

2016

ISLAND SUSTAINABILITY CONFERENCE

ISLANDED COMMUNITIES

April 11-15, 2016 | Lotte Hotel Guam



Society of



American Military Engineers

Through our environmental stewardship values, we "Preserve, protect, conserve and restore our National resources through sustainable practices."

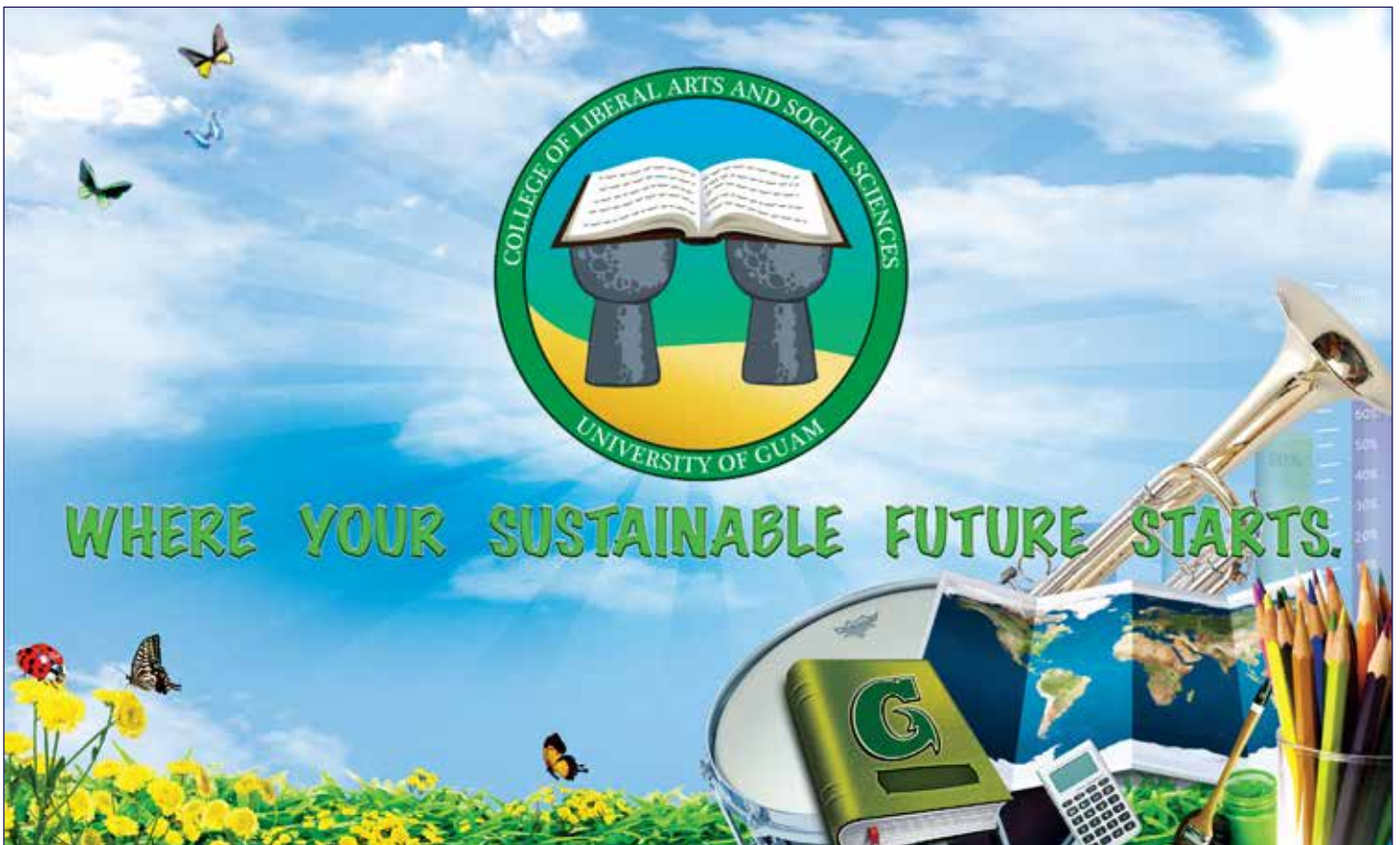
Join us as we continue to support a sound and sustainable foundation for Guam's infrastructure, now and in the future.

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SAME Guam Post

*Sponsors of the 2016
"China Ready, Guam Ready?"
Student Essay/Video Contest*



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CONFERENCE OVERVIEW

MONDAY, APRIL 11 | PRE-CONFERENCE WORKSHOPS

1. American Water Works Association 2nd Regional Conference
2. Pacific Island Climate Change Presentation/GIS Workshop
3. Green Dream Home Competition (High School Students)
4. EPsCOR Workshop
5. Sustainable Food Management for Hotel and Restaurants (USEPA)

TUESDAY, APRIL 12 | PRE-CONFERENCE WORKSHOPS

1. American Water Works Association 2nd Regional Conference
2. Pacific Island Climate Science Center
3. Achieving Sustainability for Guam Symposium (USEPA)
4. EcoFeed Project Workshop for Students
5. China Ready, Guam Ready? Student Video/Essay Competition
6. Environmental Writing Workshop on the Beach – Scott Slovic, Ph.D.
7. University of Alaska, Fairbanks Renewable Energy Workshop

WEDNESDAY, APRIL 13 | THURSDAY, APRIL 14 | MAIN CONFERENCE

WEDNESDAY, APRIL 13

- 8:00 a.m. Sign-in / Registration and Continental Breakfast
- 8:30 a.m. Opening Remarks
- 9:00 a.m. Opening Plenary
- 9:45 a.m. Guam Future Climate Downscaling Results
- 10:00 a.m. Plenary Panel 1
- 10:40 a.m. Poster and Sponsor Exhibits
- 11:00 a.m. Plenary Speaker
- 12:00 Noon Luncheon Speaker
- 1:00 p.m. Breakout Session A
- 2:15 p.m. Breakout Session B
- 3:30 p.m. Plenary Panel 2
- 4:30 p.m. Breakout Session C
- 6:00 p.m. Networking Reception

THURSDAY, APRIL 14

- 8:00 a.m. Sign-in and Continental Breakfast
- 8:30 a.m. Opening Remarks
- 8:45 a.m. Opening Plenary
- 9:00 a.m. Plenary Speaker
- 9:30 a.m. Plenary Panel 3
- 10:30 a.m. China Ready, Guam Ready? Video/Essay
- 11:00 a.m. Poster and Sponsor Exhibits
- 11:15 a.m. Green Dream Home Competition
- 11:45 a.m. Luncheon Speaker
- 12:30 p.m. Achieving Sustainability for Guam
- 1:00 p.m. Breakout Session D
- 2:15 p.m. Breakout Session E
- 3:30 p.m. Plenary Panel 4
- 3:45 p.m. Plenary Panel 5
- 4:45 p.m. Q&A

FRIDAY, APRIL 15 | POST-CONFERENCE ACTIVITIES

1. Aquifer Tour
2. Humåtak Watershed Project Tour



Message from the President

Hafa Adai!

On behalf of the University of Guam (UOG), welcome to the 2016 Island Sustainability Conference. The University of Alaska (Fairbanks) joins UOG in spearheading the conference this year. Congratulations to the Center for Island Sustainability (CIS) and the members of the planning committee for organizing another outstanding event. I also extend a special *Sen Dangkulu na Si Yu'us Ma'ase* to the Pacific Post-secondary Education Council members and the US Environmental Protection Agency in recognition of their community partnership over the past six years.

This year, we also welcome 23 High Schools joining the CIS' Green Dream Home Competition, to include three (3) High Schools from the Commonwealth of the Northern Mariana Islands (CNMI). High school students planned, designed and constructed sustainable model homes with our islands' unique location and environment in mind. Please make the time to visit the showcase of these models during your time at the Conference.

The CIS conference theme this year, "*Islanded Communities*," speaks to unique issues and solutions that communities encounter relative to the isolation from more populated and resource-available communities. This is a struggle that villages in both tropical islands and the frozen tundra share. The lessons that these communities can teach in addressing sustainability is one that we hope to amplify through this conference, so that other islanded communities can learn from and share their own successes.

Your participation today and efforts in the future are key to building a sustainable world. Thank you for making the University of Guam your natural choice in promoting access to higher education. Remember, there is no place like home. *Maila' ya ta sustieni i lina'la-ta kumu taotao isla.*

Biba CIS! Biba University of Alaska Fairbanks! Biba UOG!

A handwritten signature in black ink, reading 'Robert A. Underwood'.

Robert A. Underwood, Ed.D.
President, University of Guam



It gives me great pleasure to welcome you to the 7th Annual Island Sustainability Conference. This year the University of Guam and the University of Alaska Fairbanks are partnering to deliver excellent engagement, networking, and learning opportunities throughout the conference. It is befitting that the conference theme is “islanded communities”. This term was coined by Ms. Gwen Holdmann, the Director of the Alaska Center for Energy and Power, to describe the dispersed communities across the vast state of Alaska that are cut off from urban centers. This has forced us to rethink how we support and enable these communities to be self-sustaining with respect to energy, food security, and wellbeing. Building sustainable communities in Alaska has been further challenged by the impacts of climate change requiring us to adapt quickly to changing weather and landscapes. The research being conducted in the energy arena by our Alaska Center for Energy and Power and in the climate change arena by our researchers from the Scenarios Network for Alaska and Arctic Planning (SNAP) and their state and federal partners is critical to the success of our communities and our peoples. We find that our challenges are very similar to those faced by our island colleagues and peoples. These commonalities present opportunities for us to learn from each other as we face these unique issues.



Both the University of Guam and the University of Alaska Fairbanks are 1862 Land Grant Universities and as such have a responsibility to engage the communities we serve to work with our institutions to address our challenges together by conducting pertinent research and delivering findings in practical terms for the benefit of our communities. I see many opportunities for our institutions and our colleagues at other institutions of higher education in the region to partner to learn from each other for our mutual growth and success. In addition to the conference days, this year there are two preconference workshops, one focused on Energy and the other on Climate Change. The preconference workshops will feature hands on, practical exchanges on these two important issues between our researchers from the University of Guam and University of Alaska Fairbanks as well as our colleagues from the University of Hawaii and our federal partners and local community leaders. I encourage you to take advantage of these offerings.

I am thrilled about the partnerships (academic, research, and public service) we are building with the University of Guam and other regional institutions of higher education in Micronesia. I am particularly excited about the recent launch of a partnership to build local capacity through a Phd cohort program. The first cohort of 12 candidates are currently pursuing their doctoral studies at the University of Alaska Fairbanks. A second cohort of about the same number of students is currently in the process of being vetted for admission to begin their studies in Fall 2016. We hope to expand this offering to the rest of Micronesia, building on the success of current cohorts.

Regretfully, prior commitments preclude my direct participation in the conference. I have had a chance to visit with many of the UAF faculty and administrators who will be at the conference and I am convinced that the conference offerings provide timely, pertinent, and excellent learning opportunities. I want to thank you for joining us and wish you the best.

Michael K. Powers
Interim Chancellor
University of Alaska Fairbanks

MESSAGE FROM THE ASSISTANT VICE PRESIDENT | UNIVERSITY OF GUAM



The 2016 UOG Center for Island Sustainability Conference expands its base into a broader region as well as critical contemporary themes for presentation and discussion. The world has become aware of the urgency to recognize climate change and its impacts. The Paris COP-21 meetings underscored the need for awareness as well as the need for cooperation and action.

The somber terror events in Paris of a few weeks earlier added even more gravitas to the state of the world in 2016. Minister Tony de Brum, a leader of the Islands' Alliance at COP-21 will headline the roster of invited speakers for the meeting, and Scott Slovic, Raaj Kurapati, and many others will present from Alaska, Micronesia, Hawaii and Guam. Climate science, renewable energy, and sustainable lifeways will be engaged in the context of the broader Pacific region, including our neighbors in Alaska, another frontier region with "islanded communities".

We look forward to this gathering building partnerships for the future for research, public policy, and education and continuing into future Sustainability Conferences a platform to address these challenges constructively and with open eyes.

Dr. John A. Peterson
Assistant Vice President
Graduate Studies, Research & Sponsored Programs
University of Guam

MESSAGE FROM THE CONFERENCE COORDINATOR | UNIVERSITY OF GUAM



The greatest gift we can leave for future generations is a healthy environment that will support a high quality of life. It seems so simple, but the demands of the present sometimes overshadow our responsibility to safeguard the future. This year, the 2016 Regional Island Sustainability Conference will consider this challenge from the unique perspective of Islanded Communities, where our remote and disconnected nature can be either an opportunity for success or a barrier to solutions.

This year's conference marks the first time we have been joined by the University of Alaska at Fairbanks, where a dramatically different environment conceals fundamental similarities between our regions: the tremendous importance of indigenous cultures, our disconnection from the U.S. mainland, and need to adapt mainstream approaches to our unique circumstances. We look forward to learning from each other and considering new perspectives that may help us find innovative solutions to long-standing concerns.

This conference series, now in its seventh year, has provided a venue for sharing, networking and tackling tough issues facing our island and our region. I hope that the conference will continue in future years to serve our community by creating the space for robust and meaningful discussions about what sustainability means, and how we can come together to best achieve this important goal.

Elvie N. Tyler
Coordinator
2016 Regional Island Sustainability Conference

2016 CONFERENCE STEERING COMMITTEE

Dr. Andrea S Hartig

Associate Professor of English
University of Guam

Dr. Romina King

Assistant Professor of Geography
University of Guam

Dr. Nathan Habana

Assistant Professor of Groundwater Hydrology
Water Environmental Research Institute
University of Guam

Dr. Cheryl Sanguenza

Assistant Professor of Secondary Education
University of Guam

Philip John Cruz

Associate Project Coordinator
Center for Island Sustainability
University of Guam

Dr. Austin J. Shelton III

Assistant Professor
UOG Sea Grant

Tricee P Limtiaco

Special Assistant to the Governor
Climate Change

Adrienne M. Loerzel

Coral Management Liaison and Coastal
Specialist

Heidi Ballendorf

Public Information Officer
Guam Waterworks Authority

Art Perez

Public Information Officer
Guam Power Authority

Scott Hagen

General Manager
Pacific Solar Photovoltaic

Sherry Perez

Program Coordinator II
Guam Power Authority

Evangeline Lujan

Senior Regulatory Analyst
Guam Waterworks Authority

Hazel Estrellado

Outreach Coordinator
Professional & International Programs
University of Guam

Else Demeulenaere

Associate Director
Centre for Island Sustainability
University of Guam

Benny C. Carbullido

Management Analyst III
Guam Power Authority

Elvie Tyler

Conference Coordinator

Dr. John Peterson

Assistant Vice President
University of Guam

Dr. Robert A. Underwood

President
University of Guam



UOG Sea Grant's mission is to integrate and apply research, extension, and education activities to sustain and develop island environments while integrating knowledge and cultural perspectives of the island's people

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APRIL 11 TO 12 | PRE-CONFERENCE WORKSHOP



Message from the Subsection Chair – Paul Kemp

The Western Pacific Subsection of the Hawaii Section of the American Water Works Association (AWWA-HIWPS)

It is my privilege and pleasure to welcome you to the AWWA-HIWPS' second regional conference, April 11-12, 2016. Our theme this year is:

“Making the Best of What You Have: Reliability, Effectiveness, Efficiency”

We were pleased with the support of those who attended our first Subsection workshop, last April. We are very encouraged to continue our efforts to meet the Subsection commitment to our region.

The subsection welcomes all interested persons in, or interested in this geographic region. People working in, supporting, or with interest in water and waste water as well as the environments they affect and in which they function.

The Subsection would also like to encourage everyone to join the American Water Works Association (AWWA). This automatically makes you a voting member of the Subsection. Our emphasis is to support the needs of our geographical area.

Established in 1881, the American Water Works Association is the largest nonprofit, scientific and educational association dedicated to managing and treating water, the world's most important resource. With approximately 50,000 members, AWWA provides solutions to improve public health, protect the environment, strengthen the economy and enhance our quality of life.

AWWA serves to:

- Offer education to water professionals
- Advocate for safe and sustainable water
- Collect and share knowledge
- Create volunteering opportunities

As the Chair of Western Pacific Subsection and former Chair of the Hawaii Section, it has been one of my continuing aspirations to share the benefits of AWWA membership to all of us who live in the Pacific Basin. The choice of location for the subsection is based on the nature of regional travel, since most of us in the Western Pacific area come through (or originate on) Guam to reach any other location either in or beyond our region.

“The purpose of this Subsection shall be the advancement and dissemination of knowledge concerning the improvement of practice in the design, construction, operation and management of water works and all related activities, and supporting skill based training and an open exchange of experiences throughout Guam, the Commonwealth of the Mariana Islands, the Republic of Palau, and the Federated States of Micronesia.”

Our ability to achieve these goals has been assisted by support from those who helped create the Subsection, a lot of volunteer work by our Subsection members and by financial support from our Sponsors. We hope that those attending this year's Workshop will find it has supported your needs and interests. The Subsection remains most appreciative of input from attendees and persons from the Western Pacific region. We have made every effort to live up to the suggestions we received after our first Workshop, and look forward to managing our future activities with help and suggestions given us as we move forward.

Senseremente,

Paul J. Kemp
AWWA-HIWPS Chair

AMERICAN WATER WORKS ASSOCIATION 2ND REGIONAL CONFERENCE



Agenda

11-Apr

- 8:00 to 8:30 Registration and Refreshments
- 8:30 to 8:45 Opening Remarks, **Miguel C. Bordallo, PE, General Manager GWA**
- 8:45 to 9:30 Ice Breaker, **Kevin Delgado**
- 9:30 to 10:15 Keynote Speaker. **“Tapping into Your People – They have what it takes!”**
Jeff Theerman
- 10:15 to 10:30 Break
- 10:30 to 11:00 Low Chlorine System Residual Due To A Non Functioning Valve Program.
Patrick Trevino
- 11:00 to 11:30 Groundwater monitoring, modeling, and development in response to the military buildup. **Steve Gingerich**
- 11:30 to 13:00 Hosted Lunch
Lunch Presentation: pH: Theory and Practice. **John Moffatt**
- 13:00 to 13:30 Salinity Trends in the Northern Guam Lens Aquifer. **Dr. John Jenson**
- 13:30 to 14:00 Contaminants of Emerging Concern – An Update . **Rick Zimmer**
- 14:00 to 14:15 Break
- 14:15 to 14:45 Dieldrin in Guam's Groundwater: A Preliminary Health Assessment and Well Profile Analysis. **Dr. Gary Denton**
- 14:45 to 16:30 One Guam Panel Forum; Facilitator, **Randel Sablan**
- 16:30 to 18:00 Jointly Hosted Mixer - Society of American Military Engineers & AWWA

12-Apr

- 8:00 to 8:30 Registration and Refreshments
- 8:30 to 9:00 USGS Water Programs in Guam and the Pacific. **Steve Anthony**
- 9:00 to 9:30 Visual Inspections for Concrete Tanks. **Nick Belmont**
- 9:30 to 9:45 Break
- 9:45 to 10:15 From the Ground Up - Development of a GIS and Hydraulic Model. **Ron Abraham**
- 10:15 to 10:45 El Niño & La Niña what effects do these phenomena have on Guam’s fresh water? **Dr. Mark Lander**
- 10:45 to 11:30 Conference Activity, **Waterworks Challenge**
- 11:30 to 13:00 Hosted Lunch.
Lunch Presentation Turbidity: Theory and Practice. **John Moffatt**
- 13:00 to 13:30 SCADA communications. **Gerben Eekman**
- 13:30 to 14:00 Prediction of Flow Duration Curves at Ungauged Stream Sites in Guam.
Dr. Khosrowpanah
- 14:00 to 14:30 Energy Efficiency & the Improvement of System Reliability ...Water Pumping Solutions and ECM Technology. **Matthew Beasley**
- 14:30 to 15:00 Safe Handling of Asbestos Water Lines. **Jim Brant**
- 15:00 to 17:00 Conference Tour – (Tentatively) GIAA Water System and GWA Meter Test Shop.

**APRIL 11 | PRE-CONFERENCE WORKSHOP
GREEN DREAM HOME COMPETITION**

2016
**ISLAND SUSTAINABILITY
CONFERENCE**

**GREEN DREAM HOME
HIGH SCHOOL COMPETITION**



APRIL 11, 2016 | 8:00 AM
CRYSTAL BALLROOM
LOTTE RESORT GUAM

High School students from Guam and the CNMI will showcase sustainable model homes they designed and constructed with consideration of Guam's unique location and environment.



APRIL 11 | PRE-CONFERENCE WORKSHOP

EPSCoR Workshop

EPSCoR Biographies

Terry J. Donaldson, Ph.D.



Terry J. Donaldson earned a B.S. in Fisheries from Michigan State University, a M.S. in Biology from the University of Guam, and a Ph.D. in Systematics and Evolutionary Biology (Ichthyology) from Louisiana State University. Dr. Donaldson is currently Director of the University of Guam Marine Laboratory and is Professor of Ichthyology. Terry has over 35 years of research experience, mainly in the Indo-Pacific Region. His interdisciplinary research interests include behavior, biodiversity, biogeography, conservation biology, ecology, and taxonomy.

Jason S. Biggs, Ph.D.



Jason S. Biggs earned his B.S. and M.S. in Biology (Marine Chemical Ecology) from the University of Guam Marine Laboratory, and a Ph.D. in Pharmacology & Toxicology from the University of Utah. Dr. Biggs is an Associate Professor of Molecular Ecology and Graduate Biology Chair at the University of Guam Marine Laboratory, the Scientific Advisor to the Governor of Guam on All Ocean Matters, and the Pacific Islands Ocean Observing System (PacIOOS) Guam Representative. Jason is a Principal Investigator for Guam EPSCoR Research and will lead the genetic research and biorepository's physical inventory system.

Laura A. F. Biggs, Ph.D.



Laura A. F. Biggs earned her B.S. in Biology with a Minor in Education from Manhattanville College, and a Ph.D. in Pharmacology & Toxicology from the University of Utah. Dr. Biggs started at the University of Guam as an Assistant Professor for the Sea Grant Extension Program. Currently Laura is an Assistant Professor of Biology within the Division of Natural Sciences, College of Natural and Applied Sciences. She is also a Principle Investigator for Guam EPSCoR. Her experience and involvement in local and regional community-driven projects will benefit the development of the village-to-village watershed partnerships. Laura will spearhead student development activities, and guide them in their pursuit of STEM careers and Ph.D. programs.

John A. Peterson, Ph.D.



John A. Peterson has earned a Ph.D. in Anthropological Archaeology and is currently the Assistant Vice President for Graduate Studies and Research & Sponsored Programs. John is a Principal Investigator for the Guam EPSCoR Program and the Pacific Islands Climate Science Center. Dr. Peterson is a Vice President for the Indo-Pacific Region of the International Committee for Archaeological Heritage Management, a scientific committee of ICOMOS, and adjunct faculty at the John A. Burns School of Medicine, University of Hawai'i at Manoa, and graduate affiliate faculty Department of Anthropology, University of Hawai'i at Manoa. Dr. Peterson has extended experience in renewable energy.

APRIL 12 | PRE-CONFERENCE WORKSHOP

PACIFIC ISLAND CLIMATE SCIENCE COMMITTEE WORKSHOP

Climate Change Preconference Workshop

Tuesday, April 12 from 8 a.m. - 4 p.m.



08:00 Sign-in and Registration

08:15 Welcoming remarks – John Peterson, Ph.D., University of Guam

08:30 Overview of Alaska Climate Science Center - Steve Gray, Ph.D., Director, Alaska Climate Science Center, USGS

08:45 Overview of PICSC – Kelvin Richards, Ph.D., University of Hawaii-Manoa

09:00 Downscaled models and applications

1. Presentation-Guam Dynamic Downscaling Model and Hawaii Dynamic and Static Downscaled Models (Kelvin Richards)
2. Presentation-Dynamic Downscaling Efforts in Alaska (Peter Beieniek)
3. Presentation: Extreme events research in Alaska using dynamical downscaled data and quantile mapping methodologies (Rick Lader)
4. Presentation: Extreme events in the Pacific – typhoons, droughts, and ENSO (Mark Lander)

Panel

- Kelvin Richards, Ph.D. – Director and Professor of Oceanography, International Pacific Research Center, School of Ocean and Earth Science and Technology
- Peter Bieniek, Ph.D. – Research Associate, Alaska Climate Science Center
- Rick Lader – Ph.D. Candidate, Alaska Center for Climate Assessment and Policy
- Mark Lander, Ph.D. – Associate Professor of Meteorology, Water Energy Research Institute

Facilitator: Stephen Grey, Ph.D., Director, Alaska Climate Science Center, USGS

Panel Discussion:

- Pros and cons of dynamic vs static downscaled models
- Resolution of topographic influence on precipitation patterns (Alaska – focus on snow and the rain/snow interface),
- Development of products for stakeholders,
- Analysis of bias, and
- Lessons learned/challenges and limitations moving forward
- Uncertainty issues

10:30 Seasonal wave-induced inundation forecasts for the US API and Hawaii

Panel

- Philip Thompson, Ph.D. – Associate Director, University of Hawaii Sea Level Center
- Xavier Erbai Matsutaro – Director, Office of Climate Change, Ministry of Finance, Palau
- Robbie Greene – Pacific Coastal Research and Planning
- Melissa Iwamoto - PacIOOS

Facilitator: Carlie Wiener, Communications Manager, Schmidt Ocean Institute

Panel Discussion

- Climate change and coastal flooding: Relative importance of wave climate vs. sea level rise
- Challenges for creating Pacific-wide coastal flooding forecasts that are relevant at the local level.
- What coastal flooding forecasts/outlooks are currently available and how is this information used?
- What information is missing or not easily accessible?
- How can forecasts/outlooks be developed to most effectively drive effective policy and decision making?

12:00 Delicious Lunch

13:30 Communication - Approaches to communicate climate science research

1. Presentation: Communicating Climate Change Scenarios, Uncertainty, and Impacts in Alaska (Kristin Timm)
2. Presentation: Understanding Use of Information about Climate and Water Resources in Guam (Victoria W. Keener)

Panel

- Kristin Timm - Science Communications Lead, Scenarios Network for Alaska and Arctic Planning, University of Alaska Fairbanks
- Scott Rupp, Ph.D. - Deputy Director, International Arctic Research Center; Director, Scenarios Network for Alaska & Arctic Planning; University Director, DoI Alaska Climate Science Center

- Steve Gray, Ph.D. - Director, Alaska Climate Science Center, USGS
 - Victoria Keener, Ph.D. – Research Fellow at the East –West Center
- Facilitator:* Sharon Ziegler-Chong, University of Hawaii-Hilo

Panel Discussion:

- Best practices to communicate climate science research to various audiences
- How to communicate model uncertainty
- Assessment of available tools (e.g., Are scenarios the best starting point for government planning)
- Lessons learned/challenges and limitations

15:00 Climate Adaptation Planning

1. Presentation—Adaptation planning efforts in Alaska and specific examples from his current work with the community of Nome, Alaska (Nathan Kettle)
2. Presentation—Adaptation planning efforts in the Government of Guam (Tricee Limtiaco)
3. Presentation—Adaptation planning efforts in Palau (Xavier Erbai Matsutaro)
4. Presentation— “Climate Change and Coastal Ecosystems in Guam: Management Sustainability Forecasts and Community Engagement” (Laurie Raymundo)

Panel:

- Laurie Raymundo, Ph.D. – Professor, Marine Laboratory, University of Guam
- Tricee Limtiaco, JD – Point of Contact for Climate Change for the Government of Guam
- Nathan Kettle, Ph.D. – Research Associate, Alaska Center for Climate Assessment and Policy
- Xavier Erbai Matsutaro – Director, Office of Climate Change, Ministry of Finance, Palau

Facilitator: Romina King, Ph.D., University of Guam

Panel Discussion:

- Are there broader lessons to be learned about supporting climate adaptation for "islanded" communities;
- Top down vs. bottom approaches – exploring the pros and cons;
- What innovative solutions can we explore to meet the increasing climate adaptation needs of "islanded" communities"
- For example, what is the role of remote engagement in supporting climate adaptation planning?
- Can it be done, and if so, how?
- What are the drawbacks and benefits of such approaches?

16:00 – Closing remarks

MODERATORS

Dr. John Peterson

University of Guam Assistant Vice President of Graduate Studies, Research, and Sponsored Programs

John A. Peterson earned his doctorate degree in Anthropology from the University of Texas at Austin. He is the former director of the Richard F. Taitano Micronesian Area Research Center at the University of Guam. Before moving to Guam in 2006, he was active in Museum Studies in Texas and in the Philippines. Peterson was the director of a Living Historical Farm and Agricultural Museum in Ohio. He also contributed to the initiation of the Kabilin heritage Center at the University of San Carlos Museum in Cebu, Philippines.

Peterson served as director of the Anthropology Research Center and the Asian Studies Development Program. As an archeological investigator, Peterson has conducted archeological and ethnographical research projects in the American Southwest, Texas, California, northern Mexico, the Philippines, Guam and Hawai'i, along with innumerable cultural resources management projects and has contributed to projects in Jiangxi Province, China, Ecuador, and Palau. At the University of Texas at El Paso, Peterson's focus and accomplishments were on teaching and research of historical ecology, technology, society and archeology. His research and extensive publications include investigations and articles on the historical archeology of the American Southwest, northern Mexico, Hawaii and the Philippines.



Dr. Romina King

University of Guam Assistant Professor of Geography, Pacific Islands Climate Change Center Coordinator

Romina King, PhD is an assistant professor of Geography at the University of Guam. She is also the Climate Science Coordinator for the Center for Island Sustainability, a part-time position funded by the USGS Pacific Islands Climate Science Center, to assist with the coordination of climate change work within the university and with the Government of Guam. Her research interests include GIS, sustainability, coastal zone management, and natural resilience to climate change as it relates to small tropical islands. Romina earned her PhD in Geography from University College Cork, Ireland; her MSc in GIS from the University of Southampton, UK; her MA in Micronesian Studies from the University of Guam; and her BSc in Economics with a focus on environmental studies from Boston College. She enjoys yoga, surfing, and teaching her daughters about earth science.



UOG EcoFeed Student Symposium

FREE FOR UOG STUDENTS!

Learn about how food waste is diverted from the landfill and converted into animal & plant feed.



Where: Lotte Hotel, Tumon, Guam
When: Tuesday, April 12, 2016
Time: 8:00 AM-8:30 AM - Registration
8:30 AM-12:00 PM - Program

What is the EcoFeed Project?

*Phillip Cruz, Associate Project Coordinator, CIS
& Mari Marutani, PhD, University of Guam*

Pros and Cons of Animal Feed Production

Odi Diambra, PhD, University of Guam

Composted Organic Waste

Ferdinand Galsim, University of Guam

EPA Sustainable Food Management

Wendi Shafir, LEED AP, USEPA, Region 9



12:00 PM-1:00 PM- Lunch

1:00 PM-3:00 PM- Field Trip

Composting at UOG Triton Farm

Mohammad Golabi, PhD, University of Guam



APRIL 12 | PRE-CONFERENCE WORKSHOP

GEOGRAPHIC INFORMATION SYSTEMS (GIS) WORKSHOP

Monday, April 11, 2016

Morning	
8:00 am – 8:30 am	Registration
8:30 am – 9:00 am	Welcome and Pre-Conference Overview <i>John Peterson, Vice-President of Graduate Studies, Sponsored Programs and Research and Interim Director of the Center for Island Sustainability, PI for the UOG PICSC Romina King, Assistant Professor and Climate Science Coordinator, UOG PICSC Maria Kottermair, Geospatial Coordinator, UOG PICSC</i>
9:00 am – 9:15 am	Introductions
9:15 am – 9:30 am	Overview of Pacific Islands Climate Science Center's (PICSC) Role on Guam and the USAPI <i>Dave Helweg, Director, PICSC</i>
9:30 am – 10:30 am	Presentations by Federal Partners Part I <i>USGS Earth Resources Observation Systems (EROS): elevation data USDA Natural Resources Conservation Service (NRCS): available imagery</i>
10:30 am – 10:45 am	Break
10:45 am – 12:00 pm	Presentations by Federal Partners Part II <i>NOAA Pacific Services Center (PSC): Digital Coast NOAA National Geodetic Survey (NGS): benchmarks NOAA PSC/USDA Forest Service/NOAA PSC: vegetation/ land cover mapping</i>

Afternoon	
12:00 pm – 1:00 pm	Lunch
1:00 pm – 2:00 pm	Overview of GIS Projects by local and regional partners 5-10 min Blitz-Presentations by the university, local government agencies and partners from Micronesia
2:00 pm – 3:00 pm	Break-out sessions: Data GAP Analysis
3:00 pm – 3:15	Break
3:15 pm – 4:00 pm	Break-out sessions: Training Needs Analysis
4:00 pm – 4:30 pm	Presentations of results & panel discussion
Evening	Social activity



Coordinator: Maria Kottermair

Maria Kottermair is a certified Geographic Information Systems (GIS) Professional and has applied that expertise on Guam for over a decade. She holds a BSc in Cartography from the Munich University of Applied Sciences and an MSc in Environmental Science from the University of Guam. She has worked as a GIS Analyst for several programs at the University of Guam, including the Water and Environmental Research Institute and the Marine Laboratory.

Lately, Maria has combined her passion for GIS and the islands by expanding her scope of work to other locales in Micronesia, notably the Outer Islands of Yap. Her most recent project was a water resources assessment of a Yap outer island. For the past year, she has also taken up the role as the Regional Geospatial Coordinator of the Pacific Island Climate Science Center at the Center for Island Sustainability at UOG.

APRIL 12 | PRE-CONFERENCE WORKSHOP
CHINA READY, GUAM READY? - STUDENT VIDEO/ESSAY CONTEST

CHINA READY.

GUAM READY?

2016 GUAM SUSTAINABLE TOURISM CONTEST

A goal of Guam's tourism industry is to secure a China visa waiver that would allow easier access for mainland Chinese travelers to visit Guam. This presents new challenges, changes, and opportunities for Guam.

Open to Guam high school seniors and UOG students. Must be qualified to compete.

All entries must be received at the University of Guam Center for Island Sustainability office by 4:00pm March 18, 2016.

What changes can we expect?
 What should we be aware of?

Visit adascisguamcontest.weebly.com for all details!

	CASH PRIZES		
	UOG ESSAY CONTEST	UOG VIDEO CONTEST	HIGH SCHOOL VIDEO CONTEST
First Place	\$500	\$1,000	\$1,000
Second Place	\$250	\$500	\$500






APRIL 12 | PRE-CONFERENCE WORKSHOP ENVIRONMENTAL WRITING WORKSHOP ON THE BEACH

Environmental Writing on the Beach

Tuesday, April 12 from 8am - 5pm

Presented by: Scott Slovic, Ph.D.

Professor and Chair, English Department, University of Idaho

This workshop is intended for anyone who wishes to develop his or her skills as an environmental communicator. We will look at various short examples of writing about the natural world and sustainability-related ideas, “wrapping ourselves” in the language of experienced writers by reading some of this work aloud. We will also practice close observation of natural phenomena and writing about these phenomena through a few brief writing exercises. The workshop leader, Dr. Scott Slovic, is a widely published environmental writer and has taught environmental writing to groups ranging from middle-school students to professional journalists for many years in locations ranging from the mountains of central Idaho to the jungles of Malaysia and the urban campuses of Tokyo.

APRIL 12 | PRE-CONFERENCE WORKSHOP ACHIEVING SUSTAINABILITY ON GUAM SYMPOSIUM (ASGS)

APRIL 12, 2016

- 8:30am Registration and Check -in
- 9:00 Welcoming Remarks
Dr. Robert Underwood
- 9:30 Keynote Speaker
Kirk Johnson
- 10:15 Break
- 10:45 Social Marketing Strategies to Address
Environmental Issues (Jane Dia, RARE
Pride Campaign Manager)
- 12:00 Lunch
- 12:30 Working Groups to Address
Sustainability Challenge
Areas of Interest:
- Coral Reefs
 - Watersheds
 - Waste Water/Water Quality
- 2:30 Report Out
- 3:00 Students Depart

APRIL 14, 2016

- 12:30pm Student representatives report out
to CIS conference attendees on
recommendations



APRIL 12 | PRE-CONFERENCE WORKSHOP

UAF RENEWABLE ENERGY WORKSHOP



A Collaborative Energy Workshop between Guam and Alaska

University of Alaska, Fairbanks Participants:

- Gwen Holdmann, ACEP
- Chris Rose, Founder and Executive Director, REAP
- Rich Wies, Electrical Engineering, ACEP
- George Roe, ACEP
- Art Nash Cooperative Extension

Time	TRACK 1	TRACK 2:
1:00 pm	Introduction: sustainable energy systems for remote and islanded communities – common challenges between Alaska and the Pacific region	
1:30 pm	Nuts and bolts of energy: A basic overview of energy, work, and power. This will be a very fun and interactive session that will help participants understand terminology and units related to energy	Hands-on workshop: Do-it-yourself home energy systems and energy efficiency measures
2:30 pm	Overview of Renewable Energy Technologies and System Economics: solar, wind, ocean energy, biomass, geothermal – what can work for our communities	Nuts and bolts of energy: A basic overview of energy, work, and power. This will be a very fun and interactive session that will help participants understand terminology and units related to energy
3:30 pm	Policy to Action; Community discussions	
4:30 pm	Adjourn	

2016

ISLAND SUSTAINABILITY CONFERENCE

ISLANDED COMMUNITIES

WEDNESDAY, APRIL 13 | MAIN CONFERENCE

Time	Session	Location
8:00 a.m.	Sign-In / Registration and Breakfast	Foyer
8:30 a.m.	Opening Remarks <i>The Honorable Judith Won Pat, Speaker, 33rd Guam Legislature</i> <i>The Honorable Eddie B. Calvo, Governor of Guam</i> <i>Robert A. Underwood, President, University of Guam</i>	Crystal Ballroom
9:00 a.m.	Opening Plenary: <i>Tony de Brum, Climate Change Negotiator</i>	Crystal Ballroom
9:45 a.m.	Guam Future Climate Downscaling Results <i>Presented by Victoria Keener, Ph.D. Fellow, Research Program</i>	Crystal Ballroom
10:00 a.m.	Plenary Panel – Planning for Climate Change <i>Tricee Limtiaco, Romina King, Joni Kerr, Xavier Matsutaro, and Steve Gray</i> <i>Facilitated by: President Robert Underwood, University of Guam</i>	Crystal Ballroom
10:45 a.m.	Poster and Sponsor Exhibits	Foyer
11:00 a.m.	Plenary Speaker: <i>Scott Slovic, Ph.D., Professor and Chair, English Department, University of Idaho</i> "Singularity: The Poignancy of Island Vulnerability and the Literature of Global Climate Change"	Crystal Ballroom
12:00 Noon	Luncheon Speaker: <i>Robert Franco, Ph.D., Director, Office for Institutional Effectiveness and Professor, Pacific Anthropology, Kapiolani Community College, U. Hawaii</i> "Sustainability: Structure and Strategy for Non-Glacial Change."	Crystal Ballroom
12:45 p.m.	BREAK	

WEDNESDAY, APRIL 13 | MAIN CONFERENCE

Time	Session	Location
1:00 p.m.	BREAKOUT SESSION A	
	CRYSTAL BALLROOM (CLIMATE CHANGE)	EMERALD BALLROOM (SUSTAINABLE ENVIRONMENTS)
	<p>Modeling a seawater wash over event on a low-lying Pacific Island. <i>Stephen B. Gingerich and Clifford I. Voss</i></p> <p>Modeling Sea level Rise Impacts on High Islands in FSM. <i>Snyther Biza</i></p> <p>Supporting Island Resilience with Ocean Data and Innovation. <i>Melissa Iwamoto</i></p>	<p>Demand-Side Management. <i>John J. Cruz Jr., Lorraine O. Shinohara, P.E., CEA, CEM, BA; Jennifer A. White, Francis J. Iriarte P.E., CEA, CEM, BA; Jennifer G. Sablan, P.E., CEA, CEM</i></p> <p>Value of Solar Study. <i>John J. Cruz, Jr., Lorraine O. Shinohara, P.E., CEA., CEM, BA</i></p> <p>Wind Turbine Generator (WTG) Pilot Program. <i>John J. Cruz Jr., Lorraine O. Shinohara, P.E., CEA, CEM, BA; Roel A. Cahinhinan, P.E., CEA</i></p>
	CHARLOTTE 1 (SUSTAINABLE LAND USE AND REGIONAL MANAGEMENT)	CHARLOTTE 2 (TECHNICAL INNOVATIONS FOR SUSTAINABLE PRODUCTION AND CONSUMPTION)
	<p>Guam's Staghorn Acropora Populations Require Managing for Resilience. <i>Valeri Lapack, Laurie Raymundo, D. Burdick and J. Gues</i></p> <p>Watershed restoration as a tool for improving island resilience against climate change and other human impacts. <i>Dr. Austin J. Shelton III</i></p> <p>Guam Community Coral Reef Monitoring Program: Adapting Approaches to Community Engagement and Stewardship. <i>Marybelle Quinata</i></p>	<p>Creating a Map-based Suitability Index for Coastal Development in the CNMI. <i>Rachel Bouchillon</i></p> <p>GIS on Guam and the REGION. <i>Romina King & Maria Kottermaier</i></p> <p>GPS and Geodetic Datums 101. <i>Edward Carlson</i></p>
		CHARLOTTE 3 (LEADERSHIP FOR SUSTAINABLE DEVELOPMENT) (POLICY IMPLEMENTATIONS)
		<p>Balanced Development and Capacity-Building Strategies for Small Island Communities: Lessons Learned from OVOP Cases. <i>Fred R. Schumann, Ph.D.</i></p> <p>Northern Marianas College setting sustainable goals through the Complete College America Initiative. <i>Dr. Cherrie Lovejoy and Ericka Dela Rosa</i></p> <p>The Power of Place – Building Sustainable Environments through learning at War in the Pacific National Historical Park. <i>Jaclyn Balajadia</i></p>
2:15 p.m.	BREAKOUT SESSION B	
	CRYSTAL BALLROOM (CLIMATE CHANGE)	EMERALD BALLROOM (SUSTAINABLE ENVIRONMENTS)
	<p>Understanding Use of Information about Climate and Water Resources in Guam. <i>Melissa I. Finucane & Victoria W. Keener.</i></p> <p>Pacific climate and climate change as revealed by the modern historical records of the U.S.-affiliated Pacific Islands: A story of sea level rise, temperature increases and drying in the east. <i>Mark Lander</i></p> <p>Some Geological Aspects of Long and Short-Term Climate Change. <i>George Devries Klein</i></p>	<p>Bamboozled: Guam's Battle with Invasive Bamboo. <i>Anna Simeon</i></p> <p>Fananom Gihaya: Native Plant Propagation mini-workshop. <i>Adrienne Loerzel</i></p> <p>Preserving Guam Rare Native Plants through a Plant Extinction Prevention (PEP) Program. <i>Ron Edzel Manzano, Jonathan K. Davis, Mario Martinez, John Horeg, Gregorio Borja, III; Mari Marutani and James McConnell.</i></p>

WEDNESDAY, APRIL 13 | MAIN CONFERENCE

Time	Session	Location
2:15 p.m.	BREAKOUT SESSION B (CONT.)	
	<p>CHARLOTTE 1 (SUSTAINABLE LAND USE AND REGIONAL MANAGEMENT)</p> <p>Feeding "Wastelage" to Pigs. <i>Hauhouot Diambra-Odi, PhD., Mari Marutani, Ph.D., and Manuel Duguies, DVM</i></p> <p>Protecting Honey Bee Pollinators for "Tropical Agriculture on Kaua'i. <i>Georgianne Purvinis, Francis Takahashi, Robert Spencer, Lauren Rusert, Noelani Waters</i></p>	<p>CHARLOTTE 2 (TECHNICAL INNOVATIONS FOR SUSTAINABLE PRODUCTION AND CONSUMPTION)</p> <p>Campus sustainability planning: the role of universities and community colleges in implementing and modeling sustainable practices. <i>Christian Palmer</i></p> <p>Participatory mapping in the Pacific Region. <i>Kalisi Mausio</i></p> <p>Use of sustainable methods for municipal wastewater treatment and reuse of excess sludge on the island of Yap. <i>Joseph D. Rouse – UOG WERI</i></p>
	<p>CHARLOTTE 3 (LEADERSHIP FOR SUSTAINABLE DEVELOPMENT) (POLICY IMPLEMENTATIONS)</p> <p>Reducing Student Food Waste in the K-12 Environment. <i>Wendi Shafir</i></p>	
3:30 p.m.	<p>Plenary Panel - How are we using distance education? <i>Panel Group: Vernice Yuzi, Georgianne Purvinis, Snyther Biza, Cherrie Lovejoy</i></p> <p><i>Facilitated by: Terry Nipp</i></p>	
4:30 p.m.	BREAKOUT SESSION C	
	<p>CRYSTAL BALLROOM (CLIMATE CHANGE)</p> <p>Joint Region Marianas Integrated Natural Resource Management Plan. <i>Mark Bonsavage, Environmental Business Line Coordinator, NAVFAC Marianas, Joint Region Marianas, J45</i></p> <p>Communicating Climate Change Scenarios, Uncertainty, and Impacts in Alaska. <i>Kristin Timm – Science Communications Lead, Scenarios Network for Alaska and Arctic Planning, University of Alaska, Fairbanks</i></p>	<p>EMERALD BALLROOM (SUSTAINABLE ENVIRONMENTS)</p> <p>Culture and Sustainable Development in Micronesia. <i>Larry Gamboa, Manny Hechanova, Kristina Sayma, Zeny Asuncion-Nace, Gerry Perez</i></p>
	<p>CHARLOTTE 1 (SUSTAINABLE LAND USE AND REGIONAL MANAGEMENT)</p> <p>Navigators from Yap - present our collaborative effort for canoe sailing and sail weaving</p> <p>Climate Change, Social Work, and the Future of the Human Race: Implications for Policy and Practice. <i>Craig Burns</i></p> <p>The Earth is my Mother and Sister: Pope Francis and the Pacific in Solidarity for Environmental Care. <i>Dr. Curtis Rigsby – Associate Professor of Philosophy/Coordinator of East-Asian Studies, University of Guam CLASS.</i></p>	<p>CHARLOTTE 2</p> <p>Poster Session.</p>
	<p>CHARLOTTE 3 (LEADERSHIP FOR SUSTAINABLE DEVELOPMENT) (POLICY IMPLEMENTATIONS)</p> <p>A Humanities Lens on the Environment: Local Activism, Karabao, and an Apocalypse. <i>Dr. Andrea Hartig, Manny Cruz and Marie Auyong</i></p> <p>Sustainability. <i>Semesa Senikuraciri</i></p>	
6:00 p.m.	NETWORK RECEPTION	
		Club Lounge

2016

ISLAND SUSTAINABILITY CONFERENCE

ISLANDED COMMUNITIES

THURSDAY, APRIL 14 | MAIN CONFERENCE

Time	Session	Location
8:00 a.m.	Sign-in and Continental Breakfast	Foyer
8:30 a.m.	Opening Remarks <i>Dr. John Peterson, Assistant Vice President Graduate Studies, Research & Sponsored Programs, University of Guam</i>	Crystal Ballroom
8:45 a.m.	Opening Plenary: <i>Senator Lisa Murkowski, AK</i>	Crystal Ballroom
9:00 a.m.	Plenary Speaker: <i>CAPT Stephanie Jones (NAVFAC MARIANAS)</i>	Crystal Ballroom
9:30 a.m.	Plenary Panel - Policy to Action <i>Panel - Gwen Holdman, Chris Rose, Erick Ness, Fred Horecky, Desiree Masterson</i> <i>Facilitated by: Misty Conrad, Senior Technical Project, NREL</i>	Crystal Ballroom
10:30 a.m.	Video/Essay Student Competition – China Ready. Guam Ready? <i>P. Sonny Ada, President, Ada's Trust and Investment, Inc.</i> Plenary Speaker – Madelsar T. Ngiraingas, Executive Director, Belau Tourism Association Presentation of winners.	Crystal Ballroom
11:00 a.m.	Poster and Sponsor Exhibits	Crystal Ballroom
11:15 a.m.	Green Dream Home Competition	Foyer
11:45 a.m.	Luncheon Speaker: <i>The Honorable Rory Respicio, Senator, 33rd Guam Legislature</i>	Crystal Ballroom
12:30 p.m.	Achieving Sustainability for Guam Symposium - Student Presentation	Crystal Ballroom
1:00 p.m.	BREAKOUT SESSION D	
	CRYSTAL BALLROOM (CLIMATE CHANGE)	EMERALD BALLROOM (SUSTAINABLE ENVIRONMENTS)
	Home is where the Waves are: Corals in Guam's Exposed Reef Fronts Are Resilient to Local Stressors but Vulnerable to Regional Warming. <i>David Burdick, Peter Houk, Travis Reynolds, Valerie Brown and Laurie Raymond.</i> Floating Ideas: Communicating forecasts and risks of coastal flooding. <i>Philip Thompson</i>	Here be dragons – a case study in urban agricultural gardening. <i>John M.U. Jocson – Associate Professor, Guam Community College</i> Vegetative Guide Dashboard: Relating Atoll Agroforestry Recommendations to Predicted Climate and Sea Level Conditions in the Marshall Islands. <i>Harley I. Manner, Maria Haws, Kathleen S. Friday, Lajkit Rufus and Karl Fellenius</i> It takes an island: Bridging the gaps on the farm. <i>Melanie Mendiola</i>

THURSDAY, APRIL 14 | MAIN CONFERENCE

Time	Session	Location						
1:00 p.m.	BREAKOUT SESSION D (CONT.)							
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3:30 p.m.	Plenary Speaker: Larry Raigetel "What would happen to traditional navigation if sea levels continue to rise?"	Crystal Ballroom						
3:45 p.m.	Plenary Panel - What we should be doing together or individually? Panel – <i>Raaj Kurapati, Robert Franco, Scott Slovic, Tony de Brum, Representatives from Regional Colleges and GDOE.</i> Facilitated by <i>President Robert Underwood, University of Guam</i>	Crystal Ballroom						
4:45 p.m.	Questions & Answers	Crystal Ballroom						

KEYNOTE SPEAKER

9:00 A.M

CRYSTAL BALLROOM

Tony de Brum

Climate Change Negotiator

Tony de Brum served as the Minister-in-Assistance to the President and then the Minister of Foreign Affairs of the Republic of the Marshall Islands from January 2012 to January 2016. During this period, Mr. de Brum played a leading role in helping build the diplomatic case for an ambitious Paris Agreement on Climate Change, including through spearheading a 'High Ambition Coalition' during the COP21 negotiations, and continued to champion the cause of nuclear disarmament.

Born in 1945, Mr. de Brum grew up on the island of Likiep during the 12-year period from 1946 to 1958 when the United States conducted 67 atomic and thermonuclear weapons in the Marshall Islands. As a nine-year-old, Mr. de Brum witnessed the 'Bravo shot' at Bikini Atoll, the largest-ever US nuclear test that produced an explosion 1,000 times more powerful than Hiroshima.

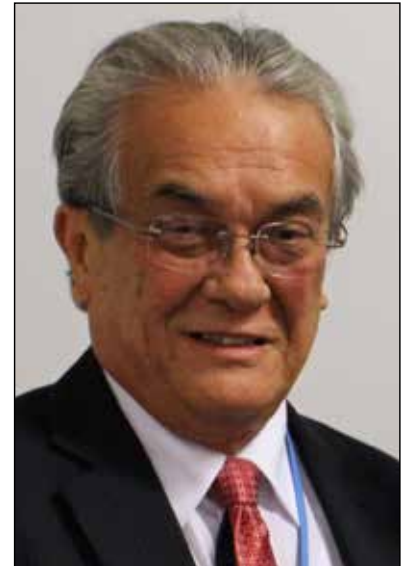
In 1968, Mr. de Brum became one of the first Marshall Islanders to graduate from university and went on to play a leading role in in the development of his country's first Constitution, and in the negotiations that led to RMI's independence via a Compact of Free Association with the United States, as well as its membership of the United Nations.

Since first entering politics in 1983, Mr. de Brum has been instrumental in helping his country to cope with the legacy of U.S. nuclear testing. In recognition of his efforts at home and abroad, Mr. de Brum was awarded the 2012 Nuclear Age Peace Foundation's Distinguished Peace Leader Award, joining an esteemed list of previous recipients, including His Holiness the XIVth Dalai Lama, Archbishop Desmond Tutu, King Hussein of Jordan, and Captain Jacques Cousteau. In 2015 Minister de Brum was also recognized with the Nuclear Free Future Award and the Right Livelihood's 'Alternative Nobel' Prize for his work on nuclear disarmament.

More recently, Senator de Brum has emerged as a leading international voice on the existential threat posed by climate change to RMI and other low-lying atoll countries, and the benefits of an accelerated transition to the low-carbon economy.

In February 2013, Mr. de Brum was invited to address the United Nations Security Council on the security implications of climate change, including the threats posed to the territorial integrity and long-term viability of Pacific small island states. In September 2013, he hosted a distinguished international 'Panel of Experts on Climate Leadership' as the key lead-up event to RMI's hosting of the Pacific Islands Forum Leaders' Meeting, which ultimately adopted the groundbreaking Majuro Declaration for Climate Leadership. The Declaration was later handed to UN Secretary-General Ban Ki-moon as "a Pacific gift" to the Secretary-General's efforts to build political momentum towards a new global climate agreement in 2015.

Building on RMI's powerful example of converting 95 per cent of its outer island communities to solar electricity, Mr. de Brum has become the world's leading voice for the transformational potential of Ocean Thermal Energy Conversion (OTEC) technology, including a proposal to power Kwajalein Atoll which hosts a US military presence.



WEDNESDAY, APRIL 13 | MAIN CONFERENCE

PLENARY SPEAKER

11:00 A.M

CRYSTAL BALLROOM

Scott Slovic, Ph.D.

Professor and Chair, English Department, University of Idaho

SINGULARITY: THE POIGNANCY OF ISLAND VULNERABILITY AND THE LITERATURE OF GLOBAL CLIMATE CHANGE

Scott Slovic is one of the leading scholars in the field of “ecocriticism” (environmental literary studies) and for many years has worked to coordinate interdisciplinary environmental humanities research and academic programs throughout the world. He earned his B.A. at Stanford University and his M.A. and Ph.D. at Brown University, and he has been a Fulbright Scholar in Germany, Japan, and China. He served as the founding president of the Association for the Study of Literature and Environment (ASLE) from 1992 to 1995, and since 1995 he has edited ISLE: Interdisciplinary Studies in Literature and Environment (Oxford University Press), the major journal for ecocriticism. The author of more than 200 articles on sustainability-related topics for publications ranging from American Literary History to The New York Times, his twenty-three books include *Going Away to Think: Engagement, Retreat, and Ecocritical Responsibility*, *Currents of the Universal Being: Explorations in the Literature of Energy*, *Ecocriticism of the Global South*, and *Numbers and Nerves: Information, Emotion, and Meaning in a World of Data*. He is currently professor of literature and environment and chair of the English Department at the University of Idaho in the United States. ecosystem and on the resilience of their own populations.



LUNCHEON SPEAKER

12:00 Noon

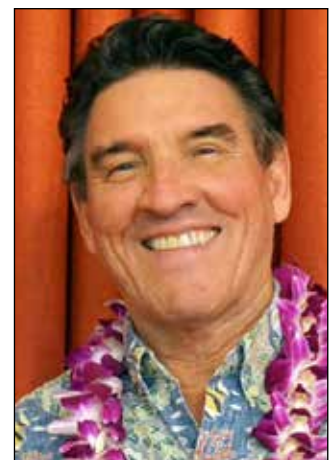
CRYSTAL BALLROOM

Robert W. Franco, Ph.D.

Director, Office for Institutional Effectiveness and Professor, Pacific Anthropology, Kapiolani Community College, U. Hawaii

SUSTAINABILITY: STRUCTURE AND STRATEGY FOR NON-GLACIAL CHANGE

Robert W. Franco is a Professor of Anthropology, and Director of Institutional Effectiveness at Kapi’olani Community College, University of Hawai’i (UH). He holds a doctoral degree in cultural anthropology from UH Manoa with a focus on cultural and demographic changes for Samoans at home and abroad. He collaboratively developed the College’s nationally recognized Service Learning program and serves as a Senior Faculty Fellow for Community Colleges at Campus Compact, Leadership Fellow for NSF’s Science Education for New Civic Engagements and Responsibilities (SENCER) program, and as a Board Member for the National Council for Science and the Environment’s Community College Alliance for Sustainability Education. He worked collaboratively with six UH campuses to develop the Hawaii Pre-Engineering Education Collaborative (PEEC) proposal and to institutionalize PEEC at Kapi’olani, He is also an NSF LSAMP partner in the Islands of Opportunity Alliance.



WEDNESDAY, APRIL 13 | MAIN CONFERENCE

BREAKOUT SESSION A | 1:00 P.M. TO 2:00 P.M.

CRYSTAL BALLROOM

Modeling a seawater wash over event on a low-lying Pacific Island

Stephen B. Gingrich and Clifford I. Voss

Understanding the processes that affect aquifer salinization and recovery following seawater washover events on low-lying islands is critical to management of the limited water supplies on such islands. Several hypothetical seawater inundation events, which create unstable inverted density distributions, were tested in simulations of Roi-Namur Island, Kwajalein Atoll, Republic of the Marshall Islands. Results were constrained by matching observed salinity data collected in the horizontal production well. The Roi-Namur model simulates freshwater, the underlying brackish-water transition zone and saltwater in the aquifer composed of coralline sand and rubble. Estimates of the potential distribution and volume of seawater that is projected to wash over the island in future events are used to investigate the impacts to the freshwater lens and evaluate various strategies to mitigate the impacts. The groundwater-flow model is also useful as a tool to forecast the effects to the freshwater resource due to projected future changes in recharge and sea level as climate changes.

Modeling Sea level Rise Impacts on High Islands in FSM

Synther Biza

In FSM today, 70% of its population and infrastructure is located on the coastline, and are experiencing damage to houses and infrastructure, affecting food crops and trees, as well as permanent loss of beaches; all due to climate change impacts. In the future, it is expected that the impacts will get worst. Managing these problems can be facilitated with maps showing locations where inundation is likely. Therefore, one of the crucial steps in climate risk management in the FSM is to make maps of inundation vulnerability and risk, to assist in land use and infrastructure planning and development, as well as identification of adaptation measures that can enhance the food systems. This project investigated the power of GIS by using spatial modeling in predicting climate change impacts on the high islands in FSM. The spatial model utilized in this project used three (3) datasets; 1) the Pacific Science Climate Change Program (PSCCP) sea level rise scenarios for FSM for the years 2030, 2055, 2090; 2) digital elevation models (DEMs) for the high islands; and 3) mean sea level for each state in the FSM. As the results of the spatial model, an inundation map for each scenario for each state was created, and then was used in assessing and analyzing vegetation, land use, and infrastructure risk and vulnerability to sea level rise. One major finding from this analysis was that the airport runways in Kosrae, Chuuk and Pohnpei to be an area most likely to be affected i.e. under sea water given the scenario generated by PSCCP. Several challenges were identified and will be presented in the presentation.

Supporting Island Resilience with Ocean Data and Innovation

Melissa Iwamoto

The Pacific Islands Ocean Observing System (PacIOOS) believes that ocean data can help save lives and resources. PacIOOS empowers communities and decision-makers to build island resilience by supporting the development of innovative and stakeholder-driven solutions to disseminate essential ocean information in user-friendly tools and services. These solutions can assist with both short-term and long-term decision-making with regard to weather and climate. Articulating the strategies employed by PacIOOS and the lessons learned from such efforts may assist with similar efforts or help identify potential synergies and opportunities for collaboration with conference participants. In order to illustrate the potential for impact, this presentation will highlight tools including wave inundation forecasts for the Marshall Islands, an online mapper for education and decision-making with regard to the impacts of sea level rise in Hawaii, and a low-tech email solution of near real-time sea surface temperature for identified stakeholders.

EMERALD BALLROOM

Demand-Side Management

John J. Cruz Jr., Lorraine O. Shinohara, P.E., CEA, CEM, BA; Jennifer A. White, Francis J. Iriarte P.E., CEA, CEM, BA; Jennifer G. Sablan, P.E., CEA, CEM

GPA is embarking on a DSM program helping customers reduce energy use and costs while strengthening the Guam community and improving our quality of life. GPA's DSM program is called "Energy Sense." Energy Sense goals include reducing energy demand and consumption, lowering fuel and non-fuel operating expenses, reducing future capital expenditures and associated debt service, improving the environment, enhancing sustainability, and providing customers greater value. This presentation describes GPA's Energy Sense Program Plan (ESPP). The ESPP:

- Describes the resources and functional support needed—such as communications, stakeholder engagement, and public outreach; vendor and trade ally relations; customer service; and program performance assessment—as well as providing various logistical information pertaining to the evaluation, rollout, and continuation of initiatives;
- Provides the methodology, assumptions, and analysis used to evaluate the various potential initiatives and their associated costs and benefits; and,
- Serves as GPA's roadmap for effectively implementing and sustaining a DSM program.

Value of Solar Study

John J. Cruz, Jr., Lorraine O. Shinohara, P.E., CEA, CEM, BA

Like GPA, utilities across the country, and across the world, are striving to determine and understand the impacts of distributed solar installations on their electric systems. One approach that has been accepted before various commissions, councils and boards is to determine a "Value of Solar" for the utility. The Value of Solar is the unique, intrinsic value or the net benefit (or cost) of distributed solar generation on a utility's system for an identified period of time. The result of a Value of Solar analysis provides a utility with direct application to its distributed solar energy policy as a whole, including rebates and rates, and specifically its Net Energy Metering (NEM) and potential Community Solar or "Shared Solar" programs. GPA is embarking on a Value of Solar Study (Study) that will help GPA recognize, analyze, and evaluate how distributed solar generation impacts its system and customers and how these impacts should be captured and addressed through specific policy and ratemaking initiatives. This paper/presentation describes GPA's plan to conduct an upcoming Value of Solar Study and the benefits to be derived from this effort. This study will seek to achieve the following goals:

- Establish a study framework that is understood and endorsed by a broad group of GPA's stakeholders; including its NEM and non-NEM customers, the Public Utilities Commission, and community leadership.
- Provide transparent and easy to understand data and calculations for the various components that determine the Value of Solar, including generation and avoided energy costs, avoided line loss costs, and the costs for required system stability investments as intermittent solar generation increases, among others.
- Provide a forecast of distributed solar penetration under a variety of alternative scenarios and how penetration rates affect the stability of the system and costs to customers.
- Provide recommendations for changes in rate structures to effectively capture the true Value of Solar, align cost causation with cost recovery, and ensure ratepayers are being treated fairly.

Wind Turbine Generator (WTG) Pilot Program

John J. Cruz Jr., Lorraine O. Shinohara, P.E., CEA, CEM, BA; Roel A. Cahinhinan, P.E., CEA

This presentation describes GPA's Wind Turbine Generator Pilot Program.

WEDNESDAY, APRIL 13 | MAIN CONFERENCE

BREAKOUT SESSION A (CONT.) | 1:00 P.M. TO 2:00 P.M.

CHARLOTTE 1

Guam's Staghorn Acropora Populations Require Managing for Resilience.

Valeri Lapack, Laurie Raymunda, D. Burdick and J. Gues

Guam's coral reefs were severely impacted from bleaching episodes in 2013 and 2014. Surveys in 2015 estimated that 53% (+/- 10%) of Guam's staghorn Acropora were lost to bleaching-related mortality within 12 months. Staghorn Acropora were found at 20 sites and half of these sites lost $\geq 75\%$ of their cover. The current focus is to document spawning events and examine the fecundity of Guam's staghorn Acropora. Preliminary results suggest that *A. muricata* and *A. cf. pulchra* spawn in late April, May, and early June, with a separate spawning period observed for *A. aspera* and *A. cf. intermedia* during September/October. Genetic analysis is in progress to resolve taxonomic discrepancies and examine the genetic structure of these staghorn populations. Additional management efforts include culturing asexual fragments and reintroducing them to decimated areas. Understanding the reproductive biology and genetic structure is critical to effectively manage and re-establish Guam's staghorns

Watershed restoration as a tool for improving island resilience against climate change and other human impacts.

Dr. Austin J. Shelton III

Environmental stressors in coastal areas threaten the sustainability of marine resources and reduce their resilience to climate change impacts. Accelerated land erosion is a major stressor that leads to sedimentation on downstream coral reefs and the degradation of ecosystem functions. As part of the Humatak Project (www.humatakproject.org), nearly 2,000 volunteer hours were contributed to reducing erosion in the La Sa Fu'a Watershed. Tree seedlings and sediment filter socks were tested as watershed restoration tools over a 21-month period and were effective in trapping 112 tons of sediment on land. Based on the efficiency of these tools, management recommendations were developed to bring Fouha Bay below severe-moderate sedimentation stress (>50 mg cm⁻² day⁻¹). As shown in other high islands, coral reefs are resilient and can recover after sedimentation stress is reduced. The community engagement strategy and data generated on the effectiveness of watershed restoration tools can be used in management plans to build resilience against climate change in other tropical islands.

Guam Community Coral Reef Monitoring Program: Adapting Approaches to Community Engagement and Stewardship.

Marybelle Quinata

Launched in 2012, the Guam Community Coral Reef Monitoring Program (GCCRMP) works with community members to collect data on coral reef health and improve community engagement in reef management. Over 1,200 Guam residents have participated in the GCCRMP to date and the program has grown from a simple citizen science project to a more comprehensive science based community conservation program. The GCCRMP has

since diversified to attract new members and sustain member involvement, and the program now includes socioeconomic monitoring, stewardship opportunities, and reef impact reporting as well. Members have investigated the benefits of marine protected areas on macroinvertebrate communities and helped managers document coral bleaching in 2013 and 2014. In addition, GCCRMP has established strong partnerships with the educational community through service learning and student internship opportunities that promote marine science careers. GCCRMP continues to evolve by adapting to community interests and needs for stronger community engagement and stewardship.

CHARLOTTE 2

Creating a Map-based Suitability Index for Coastal Development in the CNMI.

Rachel Bouchillon

Though guidelines for reviewing incoming coastal permit applications within the CNMI are laid out in the Division of Coastal Resources Management regulations, the decision of whether or not to grant a coastal development permit still relies heavily on the judgment of DCRM staff and other related agencies. A map-based decision support tool that incorporates social, ecological, and climate-related considerations will help centralize data relevant to the permitting process and will allow the DCRM permitting section to conduct more objective, expedient reviews of incoming applications. This tool will employ an overall suitability index for development of coastal properties based on a suite of identified factors, such as public shoreline access and coastal hazard zones. Currently in its nascent stages, a beta version of this tool is expected to be piloted within the agency later this year.

GIS on Guam and the REGION.

Romina King & Maria Kottermaier

This presentation will talk about available geospatial data sources for Guam and the region and also geographic information systems (GIS) training opportunities at the University of Guam. It will be a summary of the GIS Pre-conference Workshop.

GPS and Geodetic Datums 101. Edward Carlson Presentation is on GPS receivers and geodetic datums in the Pacific.

Will discuss:

1. The GPS navigation system.
2. Different types of GPS receivers/units. Uses of GPS receivers.
3. Brief overview of the different geodetic coordinate systems in the Pacific.

CHARLOTTE 3

Balanced Development and Capacity-Building Strategies for Small Island Communities: Lessons Learned from OVOP Cases.

Fred R. Schumann, Ph.D.

Small island states manifest some unique characteristics and various studies have identified typical advantages and disadvantages of small island economies. Small

island economies are defined as island states with less than one million in population and less than 2,000 square miles in area. Small islands are typically import dependent and even with growing tourism arrivals may lose much of its revenue due to leakage. This research provides a number of cases of rural communities around the world utilizing the One Village One Product (OVOP) strategy for economic and community development. Key success factors and challenges from these cases can provide island community stakeholders with potential ideas to implement OVOP strategies best adapted to their environment to benefit island residents. The research aims to contribute to the literature available to aid in the balanced development of small island communities with greater capacity-building abilities.

Northern Marianas College setting sustainable goals through the Complete College America Initiative.

Dr. Cherrie Lovejoy and Ericka Dela Rosa

The Northern Marianas College (NMC) serves approximately 1200 students each semester. Most of the student population are residents of the Commonwealth of the Northern Marianas Islands. NMC has gone through many changes, including the adoption of the Complete College America (CCA) initiative. NMC's decision was based on research conducted through the US National Center for Educational Statistics. NMC created goals and procedures to address national concerns identified in CCA. CCA goals include: "performance funding, co-requisite remediation, full-time is 15, structured schedules, and guided pathways to success". In order to ensure sustainable development, procedures and practices have been established and implemented. Assessment data is collected each semester to identify and modify effective implementation of these procedures. Assessment data is collected through examination of remediation passing rates, degree completion rates, cohort students, and providing extended support services. This presentation will focus on NMC's movement towards its goals for CCA.

The Power of Place – Building Sustainable Environments through learning at War in the Pacific National Historical Park.

Jaclyn Baljadia

War in the Pacific National Historical Park and its cooperating association, Pacific Historic Parks, have partnered to develop a series of innovative programs that promote the park's mission of conserving and interpreting outstanding natural, scenic, and historic values and objects on the island of Guam for the benefit and enjoyment of present and future generations. The park will showcase strategies on how it promotes responsible interactions among youth with the natural environment. Programs offer dynamic place-based learning opportunities that motivate local youth to experience their national parks in ways that encourage a special sense of responsibility that will last a lifetime. These free programs include River Ranger, Reef Ranger Summer Camp, Junior Ranger Academy, Preservation Rangers, and the Guam Teacher Workshop. This workshop will be led by War in the Pacific National Historical Park, Pacific Historic Parks staff, and youth leaders who participated in the programs.

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BREAKOUT SESSION B | 2:15 P.M. TO 3:15 P.M.

CRYSTAL BALLROOM

Understanding Use of Information about Climate and Water Resources in Guam.

Melissa I. Finucane & Victoria W. Keener.

What can be done to make future climate and water information more useful for both government and Department of Defense fresh water managers in Guam? We address this question with research conducted as part of a collaborative, interdisciplinary project examining potential impacts and adaptive responses to climate change for public infrastructure and Department of Defense installations. Our main objectives were to examine (1) background knowledge and use of existing resources and (2) usability of existing information about climate impacts on Guam's fresh water resources. Semi-structured interviews were conducted with key informants from diverse organizations involved in managing fresh water. Qualitative analyses of interview transcripts revealed several key themes: (1) Existing resources varied in familiarity and perceived usefulness. (2) Information about climate variables seemed harder to understand than information about water variables. (3) Preferred information formats depend on the intended use and potential audiences. Next steps for developing more useful information for fresh water managers will be discussed.

Pacific climate and climate change as revealed by the modern historical records of the U.S.-affiliated Pacific Islands: A story of sea level rise, temperature increases and drying in the east.

Mark Lander

Continuous measurements of rainfall, sea level, and temperature exist for most of the U.S.-affiliated Pacific islands (US-API) since the end of World War II. Most island groups have at least one station with a nearly complete record of climate variables for the period 1953 through present. The record can be extended back to 1915 at some locations where the Japanese made weather observations. Air temperature over the past six decades has increased, with some irregularities related to physical changes to the station infrastructure or location. At most US-API locations, the temperature peaked in 1998, and has been steady or cooling slightly since then. Changes of sea level across Micronesia show highly coherent variations that are mostly related to ENSO. After the very strong 1997 El Niño event, the sea level across Micronesia rose substantially, and was continually well above normal until a large fall of sea level occurred during 2015

Some Geological Aspects of Long and Short-Term Climate Change.

George Devries Klein

Geological observations, data and measurements shows that throughout the last 600 million years, global temperatures changed independently of changes in CO2 content. Similar geological analysis of

the Antarctic Vostok Ice Core shows that during the past 400,000 years increases in temperature occurred ~1,000 years prior to measured increases in CO2. Past temperature cycles show that climate always recovered from extremes. Evidence for "Tipping Points" and runaway "scenarios" is absent from the geological record, even though CO2 content was unusually high during certain past geological periods. Recent geological research demonstrated also that Pacific Ocean coral reef growth keeps pace with rising sea level; thus barrier and fringing reefs likely can protect islands and island nations from flooding during sea level rise. Additional factors contributing to relative sea level change include island thermal subsidence, tectonic uplift, and hydro-isostasy. Mitigation by land-raising is a plausible solution to potentially threatened islands.

EMERALD BALLROOM

Bamboozled: Guam's Battle with Invasive Bamboo.

Anna Simeon

The invasive bamboo *Bambusa vulgaris* is widespread on Guam and outcompetes native vegetation, leaving large areas of rootless soil vulnerable to erosion. Heavy rain events cause the Geus River in Merizo to cut into these bare areas, toppling bamboo stands which dam up and cause streambank erosion, flooding, and property damage.

This presentation introduces a bamboo removal pilot project currently underway in the Geus watershed designed to determine the cost of killing bamboo stands through manual removal and herbicide application. Through community and local partner collaboration, the project will expand to other areas of the watershed, removing bamboo in key areas that cause the most environmental and residential problems. Ultimately, these areas will be replanted with native species, restoring the forests and preventing sediment from entering the river.

We will also discuss ideas for potential bamboo-related industries and projects, as well as opportunities for collaboration.

Fananom Gihaya: Native Plant Propagation mini-workshop.

Adrienne Loerzel

Restoration practitioners have identified the lack of a consistent, reliable source of native plant materials as one challenge in both agency-led and community-driven watershed projects. Because healthy forests are integral to coastal and coral health, NOAA's Coral Reef Conservation Program is investing in native plant propagation efforts to build local capacity for watershed restoration. This mini-workshop will introduce the use of Guam species in restoration work, and provide materials and supplies for participants to learn some of the mechanics of native plant propagation.

Preserving Guam Rare Native Plants through a Plant Extinction Prevention (PEP) Program.

Ron Edzel Manzano, Jonathan K. Davis, Mario Martinez, John Horeg, Gregorio Borja, III; Mari Marutani and James McConnell.

Plant endemism occurs in island communities because of biological, climatic, and physical barriers. Due to the recent changes in climate and the introduction of invasive species, native plants are now at risk of extinction, which would change Guam's landscape and threaten its biodiversity. To prevent the loss of native plants, the Guam Plant Extinction Prevention Program (GPEPP) was established to set up new populations of rare native plant species throughout Guam. This is accomplished through the following tasks: surveying and monitoring, propagule collection, seed storage, tissue culture, propagation in the rare plant nursery, and out-planting. GPEPP also works with private land owners and local agencies, such as the US Fish and Wildlife Services, the US National Park Service, the Guam Forestry Division, and the Department of Defense, to raise awareness and to help our people realize the connection of these native plants to our culture.

CHARLOTTE 1

Feeding "Wastelage" to Pigs.

Hauhout Diambra-Odi, PhD, Mari Marutani, Ph.D., and Manuel Duguies, DVM

A total of twenty-four piglets weaned at one month of age were used in a trial to assess the feeding value of food waste processed by anaerobic fermentation, similar to silage making. Piglets were distributed in four pens with six subjects per pen, and assigned to two treatments ((1) control with commercial pig grower and (2) experimental with "wastelage") with two replicates each. Average daily feed intake (g/pig/day), average daily weight gain (g/pig) and feed conversion were recorded for six weeks. The experimental feed was analyzed for moisture content, protein, fat and fiber. Results indicated a significant lower dry matter intake with experimental feed resulting to a slower weight gain, but an improved feed conversion, although not significant, when compared to a commercial ration. "Wastelage" may result in lower feed costs and increased productivity and sanitation for small-scale pig operations in Pacific island environments.

Protecting Honey Bee Pollinators for "Tropical Agriculture on Kaua'i"

Georgeanne Purvinis, Francis Takahashi, Robert Spencer, Lauren Rusert, Noelani Waters.

Approximately one third of all the food we eat is directly or indirectly derived from honey bee pollination. However, since 2006, honey bees colonies have been dying at a rate of about 30 percent per year with contributing factors being parasites, diseases, loss of foraging area, pesticides, and poor beekeeping

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BREAKOUT SESSION B (CONT.) | 2:15 P.M. TO 3:15 P.M.

practices. Varroa mite is the parasite with the most harmful economic impact on the beekeeping industry. The mites were discovered on Oahu in 2007 and Big Island in 2008. That year, Oahu reported colony losses from 419 colonies down to 274, seriously damaging crop productivity. The island of Kaua'i is one of the last places on earth where the honey bees are still free from the Varroa destructor mite. This talk explains the strategies and efforts that Kaua'i's college, the state government, and the community beekeepers are implementing in order to both prevent and prepare for potentially catastrophic mite infestation.

CHARLOTTE 2

Campus sustainability planning: the role of universities and community colleges in implementing and modeling sustainable practices.

Christian Palmer

Universities and community colleges should lead their communities in the transition towards sustainability in energy production, climate change, land and resource management, technical innovations, policy changes, and the valorization of cultural knowledge. As part of a larger University of Hawaii initiative, Windward Community College has been working in a number of these areas to develop a cohesive sustainability

plan that will guide the diverse efforts ongoing on campus. This workshop briefly summarizes the efforts at Windward Community College and then works with other Universities to begin to develop a framework to create their own sustainability plans. The workshop will allow space for universities to share best practices across campuses and to create innovative ways that campus initiatives can be magnified and impact the larger communities in which they reside.

Participatory mapping in the Pacific Region.

Kalisi Mausio

Participatory GIS (PGIS) is a form of mapping that is increasingly utilized in the field of coastal and natural resource management. It involves communities and fosters discussion and collaboration among stakeholders. It is a tool that captures spatial information at the local level, often from underrepresented groups, to aid with decision making and planning. The e National Oceanic and Atmospheric Administration's Office for Coastal Management (NOAA OCM) uses PGIS in coastal management projects in the Pacific Islands Region. These projects include the mapping of cultural knowledge for lo'i (taro plots) management, and wetland and fishpond restoration; the mapping of ocean uses for marine spatial planning and associated

projects such renewable energy siting, fisheries and harbor management, and tourism; and the capturing of ideas around place-based features to assist planning for natural disaster events. The talk will also touch on some of the technical aspects of the software and hardware used, and strategies involved with engaging coastal communities in a PGIS workshop format.

Use of sustainable methods for municipal wastewater treatment and reuse of excess sludge on the island of Yap.

Joseph D. Rouse – UOG WERI

On the island of Yap in the Federated States of Micronesia, the municipal sewage treatment plant provides only primary treatment prior to effluent discharge into the bay near the population center. Furthermore, the excess sludge from the plant is used without prior treatment to enhance crop production for the local population. A pilot test was conducted to assess the use of an attached-growth process to retain beneficial biomass and improve wastewater treatment efficiency. In addition, a composting pilot test was implemented to assess the adequacy of this natural technology to allow for reuse of the nutrients in the sludge. Results demonstrated that improvements to water quality and reuse of sludge in a safe manner can be achieved using practical and inexpensive technologies, thus reducing risks to public health while enhancing the environmental sustainability of the island.

CHARLOTTE 3

Reducing Student Food Waste in the K-12 Environment.

Wendi Shafir

Learn best practices to maximize the amount of healthy food students eat while identifying sources of wasted food and reducing them. The session will include an overview of the Food Recovery Hierarchy including source reduction, donation, feeding animals, industrial uses and composting; EPA's Food Recovery Challenge; an introduction to performing a food waste assessment complete with a guidance document and forms; tips and techniques for reducing wasted food; and a fact sheet on the best resources available. All material conforms to United States Department of Agriculture, Food and Nutrition Service Guidance for the School Breakfast and Lunch programs.

"K-12 schools have a special role in not only reducing, recovering, and recycling food waste on their premises, but also in educating the next generation about recovering wholesome excess food for donation and about reducing food waste to conserve natural resources." (From the USDA website)

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WEDNESDAY, APRIL 13 | MAIN CONFERENCE

BREAKOUT SESSION C | 4:30 P.M. TO 5:30 P.M.

CRYSTAL BALLROOM

Joint Region Marianas Integrated Natural Resource Management Plan

Mark Bonsavage, Environmental Business Line Coordinator, NAVFAC Marianas Joint Region Marianas, J45

The Joint Region Marianas (JRM) Integrated Natural Resources Management Plan (INRMP) is a guide for management and stewardship of all natural resources on JRM managed lands, while ensuring the successful accomplishment of the military mission. We use ecosystem management because the mission of JRM is linked to local, regional, and global ecological integrity. Sustaining ecosystem integrity is also the best way to protect biodiversity, ensure sustainable use, and minimize the effort and cost of management. Ecosystem level projects that we are working on are designed to help reach the long term goal of restoring native forests and contribute to the recovery of federally threatened and endangered species.

Communicating Climate Change Scenarios, Uncertainty, and Impacts in Alaska.

Kristin Timm – Science Communications Lead, Scenarios Network for Alaska and Arctic Planning, University of Alaska, Fairbanks

There is agreement among practitioners and the literature alike—climate change can be a challenging subject to communicate. Nonetheless, effective communication is urgently needed to engage, inform and support communities and decision-makers in their efforts to respond to and plan for the impacts of climate change. The Scenarios Network for Alaska and Arctic Planning (SNAP) at the University of Alaska Fairbanks facilitates climate change planning for a wide variety of audiences. Individuals can use SNAP's online data tools to

visualize past climate patterns and modeled projections for the future. SNAP also works with agencies and communities to develop scenarios and synthesis products of climate information. This talk will describe some of SNAP's communication efforts to engage diverse audiences with climate information in Alaska. This session will be useful for science communicators, climate services practitioners, researchers and program managers looking for ideas and discussion related to climate change communication and planning.

EMERALD BALLROOM

Culture and Sustainable Development in Micronesia.

Larry Gamboa, Manny Hechanova, Kristina Sayma, Zeny Asuncion-Nace, Gerry Perez

In 2015, the University of Alaska Fairbanks (UAF) and the University of Guam (UOG) embarked on a Ph.D. partnership to develop the island's next set of professional research resources in select topical areas. One strength of the interdisciplinary Ph.D. program is the formation of a strong dissertation committee of faculty from diverse backgrounds to guide the research process. The first cohort of the Interdisciplinary Ph.D. program includes members from varied professions, whose paths met at the cross-current of a desire to learn, develop, and contribute and whose research interests share a common theme – culture. Cohort 1 steps forward to share their research and its importance to island sustainability. Research topics include cross cultural transparency and accountability; indigenous leadership, culture, and globalization; data science, cultural education practices, and educational administration; cultural tourism and rural economic development; and culture, health, literacy, and health behavior.

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WEDNESDAY, APRIL 13 | MAIN CONFERENCE

BREAKOUT SESSION C (CONT.) | 4:30 P.M. TO 5:30 P.M.

CHARLOTTE 1

Navigators from Yap - present our collaborative effort for canoe sailing and sail weaving

Climate Change, Social Work, and the Future of the Human Race: Implications for Policy and Practice.

Craig Burns

This workshop begins with an introduction to several key practice areas of social work: systems theory and ecological practice, indigenization of practice, person-in/as-environment, the use of genograms and ecomaps, and the concept of historical and multi-generational trauma. It will then move into a discussion of the use of practical social work assessment tools to create a framework to visualize and contextualize environmental problems. Following the lecture portion (approximately 45 minutes), participants will be invited to participate in a practical analysis of a real-world, climate-change-related situation relevant to our region. This includes identifying elements of the ecological and systemic framework of the problem. As part of this analysis, participants will learn how to use the introduced tools (ecomap and genogram) to create a more holistic understanding of the situation. We finish by contextualizing the problem in a global framework with a discussion of potential approaches to practical solutions.

The Earth is my Mother and Sister: Pope Francis and the Pacific in Solidarity for Environmental Care.

Dr. Curtis Riggsby – Associate Professor of Philosophy/ Coordinator of East-Asian Studies, University of Guam CLASS.

In May 2015, Pope Francis issued his second encyclical letter *Laudato si'* as an appeal for "swift and unified global action" toward care for the environment and its sustainable use. Because Pope Francis's immediate audience is the Catholic Church, his appeal should be of special interest to Guam's largely Christian population. However, the encyclical's aim is markedly universal: "to enter into dialogue with all people about our common home." This presentation for UOG's 2016 Sustainability Conference summarizes the main points of *Laudato si'*, offering reflections on its special meaning for Guam. Noting with Pope Francis the ways that the Catholic heritage itself affirms responsible care of our environment, this presentation also offers reflections upon how environmental care is promoted by Christianity's Hebraic heritage, ancient Chamoru lore, and the worldviews of Pacific peoples in general.

CHARLOTTE 2

POSTER PRESENTATIONS

CHARLOTTE 3

A Humanities Lens on the Environment: Local Activism, Karabao, and an Apocalypse.

Manny Cruz (graduate student MA English) "1 A' ADAHL: The Ecology of Chamorro Activism"

Based on scholarly research and interviews with local activists, advocates, and scientists, this research paper seeks to affirm a thesis that Guam-based environmental activism and Chamorro political activism are inseparable. Before taking on this assignment, the researcher aggressively sought to find clear distinctions between contemporary Chamorro activism and Western models of environmentalism. After conducting first-person observation at the Tumon culvert protest, the writer concluded that a gap exists between environmental activism and political activism on Guam, but only that we have yet to see an environmental non-government organization (NGO) take a stand against the agents of structural development in the same way that groups like Our Islands are Sacred and We are Guåhan continue to stand against agents of militarization. This talk will conclude with the researchers arguments that what is lacking is the presence of an NGO environmental activism group that employs Chamorro language and cultural symbols tactfully and intentionally to take on their opposition.

Dr. Andrea Sant Hartig (Division of English): "Karabao, Culture, and Militarism"

Guam has the rare and unique privilege of having a wild water buffalo population. This population of karabao (carabao) currently resides on land of which the U.S. military has primary control. This project includes an investigation into the current state of the wild karabao herds of Guam and the US Military's stewardship of this culturally significant animal. This project asks the following questions: What is the cultural significance of the karabao to the island of Guam and to the Chamorro people? How has the wild water buffalo herd fared under the stewardship of the US Military? What does the future relationship between karabao and US Military look like with the buildup pending? What role can tourism, local attitudes, and scholarly interest play in the protection of this unique animal population? Is such a goal, a sustainable wild karabao population, even desirable or possible?

Marie Auyong (UOG Sea Grant): "Environmental Literacy: Developing Personal Connections for a Broader Construction of Conservation"

Science writing for a general audience about Pacific Island environments tends to invoke tropes of catastrophe, exoticism, adventure, fiscal irresponsibility, and native people (mis)handling nature. However problematic the narratives, texts such as Carl Safina's *Song for the Blue Ocean* create significant

opportunities for analysis and reflection on: 1) The dialogue between global conservation movements and environmental justice frameworks, and 2) The utility of localized scientific observation in cultivating personal connections to our natural surroundings. It is through the latter action that the global conservation movement's ostensible concept and objectives may address and perhaps inspire future advocates.

Sustainability.

Semesa Senikuraciri

Solar panels can provide the power necessary to pump abundant quantities of water from a well that is more than 100 feet deep, all without noise or the use of fossil fuels. The sustainable technology innovation wave is only just building. Improvements in resource productivity in energy, land, water and materials – based on better deployment of current innovative technologies – could meet up to 30% of total 2030 demand, with 70% to 85% of these opportunities occurring in developing countries. Importance of oceans, comprising 72% of the Earth's surface, constitute a major part of the planet that supports life, drives the climate and hydrological cycles and provides vital resources. As noted oceans, seas, islands and coastal areas form an integrated and essential component of the Earth's ecosystem and are critical for global food security and for sustainable economic prosperity and the well-being of many national economies, particularly in developing countries.

KEYNOTE SPEAKER

8:45 A.M.

CRYSTAL BALLROOM

Lisa Murkowski

U.S. Senator, AK

Senator Lisa Murkowski is the first Alaskan-born Senator and only the sixth United States Senator to serve the state. The state's senior Senator, Lisa Murkowski is a third-generation Alaskan, born in Ketchikan and raised in towns across the state: Wrangell, Juneau, Fairbanks and Anchorage. Since joining the Senate in 2002, Senator Murkowski has been a strong advocate for Alaska on the important issues facing the state, including energy, health care, education, military/veterans' affairs and infrastructure development.

Only the 32nd female to serve in the United States Senate since its founding in 1789, Senator Murkowski has assumed leadership roles quickly. She is the Chairman of the Senate Energy and Natural Resources Committee and also serves on the Senate Appropriations Committee, where she is the Chairman of the Interior and Environment Subcommittee. Senator Murkowski is a member of the Senate Health, Education, Labor and Pensions Committee – the first Alaskan to serve on that panel – and also is a senior member of the Senate Indian Affairs Committee.

She earned a B.A. in economics from Georgetown University in 1980 and a law degree from Willamette University in 1985. Prior to her appointment to the United States Senate, Senator Murkowski practiced commercial law in Anchorage and served three terms in the Alaska State House of Representatives. She was elected to a full six-year U.S. Senate term in 2004, and was re-elected in 2010 in a historic write-in campaign, the first successful write-in effort to the Senate since 1954.



PLENARY SPEAKER

9:00 A.M.

CRYSTAL BALLROOM

CAPT Stephanie M. Jones

Commanding Officer, NAVFAC Marianas

Captain Jones grew up in Annandale, Virginia. She graduated from Virginia Tech with a Bachelor of Science in Industrial Engineering and received her commission through the Naval Reserve Officer Training Corps program. She holds a Master's Degree in Civil Engineering from Texas A&M, a Master's Degree in Economics from the University of Oklahoma and is a graduate of The Executive Program from the University of Virginia, Darden School of Business.

Captain Jones is qualified as a Seabee Combat Warfare Officer, a registered Professional Engineer in the Commonwealth of Virginia, a member of the Defense Acquisition Corps (Level III) and a Certified Energy Manager.

Her personnel decorations include the Legion of Merit, Bronze Star, Meritorious Service Medal (four awards), Navy Commendation Medal (five awards), Navy and Marine Corps Achievement Medal and other unit and service awards.



LUNCHEON SPEAKER

11:30 A.M.

CRYSTAL BALLROOM

Rory J. Respicio

Sentator, 33rd Guam Legislature

Rory J. Respicio is a senator of the 32nd Guam Legislature and currently serves as the Majority Leader and Chairperson of the Committee on Rules; Federal, Foreign & Micronesia Affairs; Human & Natural Resources, and Election Reform. Senator Respicio has served in the 27th, 28th, 29th, 30th, 31st, 32nd and 33rd Guam Legislatures and has had a number of his bills become law, including the establishment of the Office of Finance and Budget and the creation of the Guam First Commission which brings all the various interests in Guam together to speak with one voice concerning the military buildup. Senator Respicio earned a Bachelor of Science degree in Government & Politics with a minor in English/Business & Management from University of Maryland University College.



THURSDAY, APRIL 14 | MAIN CONFERENCE

BREAKOUT SESSION D | 1:00 P.M. TO 2:00 P.M.

CRYSTAL BALLROOM

Home is where the Waves are: Corals in Guam's Exposed Reef Fronts Are Resilient to Local Stressors but Vulnerable to Regional Warming.

David Burdick, Peter Houk, Travis Reynolds, Valerie Brown and Laurie Raymundo.

High coral cover and diversity are typical of Guam's wave-exposed reef-front habitat. This is in contrast to deeper coral communities that have experienced significant declines in cover associated with *Acanthaster planci* outbreaks. Regular exposure to moderate wave energy may mitigate the effect of some stressors, but few data have been available to empirically test this claim. Using data collected at 45 shallow (5 m) sites during a major bleaching event in 2013, Guam's reef front communities were characterized and assessed for bleaching prevalence. These communities generally exhibited high coral and crustose coralline algae cover and low macroalgae and cyanobacteria cover. The stress-sensitive genera *Acropora* and *Montipora* were in greater abundance along exposed coasts, while the stress-tolerant genera *Porites* and *Leptoria* were more abundant along leeward coasts. In comparison, deeper (15 m) communities assessed during NOAA PIFSC towed-diver surveys in 2011 were homogeneous around the island, with low coral and crustose coralline algae cover and higher cyanobacteria and macroalgal cover. While reef front communities appear to be more resilient to local-scale stressors, bleaching prevalence data indicated they were highly impacted by a regional warming event. The substantial number of taxa shared between reef front and lower slope coral communities suggests that the reef front may serve as refugia for some species. However, the vulnerability of reef front communities to thermal stress may diminish their future ability to provide suitable refugia and aid in recovery of Guam's deeper communities.

Floating Ideas: Communicating forecasts and risks of coastal flooding.

Philip Thompson

Coastal flooding presents a serious threat to the communities and habitats of the Pacific Islands. The frequency and magnitude of these events vary substantially from location to location and season to season depending on a variety of factors. In addition, global climate change may increase the frequency and/or severity of coastal flooding events during the 21st century due to sea level rise and changes in Pacific wave climate. Research groups from around the Pacific are working to understand why and when flooding and erosion events occur, but there is a need for scientists to engage those working within Pacific Island communities to communicate present and future risk in light of a changing climate. This panel provides an opportunity for scientists, managers, and community members to talk about what types of information are needed and how this information can best be communicated to drive effective policy and decision-making.

EMERALD BALLROOM

Here be dragons – a case study in urban agricultural gardening.

John M.U. Jocson – Associate Professor, Guam Community College

While Guam's limited land mass and other challenges make it difficult for many people to engage in full-time farming, families and individuals can still grow a substantial portion of their food needs. Dragon fruit is one example of a crop that is exceptionally well-suited to gardening in small or difficult spaces. The fruit, which commands local retail prices of \$8 per pound and occasionally higher, is in high demand on Guam and is currently grown by several commercial operations. Families can grow their own dragon fruit by understanding the needs of this epiphytic cactus, which is readily available on Guam.

Vegetative Guide Dashboard: Relating Atoll Agroforestry Recommendations to Predicted Climate and Sea Level Conditions in the Marshall Islands.

Harley I. Manner, Maria Haws, Kathleen S. Friday, Lajkit Rufus and Karl Fellenius

The progress and outcomes of this USGS Climate Science Center-funded project are presented. Proposed by the Pacific Aquaculture and Coastal Resources Center at the University of Hawaii- Hilo and awarded in late 2014, the project is designed to provide information to agricultural stakeholders in the Marshall Islands on the expected impacts of climate change and weather as a basis for short- and long-term decision making so that Marshall Islanders will be better able to adapt their agriculture and shoreline preservation practices to the predicted climate and sea level conditions of their islands. A partial listing of project's tasks includes: Compilation and assessment of available information from the literature and Marshallese sources about current agroforest and cropping practices, data, and information needs; shoreline protection initiatives and species relevant to preservation of agricultural resources; recommendations for sustainable agroforestry; and development of a web-based Vegetative Guide & Dashboard for the Marshall Islands.

It takes an island: Bridging the gaps on the farm.

Melanie Mendiola

In 2013, Farm to Table Guam was awarded a grant by the Administration for Native Americans to grow the agricultural economy of the island. Designed around data gathered in 2012 wherein farmers were interviewed regarding challenges to developing their businesses, Farm to Table Guam launched a project entitled "Tanom, Fatinas, Yan Sustansia" which means "Plant, Prepare, and Sustain" in Chamorro. The presentation will focus on the following conference topics: technical innovation for sustainable production and consumption and leadership for sustainable development. There is a focus on Community Partner Development and Outreach, Innovations in the Tropical Farm Business Model, and developing projects like this in your community.

Data presented will involve photo exhibits of the project, interview data gathered, and examples of client stories.

CHARLOTTE 1

Students as Stakeholders in the Curriculum.

Dr. Krista Hiser

Using focus-group methodology, students at Kapi'olani Community College in Honolulu, Hawaii were interviewed about their knowledge, behaviors, and attitudes towards energy, climate change, biodiversity, and how these and other topics related to sustainability are appearing in the classroom. Review of the literature suggests that curricular transformation to teach sustainability is slower than we think, and that poorly scaffolded sustainability topics result in cognitive dissonance with negative impacts on learning. Results of this study informed the college's Sustainability Designation, a rubric for integrating sustainability across the curriculum based on AASHE stars criteria and core concepts of sustainability. Participants in this engaging workshop will a) understand the theoretical framework of the endeavor, b) the process and results, c) Kapi'olani's successes and challenges in transforming curriculum through Sustainability. After a brief framing presentation, participants will engage in a mock-intake to experience the interdisciplinary curricular potential of the S Designation rubric.

CHARLOTTE 2

Playing by the Rules: Mobile GIS and Permit Enforcement in the Field.

Mark Stewart

The CNMI Bureau of Environmental and Coastal Quality (BECQ) is responsible for enforcing rules that regulate development and activity that can impact the coastal management zone. One of the challenges for the BECQ Enforcement team has been tracking the location and descriptive characteristics of permit violations and other incidents that threaten the islands' environmental quality. In late 2015, the Enforcement team implemented a map-based field data collection app that allows them to capture where violations occur, describe what they are and even include photographs. The data collected in the field is uploaded to the department's online GIS database, allowing staff to better assess impacts, visualize patterns and more efficiently enforce regulations. This case study will describe the field data collection app, the team's workflow and the challenges and limitations they have experienced with the new system.

Anthropogenic Stressors and the Way of Protecting the Environment from them via Community Driven Action.

Mohammad H. Golabi

Accelerated sedimentation from the unprotected watershed of southern Guam is a growing economic and environmental concern for the island. When soil is disturbed sediments are moved by water and wind into rivers that empty into the ocean. The reefs located near the mouths of these rivers are smothered by the settling sediments, killing microbial organisms, and making our reefs uninhabitable. However, watersheds are by design dynamic and adaptable to change. The natural results of such adaptations are more often incompatible with human land use. Human activity such as the use of off road vehicles, frequent hiking from unprotect upland areas, clear cutting, etc., however often has a strong impact on watershed dynamics in one form or another. One factor that can aid in the preservation and increase of habitats

(Continued on next page.)

THURSDAY, APRIL 14 | MAIN CONFERENCE

BREAKOUT SESSION D (CONT.) | 1:00 P.M. TO 2:00 P.M.

through the re-vegetation or reforestation of watershed systems that have become barren are not only actions upon the watershed itself, but on the human impact on such systems. Such changes to human activity may include education of the public on the natural resources, but reaches deeper into the need to instill a conscious effort to reduce negative impacts on the environment and promote community driven actions to improve the environment. This education of the community includes the collection of information available about nearby watershed systems and the ability to describe the improvements that preservation efforts are making. For this purpose, we have developed a topographical model of the island of Guam in which watershed features as well as limestone landscape of southern and northern Guam are presented in a small scale model at the UOG campus. The model is surrounded by a moat representing the ocean and it is also equipped with rainfall simulators for creating local, as well as island-wide rainfalls with control time lapse for simulating the island's rainfall patterns. Also, a number of toy size off-road vehicles are being introduced to certain areas where unprotected soil is disturbed and made susceptible to soil erosion and sedimentation. In this educational model, runoff is being directed to streams and rivers which carry the sediments straight to the ocean presenting murky water at the shorelines in order to demonstrate the immediate impact of disturbances (i.e. off-roading) on the watershed and consequences on the ocean water. The model as well as the impact of the demonstration will be presented in this lecture.

Case Study: A Reef Flat Community Inventory of the Manell-Geus Habitat Blueprint Area.

Laurie Raymundo

The Manell-Geus watersheds of southwestern Guam were selected as the eighth focus area within NOAA's Habitat Blueprint Program. Prior to developing management strategies to address anthropogenic threats and increase productivity of this area, it was deemed necessary to undertake an assessment of the current status of habitats and communities lying within it. This presentation describes efforts to map and quantify communities within the inclusive shallow reef flat zone and Cocos Lagoon. Communities include mangrove stands, seagrass beds and coral patch reefs. To date, both seagrass beds and mangroves have been described and mapped and initial results are presented here. Future planned work, to be undertaken in May 2016, will complete the inventories of coral patch reefs and undertake an assessment of current rates of sedimentation and nutrient enrichment from the major rivers. These results will be used to inform and identify possible management strategies to reduce impact from these stressors.

CHARLOTTE 3

Going from Hot to Not - Using Geothermal and Solar Energy for Refrigeration.

Gwen Holdmann (Director, Alaska Center for Energy and Power)

Ms. Holdmann's presentation will discuss the use of heat recovered from power plant cooling systems and other hot water sources as a resource to make ice and provide refrigeration services, with applications to food preservation and enabling local commerce. She will discuss the integration of commercially available absorption refrigeration system systems with locally available thermal energy resources, based on first-hand experience at Chena Hot Springs Resort and laboratory / field testing of community-scale systems integrated with diesel power plants.

Win-Win Technology Commercialization and Knowledge Sharing Partnerships.

George Roe (Adjunct Research Professor, Alaska Center for Energy and Power)

Mr. Roe will discuss two ongoing programs (the Alaska Center for Microgrid Technologies Commercialization, and the Arctic Remote Energy Networks Academy) that focus on energy systems that meet the needs of communities who depend on local energy networks in remote and challenging environments, isolated from larger regional energy grids. He will highlight the genuine opportunities for Guam and other Pacific Island communities to impact these programs via inclusion of their requirements and application priorities, and participation in these programs' collaboration networks.




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THURSDAY, APRIL 14 | MAIN CONFERENCE

BREAKOUT SESSION E | 2:15 P.M. TO 2:00 P.M.

CRYSTAL BALLROOM

Achieving Maximum Value from Variable Resources.

Richard Wies, Jr, PhD (Associate Professor, Electrical Engineering)

Dr. Wies will discuss strategies for achieving high contribution of renewable energy resources in the microgrids typical of rural settings in Alaska and many island communities around the world. Using wind – diesel hybrid energy systems as his frame of reference, and comparing key characteristics of solar and wind energy, he will identify the challenges that can be imposed by variable energy supplies. He will then review some of the approaches that can be used to address these renewable resources and achieve maximum reduction in diesel fuel dependence.

Advanced Energy Initiatives – Sharing Alaska Experience Globally.

Christopher Pike (Research Associated, Alaska Center for Energy & Power)

Mr. Pike will review highlights from community implementations of various advanced energy technologies funded by Alaska's Emerging Energy Technology Fund, with special attention to topics applicable in both the arctic and the tropics – solar photovoltaic panels, seawater heat pumps for heating and/or cooling, and hydrokinetics. In addition, he will address the energy system performance data collection and analysis as a means of extending experience in one setting to enable multi-community technology transitions.

EMERALD BALLROOM

Energy Disaster Planning and Recovery: A Multi-Sector Approach.

Misty Conrad

Disasters are increasing due to climate change. This session will discuss how energy is intertwined with climate change and the importance of a multi-sector planning approach.

Implementing Energy Projects in the Pacific: Overcoming Challenges Faced by Developers.

Erik Ness

Projects fail for a variety of reasons, most of which can be avoided with sufficient up-front planning. This session outlines the steps you can take to help ensure project success.

CHARLOTTE 1

New approaches for sustainable development and policy making in Micronesia.

Else Demeulenaere, Grace Donaldson, Fermina Sablan, Massoud Timour

In 2015, the University of Alaska Fairbanks (UAF) and the University of Guam (UOG) embarked on a Ph.D. partnership to develop the island's next set of professional research resources in select topical areas. One strength of the interdisciplinary Ph.D. program is the formation of a strong dissertation committee of faculty from diverse backgrounds to guide the research process. The first cohort of the Interdisciplinary Ph.D. program includes members from varied professions, whose paths met at the cross-current of a desire to learn, develop, and contribute and whose research interests share a common theme – policy. UAF-UOG Cohort 1 steps forward to share their research interests and its importance to island sustainability. Proposed research topics include integrating plant conservation genetics and biocultural diversity to promote policies for island sustainability; policy implications of China's support of FSM students; policy and language restoration and revitalization; policy implications for Federal Student Aid (Title IV) at the University of Guam, and sustainable water resource engineering and management.

CHARLOTTE 2

POSTER PRESENTATIONS

CHARLOTTE 3

Restoring Degraded Lands and Improving Livelihoods of Environmental Migrants through Agroforestry – A case Study from Yap.

Murukesan Krishnapillai

For climate change-induced and climate change-forced displaced atoll populations living in environmentally fragile locations on Yap Island, land-based action is one of the vital adaptation pathways for climate resilience and food security. Adaptation measures driven by the land using simple and affordable traditional methods can stop, and even reverse land degradation. This is primarily achieved through restoration of degraded lands by utilizing sustainable volcanic soil management practices and sustainable production intensification through mosaic restoration approaches and agroforestry practices. Agroforestry is a climate-smart production system that sustainably diversifies environmental, ecological and socioeconomic benefits of subsistence farmers. The diversity benefits of agroforestry based food production system increases smallholders' resilience during environmental extremes and climate variability. Drawing on a case study from Yap Island, this paper examines the versatile role of mosaic restoration efforts in re-greening a degraded landscape that brings fresh promise to a group of environmental migrants.



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POSTER PRESENTATIONS

Community Food System Planning.

Peter Barcinas, Tony Ada, & Victoria Santos

Community Food System Planning provides for a thematic organization of the multi-disciplinary food system issues and references and assets defining Guam's food situation. This food system map attempts to capture the local food system processes and activities or simply visualizing from production source to final consumption of food and managing of food waste. This presentation attempts to refine appropriate references of Guam's natural capital metrics and indicators themed to the interconnectedness of how our island community relates to the food system. Given Guam's high dependence on imported food commodities, increasing interest on self-reliance strategies food system planning appears to now have a high place under sustainability and begins with an all fronts planning approach.

GIS on Guam and the Region.

Cassandra-Jay Flores

This poster will cover results from an online survey which was given to Geographic Information Systems (GIS) users from Guam and the region. The survey focused on geospatial data and training needs of the participants.

Green Restaurants.

Hanna Jugo

My specific project question centers on the concept of green restaurants, which are establishments that meet certain criteria of sustainable practices in the areas of food waste, energy efficiency, water use, pollution, and use of materials. The goal of my research was to define and evaluate the kind of sustainable practices restaurants in Guam are implementing for their food waste. I surveyed around thirty restaurants to assess any sustainable practices that may or may not be set in place for food waste production and disposal. Results showed that majority of restaurants not only separated their food waste, but also utilized relationships with local pig farmers who used the food waste for animal feed. The data I collected can aid in further developing standards and procedures for restaurants specifically in Guam to promote greener practices among the restaurant industry.

Tasi Beach Guides Programs.

Phillip John R. Cruz, Enrika Espirtu

The Tasi Beach Guides Program is a coral reef outreach project hosted by the Center for Island Sustainability (CIS) through MOU with the Bureau of Statistics and Plans (BSP). The projects main objective is to build awareness of the importance of protecting Guam's coral reefs to the community through outreach. The UOG Green Interns, along with assistance from CIS and BSP staff, are conducting outreach to both local and tourist beachgoers at various beaches around Guam. Out-

reach is done by offering presentations explaining what coral is, why it benefits Guam, and ways we can protect it from recreational impacts, including littering, snorkeling, diving, reef walking, etc. This project is funded by the National Oceanic and Atmospheric Administration (NOAA) under federal award NA13NOS4820012.

Conservation: A Bond Between the Past and the Future.

Neola K. West, Palau Community College; Republic of Palau

Oceanic-wide, conservation has never been taken more seriously than the islands of Palau. It has one of the world's most diverse species of marine organisms and is known for its campaign and great efforts of conservation. Because conservation has always been part of culture and has successfully kept sustainability of marine resources, it's an ongoing campaign Palauans hope will influence other Pacific islands to take action as well. BUL is an example of cultural practice that has been implemented by Rubekul Belau or chiefs and elders of Palau to keep sustainability of marine resources. Palau is using a modern day practice of BUL that has been created and modified to ensure sustainability of marine resources for the present and economic and food security for the future. A more recent drive for conservation by the islanders is the Palau National Marine Sanctuary which is held together by BUL established in November 2015.

Are Guam's reefs being over-dived? A look at Guam's diver population and divers' effects on coral reefs.

Ashton Williams

As global climate change threatens coral reefs worldwide, reducing local stressors is our best tool to combat reef degradation. In low numbers, scuba divers are non-harmful to coral reefs—but when reefs are over-dived, they can suffer damages including breakages, disease, and abrasions to the fragile living tissue. Currently, no agency or organization tracks diving activity on Guam, and no research has been done to monitor the effects of divers on Guam's coral reefs. With the number of tourists expected to increase in coming years, managing divers will become more important than ever for protecting our reefs. This study aims to determine whether divers are affecting Guam's coral reefs, as well as describe the diver population and estimate the number of dives happening on Guam each year.

Preserving Guam Rare Native Plants through a Plant Extinction Prevention (PEP) Program.

Ron Edzel Manzano, Jonathan K. Davis, Mario Martinez, John Horeg, Gregorio Borja, III, Mari Marutani and James McConnell

Plant endemism occurs in island communities because of biological, climatic, and physical barriers. Due to the recent changes in climate and the introduction of inva-

sive species, native plants are now at risk of extinction, which would change Guam's landscape and threaten its biodiversity. To prevent the loss of native plants, the Guam Plant Extinction Prevention Program (GPEPP) was established to set up new populations of rare native plant species throughout Guam. This is accomplished through the following tasks: surveying and monitoring, propagule collection, seed storage, tissue culture, propagation in the rare plant nursery, and out-planting. GPEPP also works with private land owners and local agencies, such as the US Fish and Wildlife Services, the US National Park Service, the Guam Forestry Division, and the Department of Defense, to raise awareness and to help our people realize the connection of these native plants to our culture.

PREL (Pacific Resources for Education and Learning)

Pamela Legdesog

This poster session will include a table display of current PREL educator resources related to Climate Education and Water Education sponsored by PREL's Pacific Climate Education Partnership (PCEP) Program and PREL's Water For Life Program. Both programs are funded by the National Science Foundation.

Pacific Islands Climate Science Center (PICSC)

Romina King, Chandra Legdesog

The mission of the PICSC is to provide land managers in federal, state and local agencies access to the best science available in climate change and other landscape-scale stressors that are impacting the nation's natural and cultural resources. Located at the Center for Island Sustainability at the University of Guam, PICSC conducts climate science outreach and research to foster awareness of our islands' changing environment and to find solutions for societal and ecological challenges in Micronesia. PICSC strives to connect climate science and the communities/stakeholders who are most affected by climate science while exploring how these stakeholders perceive and understand climate change. PICSC empowers communities to find solution-oriented climate change adaptation strategies that increase resiliency and preparedness in an ever-changing environment.

Western Pacific Coral Reef Institute (WPCRI) Sponsored Research Projects

James Whippy

The Western Pacific Coral Reef Institute (WPCRI) is currently conducting outreach to convey its four completed sponsored research project findings to the broader community. The four completed sponsored research projects focusing on coral reef and fisheries sustainability were conducted in Palau, the CNMI, Pohnpei, and the Marshall Islands.

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