biological Diversity, Palau, the Federated States of Micronesia (FSM), the Republic of the Marshall Islands (RMI), Guam, and the Commonwealth of the Northern Mariana Islands (CNMI) launched the Micronesia Challenge (MC) in an effort to address the degradation of the marine and terrestrial environments upon which the future economic, cultural and political health of these islands depend; and foster opportunities for collaboration regarding regional environmental and sustainable development issues.

Micronesia is a home to some of the most vibrant cultures and diverse variety of plant and animal life on Earth. Yet the features that make these islands unique also make them especially vulnerable to environmental threats such as deforestation, overharvesting, climate change and invasive species. The Micronesia Challenge provides a framework for action on an unprecedented scale.

The Challenge states that the Chief Executives of Micronesia in order to:

- Sustain our unique island biodiversity;
- Ensure a healthy future for our island people;
- Protect our unique island cultures;
- Guard the foundations of our future development, our pristine island environments;
- Sustain the livelihoods of our island communities; and
- Contribute to global and national goals
- Agree to undertake an expanded commitment to preserve our marine and terrestrial environments through: "effectively conserving at least 30% of the near-shore marine and 20% of the forest resources across Micronesia by 2020."



Evangeline Lujan is the Administrator for the Guam Coastal Management Program, Bureau of Statistics and Plans. As the Administrator, one of her responsibilities is leading the effort to achieve the goals of the Micronesia Challenge. She was recently selected to be the Chairperson for the Steering Committee of the Micronesia Challenge. She started her career in government service as the Geographic Information System Manager at the Bureau. She received her Bachelor of Arts in Mathematics from the University of Guam and a Master of Science in Engineering from the Arizona State University.

Knowledge@Guam

Presented by Charles Aiseam, Jessica Nanguata, Mario Martinez, and Mari Marutani, Tropical Agricultural Science Program, Agriculture and Life Science Division, College of Natural and Applied Science, University of Guam | 3:30 - 4:30pm, MVV

Unlike the various references making our community (community capitals), the sustainability theme requires more direction and guidance specific to how a community can embrace and feed this interest in evolving the ideal version of livable communities. The Knowledge @ Guam Initiative represents the latest effort aligned through a community-centric approach and strives to identify data and trends that speak to these interest areas: developing data metrics for the following: Sustainable environments, Climate change and energy, Sustainable land use & regional management, Technical innovations for sustainable production and consumption, Leadership for sustainable development (policy implementations), Entrepreneurial opportunities for sustainable solutions, and Corporate social responsibility. Understanding sustainability begins with understanding the key and its key issues means having data. Creating Knowledge @ Guam starts with identifying data and communicating the data to planners and

policy makers. Strategy for sustainability demands knowledge and data. How do we know we are doing better or worse? What information is our strategy based on? Quality data allows for better decision-making. Join our session and help craft a livable community (sustainable) strategy. Share your ideas of what data would be valuable for this sustainability metric of initiative.



Nacrina San Nicolas (Left Photo) an extension associate for the Cooperative Extension Services program. She graduated from the University of Guam with a Bachelors degree in Business Administration with a concentration in Finance and Economics and Professional Masters in Business Administration. Nacrina previously worked as an account executive and a financial analyst.

Nicolas Yasuhiro (Middle Photo) is an Extension Associate for the Communities, Youth, Families, Food and Nutrition (CYFFN) unit with the University of Guam Cooperative Extension Service. Nicolas holds a Bachelors Degree in Economics from San Dlego State University. Through Cooperative Extension Service Nicolas provides technical assistance and outreach pertaining to Community Development.

Peter R. Barcinas (Right Photo) is a Program Leader for the Communities, Youth, Families, Food and Nutrition (CYFFN) unit with the University of Guam Cooperative Extension Service. Barcinas also holds a faculty rank of Assistant Professor/Cooperative Extension Agent III with the College of Natural and Applied Sciences, University of Guam. Mr. Barcinas is your land-grant partner and collaborator bringing many years of experience and programming connected to our community, family, youth and resident instruction, research and service.

A View of the Wetlands in the Mariana Islands

Presented by Robert Gavenda, Ph.D. | 2:15 - 3:15pm, Grand Ballroom A

Wetlands perform valuable ecological functions primarily by cleaning water, providing wildlife habitat and ameliorating the effects of flooding. But what is a wetland? How do you recognize one? How are they characterized? If you own one, does anyone care what you do with it? This presentation examines some of the history of wetlands in the United States, and discusses how to identify wetlands using examples from the Mariana Islands.



Robert Gavenda is a Resource Soil Scientist for USDA-NRCS (US Department of Agriculture, Natural Resources Conservation Service) based on Guam, having transferred there in 2000 after 17 years in Hawaii. His service area covers all of Micronesia. In addition to maintaining accurate soil survey data he assists private landowners and local governments in the use and interpretation of USDA soil surveys. He has worked with soils in a variety of environments but has specialized in tropical soils and has nearly 30 years experience in Hawaii, Micronesia and Latin America. He specializes in soil formation, classification and mapping, and soil behavior and management especially with regards to maintaining or improving soil quality.

Status and Management of Coral Reef Ecosystems Across Micronesia

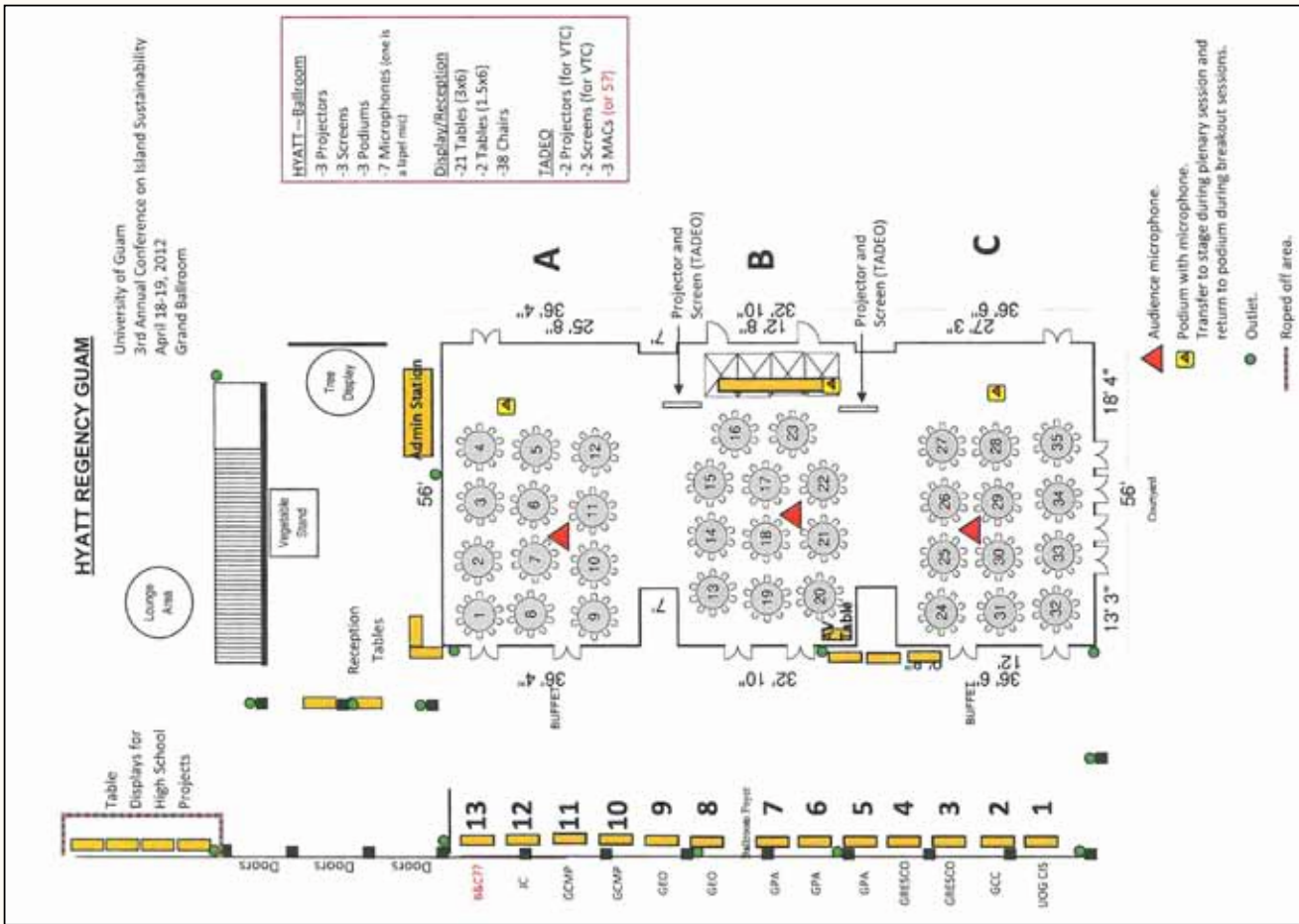
Presented by Dr. Peter Houk | 2:15 - 3:15pm, Grand Ballroom C

Across Micronesia, concerns about the impacts of climate change, food security, and economic prosperity are higher than ever. Coral-reef ecosystems, and the goods and services they provide, are inherently linked with these concerns. The current body of science supports that ecosystem health determines the degree to which environmental change impacts our societies. Whether one considers the value of reefs from a tourism, fisheries, or subsistence perspective, their proper functioning is essential to Micronesian livelihood, and its future. Here, an expansive body of evidence is synthesized from collaborative coral and fish monitoring efforts conducted across Micronesia, encompassing datasets from nearly pristine atolls to major population centers. Specifically, numerous examples will be introduced to illustrate how coral-reef resource distributions are predicted by natural environmental regimes, human footprints, and changing climate cycles. The extensive body of science will be efficiently translated so that the audience will gain a better understanding of where we stand, what major deficiencies exist, and what are the most logical ways to move forward. While Micronesia may be too small to address climate change or improve the global economic atmosphere, we can greatly minimize their impacts on our society through improved coral-reef science and management.



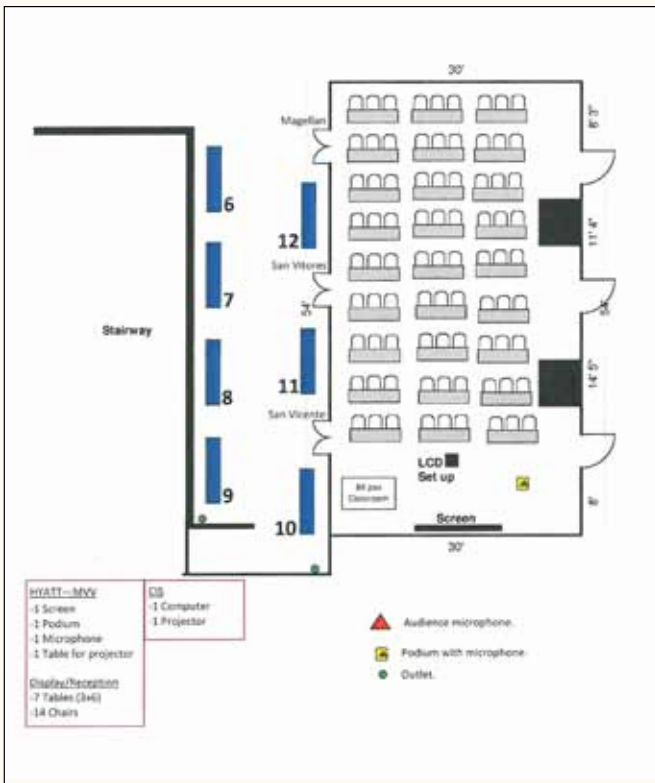
Dr. Peter Houk is a coral reef ecologist who is focused upon understanding the dynamics of coral and fish populations through space and time to generate patterns and predictions that improve our ability to management these influential resources. He works closely with all of the monitoring programs across Micronesia to help build and analyze long-term datasets that address local concerns of land-based pollution, fishing sustainability, and climate change. About a decade ago, he graduated from the University of Guam Marine Laboratory, and subsequently completed his Ph.D. studies at Florida institute of Technology. Recently, he co-founded a small non-profit organization based in Saipan, CNMI, Pacific Marine Resources Institute, that is dedicated to generating and translating compelling science for improved coral reef management.

Grand Ballroom A, B, and C

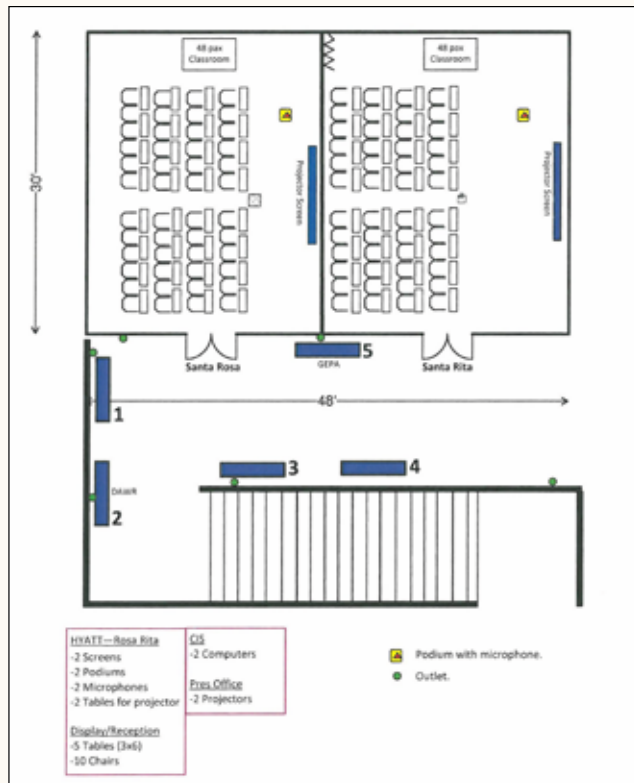


HYATT MEETING ROOMS

Magellan, San Vitores, and San Vicente Rooms



Santa Rosa and Santa Rita Rooms





Established 1981

The Pacific Postsecondary Education Council (PPEC), a consortium of presidents and chancellors of higher education institutions in the U.S. and U.S. affiliated Pacific Islands, congratulates the University of Guam on their 3rd Annual Regional Conference on Island Sustainability. With an agreement to work collaboratively to address regional and postsecondary education issues, this year, the Council supported six Regional Emerging Sustainability Scholars to attend and participate at this annual event. These scholars are:

- Severino Pascual Alforeza III, NMC
- Destiny Anrok George, CMI
- Elsei Diane Tellei, PCC
- Angel Burt Igemera, COM-FSM
- Asomaliu Lotovale, ASCC
- Vincent van der Gouwe, Kapi'olaniCC

PPEC extends their best wishes to the University of Guam on another successful, thought-provoking conference.

PPEC Membership

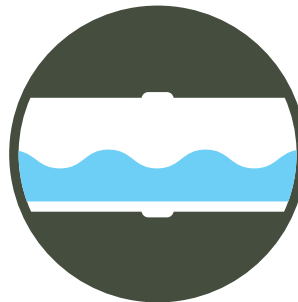
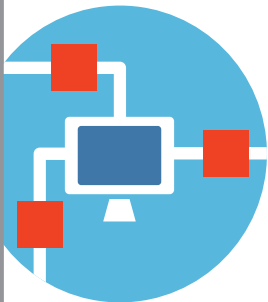
American Samoa Community
College of the Marshall Islands
College of Micronesia – FSM
Guam Community College
Hawai'i Community College

Honolulu Community College
Kapi'olani Community College
Northern Marianas College
Palau Community College
University of Guam

University of Hawai'i
Community College System
University of Hawai'i at Hilo
Windward Community College

E-mail: pacificpec@gmail.com

advancing*innovation™



Engineers | Scientists | Consultants | Constructors

Water | Wastewater | Solid Waste | Program Management

Brown AND
Caldwell

Guam | Honolulu | Wailuku

Offices Nationwide | 100% Environmental | Employee Owned
BrownandCaldwell.com

Sustainability...

PROTECTING GUAM'S NATURAL RESOURCES
FOR PRESENT AND FUTURE GENERATIONS

GUAM COASTAL MANAGEMENT PROGRAM
BUREAU OF STATISTICS AND PLANS

2012 ISLAND SUSTAINABILITY
CONFERENCE



Photo by Dave Burdick

REFINERY/ENVIRONMENTAL
320 South East Santa Rita Industrial Dr.
Santa Rita, GU 96915
Tel: (671) 565-7474 Fax: (671) 565-7575

L.P. GAS DIVISION
330 Chalan Pale Ramon Lagu
Yigo, GU 96929
Tel: (671) 653-4888 Fax: (671) 653-4889

WASTEWATER DIVISION
213 Dulce De Maria
Anigua, GU 96910
Tel: (671) 472-8280 Fax: (671) 472-8282

GRESCO ITI
482 Route 10 Vietnam Veterans Hwy.
Mangilao, Guam 96913
Tel: (671) 734-4886 Fax: (671) 734-4889

CNMI / FSM REGIONAL DIVISION
PMB 327, Box 10000
Saipan, MP 96950
Tel/Fax: (670) 234-2000



GRESCO
REFINERY



GRESCO
ENVIRONMENTAL



GRESCO
WASTEWATER



GRESCO
LP GAS
power your Life.



GRESCO
ITI

GRESCO

INDUSTRIAL ■ COMMERCIAL ■ RESIDENTIAL

Toll Free: 1-855-4GRESCO
www.grescopacific.com
DUNS# 855036711/855038696



GRESCO



Efficiency Now
It's never been more important.

Empire State Building: *New York, New York*

Landmark building provides prototype for innovative sustainability retrofit process



Background:

The Empire State Building is a pre-war, multi-tenant, trophy office building with 2.8 million square feet hosting retail, office and broadcasting uses. As a core element of the more than \$500 million upgrade program presently underway at the world's most famous office building, a comprehensive energy-efficiency retrofit was created to serve as a leading example to other commercial office buildings around the world.

Opportunity:

The Empire State Building Company brought Johnson Controls together with other leading energy-efficiency organizations to develop an innovative approach to sustainable retrofits supported by state-of-the-art tools. The resulting program involves infrastructure improvements, design standards, tenant energy management, property management, leasing and marketing initiatives.

Results: 38% reduction in annual energy use

Johnson Controls is delivering cutting edge technologies through the initial \$20 million project, including extensive onsite window refurbishment, high efficiency cooling equipment, and a Metasys® building management system including Sustainability Manager™, which will provide tenants with an online dashboard to help them track and manage their energy usage. The improvements will place the Empire State Building in the top 10 percent of U.S. commercial office buildings in terms of energy efficiency. The project will reduce energy costs, lower carbon emissions, and provide the foundation for high performance tenant workspaces.

For energy questions, please contact:

Shawn Gumataotao
Federal Government Account Executive
Johnson Controls, Inc.
Villo Trust Building, Suite D
PO Box 11888
Tamuning, Guam 96913

Phone: 671-922-1522
Fax: 671-922-1079
Personal Mobile: 671-483-0789
shawn.gumataotao@jci.com

Efficiency makes sense for everything from the wallet to the environment. Efficiency measures can be accomplished quickly, they're relatively easy, and there's a real payback. The world needs efficiency, and Johnson Controls has everything necessary to provide it. We've got the experts, we've got the technology, and we've got ingenuity and integrity built into everything we do. For more examples of energy and operational solutions for buildings around the world, visit johnsoncontrols.com/efficiencynow.

Efficiency Now
It's never been more important.



www.johnsoncontrols.com

\$138 Million Dollars To Bring Energy Solutions to You!

Over \$200M will be invested in alternative renewable energy sources like wind and solar to protect our environment and reduce the amount of money we send off island.

\$34M is dedicated to bringing in SMART GRID to our island. Making consumer's use of energy smarter, more reliable and secure.

\$8M for Tumon lines and substation

\$7.5M in Latte Heights

\$34M is dedicated to bringing in SMART GRID to our island. Making consumer's use of energy smarter, more reliable and secure.

\$2.9M on Agana Substation

\$7.5M in Sinajana Lines

\$35M allocated for a consolidated utility services campus making GPA and GWA business more efficient.

\$4.8M on Port Authority underground extension

\$26M to improve Cabras Power Plant equipment for better efficiency and reliability islandwide.

\$3.8M in Agat Lines

Over \$200M will be invested in alternative renewable energy sources like wind and solar to protect our environment and reduce the amount of money we send off island.

\$34M is dedicated to bringing in SMART GRID to our island. Making consumer's use of energy smarter, more reliable and secure.

