



## SPECIAL SECTION

INTERNATIONAL CONFERENCE ON  
UNDERWATER EDUCATION  
ICUE 2017  
LONG BEACH, CALIFORNIA - MAY 6 & 7  
*"DIVE SAFETY THROUGH EDUCATION"*



Dear NAUI Members and Friends,

I am honored to have been elected to the NAUI Board of Directors (2016-2019). My first assigned task was to look into bringing back the International Conference on Underwater Education (ICUE, or IQ). Considering that I knew nothing about the innovative and successful conference, I quickly educated myself by reading through a few of the proceedings that my predecessor (Dr. Robert Millott, NAUI 2445) left behind when he retired from the University of Florida, as well as the findings that *Sources* Editor-in-Chief Peter Oliver was able to provide. Past IQ events allowed NAUI members and divers from all over the world to meet in one location to exchange ideas about diving skills, new technology, dive safety and much more.

My research left me amazed at the history of ICUE — beginning in 1969 at Santa Ana College in California, running nearly every year until the late 1980s and sporadically thereafter, and concluding in Malaysia in July 2000. Typically, IQ would take place over three or four days and consist of various presentations, workshops, panel discussions and even film festivals. Whether you were a NAUI member or not, IQ was the event to attend! As the years passed, more dive-oriented trade shows were born, which increased the competition for our members' time and money. This, along with the fact that IQ was organized by different volunteers each year, brought about the end of the conference.

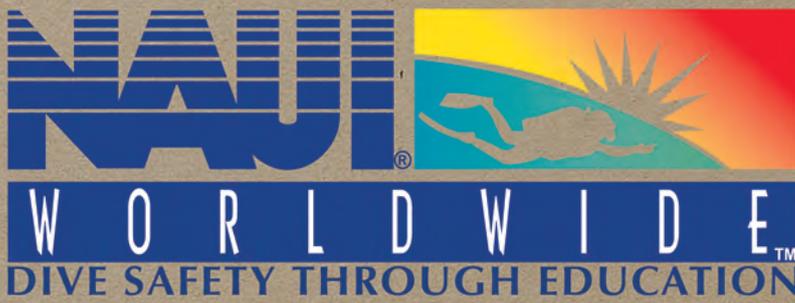
In 2016, the NAUI Board of Directors decided that it might be the right time to bring back IQ, and we decided that NAUI Worldwide would organize the event and venue each year. The first step was forming a subcommittee to brainstorm. After one year of discussions, teleconference calls, meetings, emails and hard work from the entire committee, we are thrilled to bring back the IQ. It was decided that the perfect way to showcase the all-new IQ was to hold it in conjunction with the 2017 Scuba Show in Long Beach, California, May 6-7.

IQ 2017 will kick off on Friday, May 5, with an IQ reception at 6:30 p.m. aboard the *Queen Mary*. On Saturday and Sunday, we have a diverse and exceptional lineup of speakers scheduled. We have also invited some of our IQ founders to be recognized during the reception and prior to the start of the seminars on Saturday morning. We do hope you will join us!

I would like to thank my committee members (Derik Crotts, Michael Feld, Erika Khalik, Barry Moore, Dave Ochs, Peter Oliver and Dan Orr) for all of their hard work and dedication.

We look forward to seeing you in Long Beach!

— Cheryl Thacker (NAUI 23525)  
NAUI Board of Directors, ICUE Committee Chair



On May 6, NAUI will get back to its southern California roots and relaunch its **International Conference on Underwater Education (ICUE or IQ)** in conjunction with the Scuba Show in Long Beach.

To commence the launch, NAUI will hold a reception aboard the **Queen Mary on Friday, May 5**. The reception is open to any and all who want the opportunity to mix and mingle and share engaging scuba stories with ICUE presenters and originators. [Register to attend at nau.org/about/icue/](http://nau.org/about/icue/).



# The Definition of Diving Since 1960



International Conference on Underwater Education

The IQ was conceived in 1968 in Southern California and grew in stature to be the largest traveling international conference of its type in the world, bringing together diving enthusiasts and professionals from across the industry.

Join us as NAUI carries on the IQ's legacy by presenting the latest findings and innovations in educational theory, scientific advancement, contemporary marketing and equipment improvements during the two days of seminars and the IQ proceedings published afterwards.

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# NAUI IQ Re-Emerges Alongside Scuba Show: Originators to Attend and Be Recognized

We are looking forward to the return of the International Conference on Underwater Education (ICUE, or IQ) and the opportunity to honor some of our NAUI leaders who established and grew this event, the first of its kind in the dive industry. The conference will take place May 6-7 in conjunction with the 2017 Scuba Show in Long Beach, California.

“The concept of ICUE is still relevant today. There are always opportunities for education and getting divers together to build community. Diving is a very social sport — that’s important. Social media and the internet connect us, but back in the day, you didn’t get to see everyone very often, but you would see them at the industry conferences where we created networks and shared ideas. ICUE created a forum to talk about, try out and argue crazy new ideas,” said Jeanne Sleeper (NAUI 2648), manager of IQ 6 through IQ 10.

ICUE’s primary purpose is to create a forum to present the latest advances and concepts in educational theory, diving skills, safety, physiology and dive medicine, equipment improvements, and marine science to divers and diving professionals from across the world. The relaunch will consist of two days of events and seminars held in conjunction with the Scuba Show, where attendance of over 10,000 is expected. For a complete list of ICUE speakers and topics, visit [nau.org/about/icue](http://nau.org/about/icue).

Organized by Larry Cushman (NAUI 206), Art Ullrich (NAUI 601), Glen Egstrom (NAUI 937) and John Reseck (NAUI 949), the first ICUE was held at Santa Ana College in Southern California in the late 1960s, and it grew to become one of the largest traveling international conferences of its type. The underlying goal of the conference was “making diving safer.” Each ICUE lasted several days and was filled with presentations and seminars, which were then published by NAUI as the IQ Proceedings. Following in this tradition, the 2017 IQ will have its proceedings and an event summary published as well.

“At that time, IQ was a platform for emerging industry leaders to be known and have other divers listen to their good ideas and move those ideas forward. These young 20-something presenters like Dallas Edmiston (NAUI 4099), Jeff Bozanic (NAUI 5334) and Dan Orr (NAUI 5612) have really done something for diving — some really high-level things. There is much we owe to them and so many others,” said Cheri Boone (NAUI 4851), who worked with Sleeper to execute several IQ events in the 1970s and early 1980s.

Along with a distinguished list of speakers, several conference originators and organizers will be in attendance and will be recognized for their contributions to ICUE and the diving industry as a whole: Art Ullrich (NAUI 601), Glen Egstrom (NAUI 937), John Reseck (NAUI 949), Jeanne Sleeper (NAUI 2648), Susan Bangasser (NAUI 3910), Cheri Boone (NAUI 4851) and Jennifer King (NAUI 6867), to name a few.

“Today, scuba is again in a period of great change,” said NAUI Executive Director Dallas Edmiston. “New challenges to maintaining and growing the popularity of our sport; changing methods and approaches to teaching and learning; new frontiers in diving technology and techniques, including the development and popularization of specialty diving fields; new marketing techniques; and the increased use of multimedia and digital platforms need the attention of all of us.”



NAUI invites all to attend a special evening reception on Friday, May 5, aboard the *Queen Mary* to celebrate the conference and recognize NAUI members who managed early IQ events. Invitations extend beyond ICUE attendees and offer guests the opportunity to network and mingle with presenters and NAUI leaders.

Reception reservations will automatically enter attendees in the ICUE Atlantis Dive Week Raffle. To register for the reception, visit [eventbrite.com/e/naui-icue-reception-tickets-31030988522](http://eventbrite.com/e/naui-icue-reception-tickets-31030988522). If you can't attend, you can still enter to win the seven-night dive vacation at either Atlantis Puerto Galera or Atlantis Dumaguete Dive Resorts & Liveaboards in the Philippines. This vacation includes deluxe accommodations, meals, unlimited boat diving and more. Enter the ICUE Atlantis Dive Week Raffle at [go.rallyup.com/naui-icue](http://go.rallyup.com/naui-icue). Entrants do not need to be present to win!

## SEMINAR SCHEDULE

### SATURDAY, MAY 6

8 AM  
Dallas Edmiston and  
Cheryl Thacker  
[Welcome and Schedule  
Review](#)

8:30 AM  
Gareth Lock  
[Why "Human Error" is  
a Poor Term if we are to  
Improve Diving Safety](#)

10 AM  
Capt. Michelle M. Thornton  
[Distress Beacons and  
SARSAT](#)

11 AM  
Pasi Lammi  
[Applying Principles of  
3-D Photogrammetry  
Underwater](#)

2 PM  
Jeffrey Bozanic  
[Rebreather Testing in  
Antarctica](#)

3 PM  
Oswaldo Del Cima, Ph.D.  
[Gas Diffusion Among  
Bubbles and the  
DCS Risks](#)

4 PM  
Thomas "Tec" Clark  
[Lead the Culture: Define,  
Apply and Lead the Culture  
You Want to Create](#)

### SUNDAY, MAY 7

8 AM  
Cheryl Thacker  
[Schedule Review](#)

8:30 AM  
Dan Orr  
[Diver Fatalities:  
Lessons Learned](#)

10 AM  
William K. Dolen, M.D.  
[Lionfish Venom:  
Cardiovascular,  
Neuromuscular, Cytotoxic  
and Immunologic Effects](#)

11 AM  
Amie Hufton  
[Just Add Water: Engaging  
College Students and Youth  
in Scuba Diving](#)

1 PM  
Michael A. Lang, Ph.D., and  
Karen B. Van Hoesen, M.D.  
[Amazing Polar Diving  
Adaptations: What, Why  
and How?](#)

2 PM  
Walter Chin  
[Artisanal Fisherman  
Divers of the Yucatan  
Peninsula](#)

3 PM  
Tim O'Leary and  
Bruce Wienke, Ph.D.  
[Two Decades of  
Deep-Stop Training](#)

4 PM  
Dallas Edmiston  
[Closing and Dive Trip  
Winner Announcement](#)

# SEMINAR SPEAKERS



**JEFFREY BOZANIC** is the president of Next Generation Services, where he provides consulting and training services in the diving market. Clients include rebreather manufacturers, training agencies and legal agencies. Bozanic has participated in or led more than 70 diving expeditions in the past 30 years, to places like Palau, the Canary Islands and Antarctica. He was certified as a NAUI Instructor in 1978 and is active in teaching cave diving, rebreather, nitrox, decompression and trimix diving courses. He has published extensively on diving education topics, with a heavy emphasis on diving safety. Bozanic has edited and reviewed many diving textbooks and is the author of *Mastering Rebreathers*. He has served on several boards of directors in the diving community, including as Chairman of the NSS-CDS, Vice Chairman of NAUI and Treasurer of the AAUS. In 2007, he was honored as the DAN/Rolux Diver of the Year, and in 2015, he was the recipient of the AAUS Conrad Limbaugh Award for Scientific Diving Leadership. He recently returned from diving and testing rebreathers at McMurdo Station, Antarctica.



**WALTER CHIN** has been the principal investigator on a number of studies related to diving and clinical research in hyperbaric medicine. His most recent work includes a survey of hyperbaric programs across the United States to determine access to 24/7 hyperbaric therapy nationwide, as well as a study on the efficacy of U.S. Navy treatment tables for recreational scuba divers. In Yucatan, Mexico, he and his co-principal investigator have collected more than five years of dive, capture and treatment data. They aim to reduce the incidence of decompression illness among artisanal diving fishermen in the Yucatan, where the disease has become an epidemic due to prevalent use of hookah dive systems. They are designing community-based interventions to reduce carbon monoxide poisoning and high-risk diving behavior among this fishing population. Chin has seven years of experience directing the UCLA Hyperbaric Department and now manages UCLA Radiation Oncology. He is the immediate past president of the Underwater Hyperbaric Medical Society Pacific Chapter.



**THOMAS "TEC" CLARK** has held elite positions in the dive industry, including Managing Director of the University of Florida's Academic Diving Program and National Director of the YMCA Scuba Program. He holds more than 40 professional certifications with more than 15 diving agencies. Clark has received numerous honors for his instructional abilities and has co-edited several diving texts. He has also appeared as a diving expert on A&E, The Learning Channel and Outdoor Life Network. Clark was captain of the U.S. freediving team and is the founder of Reef Ministries. He is the creator and host of scubaguru.com. He is also the host of the *League of Extraordinary Divers* podcast. Clark is Associate Director for Aquatics and Scuba Diving at Nova Southeastern University in Fort Lauderdale, Florida. He is married to his bride, Heather, and has two children.



**OSWALDO MONTEIRO DEL CIMA, Ph.D.**, was born in Rio de Janeiro, Brazil, on November 13, 1965. Del Cima is a Professor Doctor in the Department of Physics at the Federal University of Viçosa. In 2012, he created the department's Scientific Diving Unit, and since then, he has coordinated the unit's diving and scientific activities. He received a bachelor's degree (1989) in physics from

Federal University of Rio de Janeiro and a master's degree (1993) and doctorate (1996) in quantum field theory from the Brazilian Centre for Research in Physics. From 1997 to 1999, he was Assistant Research Scientist at the Institut für Theoretische Physik of the Technische Universität Wien in Austria. He has been freediving since the early 1990s, and he began scuba diving in 1985. In 2008, he became a NAUI Instructor (NAUI 48926).



**WILLIAM K. DOLEN, M.D.**, is Professor of Pediatrics and Internal Medicine at the Medical College of Georgia at Augusta University. He is Residency Program Director for allergy-immunology and Director of the Allergy-Immunology Laboratory. He is a past president of the Allergy, Asthma and Immunology Society of Georgia; the Southeastern Allergy, Asthma and Immunology Society; and the American College of Allergy, Asthma and Immunology. Dolen is a NAUI Master Scuba Diver. His favorite place to dive is the West Palm Beach area, but he also enjoys diving his local rivers and lakes as well as Mexico, Roatán and Bali.



**AMIE HUFTON** is Instructional Associate Professor at Texas A&M University at Galveston, where she has served as faculty in the scuba diving program since 2006. She has been diving since 2000 and has worked at the Neutral Buoyancy Lab at NASA. She has more than 15 years of experience in open-water lifeguarding and water safety. Hufton currently manages the academic minor in Diving Technology and Methods at the university, with a focus on recruiting a diverse student base and offering transformative learning experiences. Her interests include understanding proactive cultural development within organizations and developing leadership qualities in college-age students. Besides scuba, she also teaches the science of health and fitness, swimming, and team sports.



**PASI LAMMI** may be a cloud architect, but he spends most of his time below the surface. An avid mine and wreck diver, he is a member of several research groups that document wrecks in the cold, dark waters of the Baltic Sea. He is also an active NAUI Technical Instructor and the creator of the NAUI 3-D Photogrammetry specialty course.



**MICHAEL A. LANG, Ph.D.**, is a marine biologist, environmental physiologist, author and international lecturer. He is Co-Director of the University of California San Diego Center of Excellence in Diving and holds a research faculty appointment at UCSD Emergency Medicine. He is Senior Research Fellow at the Ocean Foundation and has served as director for nonprofit organizations including AAUS, DAN, UHMS and AUAS, and as expert consultant to the National Science Foundation, U.S. Coast Guard, U.S. Geological Survey, The Nature Conservancy and Conservation International. He is the former Marine Collector/Curator at San Diego State University, former Director of the Smithsonian Marine Science Network, former Smithsonian Scientific Diving Officer and former National Science Foundation Polar Diving Safety Officer. Lang holds a bachelor's degree in zoology from San Diego State University and a doctorate in environmental physiology from the Norwegian University of Science and Technology in Trondheim. He is fluent in five languages, has published more than 50 scientific papers and popular articles, and has presented more than 350 seminars and papers on



current marine science and diving topics. His honors include DAN/Rolux Diver of the Year, the U.S. Antarctica Service Medal, the NAUI Outstanding Instructor Award, the Smithsonian Special Act Award, the UHMS Craig Hoffmann Diving Award, the AAUS Conrad Limbaugh Scientific Diving Leadership Award, the DEMA Reaching Out Award and the AUAS NOGI Award for Science.



**GARETH LOCK** is an advanced trimix and rebreather diver who runs a niche training consultancy focused on human performance and human error, taking the lessons learned from his 25-year career in the Royal Air Force and developing this further with current and established research in human factors. He has recognized that there is a knowledge and practice gap in the diving community, and as such he has developed a globally unique class that teaches divers of all levels — from beginner to advanced-technical diver to instructor and instructor trainer — that human error is normal and that we need to change our attitudes toward human errors and failures if we are to move forward. He actively promotes the fact that human error is a post-event classification, and that if we are to improve diving safety, we need to understand why it made sense to those involved and to be less judgmental when it comes to incidents and accidents. Lock has presented at numerous international diving conferences to discuss human factors, human error and an improved safety culture in diving. He delivers thought-provoking presentations, training and coaching that will challenge any diver to reconsider their perceptions of “diver error” and the “stupid divers” that are out there.



**KAREN B. VAN HOESEN, M.D.**, is one of the leading authorities on diving medicine and physiology. She is Co-Director of the University of California San Diego Center of Excellence in Diving. Van Hoesen is a Clinical Professor of Emergency Medicine at UCSD and is board certified in both emergency medicine and undersea and hyperbaric medicine. She received her bachelor's degree in zoology from UC Davis and her M.D. from Duke University Medical School in 1988. She has been on faculty at UCSD in the Department of Emergency Medicine and Division of Hyperbaric Medicine since 1993, and as Director of the Undersea and Hyperbaric Medicine Fellowship since 1998. She is Director of the UCSD Diving Medicine Clinic, working to improve diver health and fitness. Van Hoesen has served on the board of directors of DAN and UHMS. She has published more than 30 research papers, book chapters and abstracts and is a frequent speaker on diving medicine. She has been a NAUI Instructor since 1983. She was the 2014 DAN/Rolux Diver of the Year and an inaugural member of the Women Divers Hall of Fame.



**TIM O'LEARY** heads up NAUI Technical Diving Operations. He has developed and co-authored training manuals, support material, tech diving tables, monographs and related media, along with NAUI Technical Diving course standards. O'Leary is a practicing commercial diver and CEO of American Diving & Marine Salvage on the Texas Gulf Coast. He has a bachelor's degree in zoology from Texas A&M University and a DMT and CHT from Jo Ellen Smith Medical Center at the Baromedical Research Institute. He was a commercial diving and hyperbaric chamber instructor at the Ocean Corp. O'Leary is a member of the Undersea & Hyperbaric Medical Society, Society of Naval Architects and Marine

Engineers, and National Association of Diver Medical Technicians. He is an admiral in the Texas Navy, a U.S. Coast Guard 100-Ton Vessel Master, and a consultant to Texas Parks & Wildlife, Canadian Corp., Rimkus Group and the offshore oil industry. O'Leary is a NAUI Technical Instructor Trainer, Course Director and Workshop Director. His other interests include skiing, deep wreck diving and dive travel.



**DAN ORR** has been involved in many facets of recreational, commercial and scientific diving. He has worked and taught recreational diving in retail and academic environments, supervised research in fields of scientific diving, tested diving equipment, and worked on the boards of various nonprofit organizations. He began his tenure at the Divers Alert Network in 1991. He was responsible for developing and implementing DAN training programs, beginning with the DAN Emergency Oxygen program, which became the worldwide standard in training emergency oxygen providers for diving injuries. His responsibilities at DAN grew, and in 2005, he was named president and CEO. Following his retirement from DAN in 2013, he formed Dan Orr Consulting LLC, providing expertise to the global diving community. Orr has served as NAUI's Mid-America Branch Manager and was the founding director of the NAUI Technical Advisory Group. He has authored and co-authored numerous articles and core books and manuals on diving safety and first aid.



**CAPT. MICHELLE M. THORNTON** is a government service employee supporting the U.S. Coast Guard as a Search and Rescue Specialist. In her former active duty in the USCG, she served as a representative and liaison between government and civic organizations. She holds a USCG 100-Ton Master License near coastal. She has a bachelor's degree in business administration from American Intercontinental University. Thornton is a NAUI Instructor Trainer (NAUI 38764) and is Academic Director for the scuba instructor training course at Florida Keys Community College. She is also an experienced and certified scuba equipment repair technician. Thornton is a district captain in the USCG Auxiliary and an active leader with volunteer community service organizations.



**BRUCE WIENKE, Ph.D.**, is a program manager in the Weapons Technology/Simulation Office at Los Alamos National Laboratory (LANL). He has a doctorate in particle physics from Northwestern University. Wienke has authored more than 350 articles in peer-reviewed journals, media outlets and trade magazines, and he has published many books on diving science, physics and decompression theory. He heads up the LANL C&C Dive Team, charged with conducting worldwide underwater search, assessment and disablement of nuclear, chemical and biological weapons of mass destruction. He is a fellow of the American Physical Society and has been a consultant to the Environmental Protection Agency, Department of Homeland Security, U.S. military, commercial oil diving operations and the dive industry at large. Wienke is an editor and reviewer for many scientific and technical journals. He is CEO of Southwest Enterprises Consulting. He is a NAUI Technical Instructor Trainer and Course Director. Other interests include USSA Masters ski racing, USTA seniors tennis and windsurfing. Wienke is a certified ski instructor (Professional Ski Instructors of America) and racing coach (United States Ski Coaches Association).

# SEMINAR DESCRIPTIONS

## **REBREATHER TESTING IN ANTARCTICA**

**Jeffrey Bozanic**

With water temperatures stable at 28.6 degrees Fahrenheit, ice sheets 7 to 25 feet thick, and air temperatures plunging to below -40 degrees, Antarctica provides a harsh environment for divers. Yet some extremely interesting research, funded by the National Science Foundation, is being conducted in the area surrounding Ross Island. Some of this research could benefit from the use of rebreathers, but until recently, this equipment hadn't been tested much. Last season, a team of six divers spent six weeks testing multiple rebreather platforms in the frigid conditions. Jeff Bozanic will present results from these dives, as well as the stories behind the research diving.

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## **ARTISANAL FISHERMEN DIVERS OF THE YUCATAN PENINSULA**

**Walter Chin**

In the Yucatan Peninsula of Mexico, artisanal fishermen have adapted capture techniques that use compressed gas as a form of diving to capture fish. Unfortunately, the prevalence of this type of diving/fishing has dramatically increased the occurrence of decompression illness in the region. DCI has in fact become an epidemic and a public health emergency in the Yucatan Peninsula. Walter Chin reports on his five years of experience with understanding dive behavior and capture techniques among the fishing communities of the Yucatan.

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## **LEAD THE CULTURE: DEFINE, APPLY AND LEAD THE CULTURE YOU WANT TO CREATE**

**Thomas "Tec" Clark**

Thomas "Tec" Clark will discuss how to define the culture that NAUI professionals wish to create, how to apply that culture, and how to actively lead that culture. Whether you're developing a culture of excellence, safety, fun or extreme adventure, Clark will share leadership methods used by major organizations to bring forth or change a culture. Case studies will include Disney, Southwest Airlines and REI.

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## **GAS DIFFUSION AMONG BUBBLES AND DECOMPRESSION SICKNESS RISKS**

**Oswaldo Monteiro Del Cima, Ph.D.**

Dr. Oswaldo Monteiro Del Cima will present the results of an experiment that reproduces the Ostwald ripening of gas (air) bubbles in a liquid that has rheological parameters of human blood. There, the time evolution of the bubbles' mean radius, the number of bubbles and the radius size (frequency) distribution have been measured and analyzed. At a fixed ambient pressure – namely, at the same "depth" – one of the main experimental results has shown that while the number of bubbles decreases over time, the bubbles' mean radius increases, meaning that the smaller bubbles disappear while larger (potentially dangerous) bubbles grow. This phenomenon may reveal a contribution of the Ostwald ripening effect to decompression sickness risk during and after diving, suggesting the need for a deeper theoretical and experimental investigation.

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## **LIONFISH VENOM: CARDIOVASCULAR, NEUROMUSCULAR, CYTOTOXIC AND IMMUNOLOGIC EFFECTS**

**William K. Dolen, M.D.**

Lionfish are not normally aggressive toward divers, so stings should be rare. Introduced in the West around 1985, this invasive species has no natural predators here; it feeds ravenously and reproduces prolifically, making it a danger to reefs. Culling programs have focused on killing the fish at depth, trying to teach other animals to feed on them (illegal in certain regions), and bringing them to the surface to be used as food. Hunting lionfish is becoming a popular sport. As a result, envenomation is becoming more prevalent as more people handle the spines. In this session, Dr. William K. Dolen will analyze a complex case of lionfish envenomation with apparent neurologic sequelae and discuss how lionfish venom components have multiple potential consequences. You will also learn how to formulate a first-aid response to a severe lionfish envenomation during this informative and engaging presentation.

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## **WATER: ENGAGING COLLEGE STUDENTS AND YOUTH IN SCUBA DIVING**

**Amie Hufton**

Between 2012 and 2016, the recreational dive program enrollment at Texas A&M Galveston (TAMUG) increased by more than 134 percent, while the school's undergraduate enrollment increased by 20 percent. On average, students in the TAMUG scuba course were enrolled in 1.4 more credit hours and had GPAs 0.131 point higher than nonparticipants. The conclusion is that the courses and culture developed within the TAMUG scuba program have resulted in high-impact learning and increased inclusion. Explore this unique case study to understand how clear communication with decision makers and demonstrating evidence of value can build similar programs.

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## APPLYING PRINCIPLES OF 3-D PHOTOGRAMMETRY UNDERWATER

**Pasi Lammi**

The Baltic Sea preserves centuries-old shipwrecks in cold, dark water, often with poor visibility. When a camera captures just a fraction of the wreck, we must rely on technology to combine these images into a 3-D picture, which provides researchers with a tool to examine a wreck without accessing it by diving.

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## AMAZING POLAR DIVING ADAPTATIONS

**Michael A. Lang, Ph.D., and Karen B. Van Hoesen, M.D.**

This presentation will highlight competitive advantages to living at the poles as compared to living in tropical or temperate environments. The Arctic Ocean is surrounded by land, while Antarctica is a continent surrounded by oceans, and these diving sites are remarkably different. Learn how divers prepare their thermal and life-support systems and diving skills to be able to participate in the increasingly popular expedition journeys to unique polar dive sites.

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## WHY “HUMAN ERROR” IS A POOR TERM IF WE ARE TO IMPROVE DIVING SAFETY

**Gareth Lock**

This thought-provoking and controversial presentation will focus on the need to change attitudes to human error in diving. Using audience participation exercises and diving case studies, Lock will show that the factors we attribute to incidents and accidents are only visible after the event because we are biased with hindsight and know what the outcome was, therefore we are able to join the dots to create the incident. However, in many cases, divers are unaware of which dots to look for, let alone that they will create a picture once joined up. Fundamentally, if “human error” or “diver error” appears in the conclusion of an accident or incident report, the investigation stopped too early. Lock will go on to explain how training, which he has developed by taking the lessons learned from aviation and healthcare, can improve individual and team performance in diving. Recognizing the value of this training to NAUI’s development, the two-day class has already been undertaken by a number of the senior members of NAUI with very positive feedback provided.

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## TWO DECADES OF DEEP-STOP TRAINING

**Tim O’Leary and Bruce Wienke, Ph.D.**

Look at the development of the NAUI RGBM ranged mixed gas tables through the eyes of NAUI Instructors from the early 1990s to today. You will analyze the early NAUI RGBM dives on the *Andrea Doria*, in the Swiss Alps and Mediterranean, as well as the living lab of Roatán. Tim O’Leary and Bruce Wienke will discuss correlations of the NAUI RGBM tables coupled with dive planning software and experiments, tests and downloaded computer profiles.

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## DIVER FATALITIES: LESSONS LEARNED

**Dan Orr**

This presentation reviews risks in various types of recreational scuba diving with a detailed discussion of an analysis of nearly 1,000 scuba diving fatalities, identifying the most significant triggering events that transformed a recreational diving experience into a fatality. The discussion will then deconstruct a diving experience that led to a diving fatality, identifying actions that might have contributed to the diving accident. The discussion will help identify and mitigate risks in order to maximize the enjoyment of recreational scuba diving.

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## DISTRESS BEACONS AND THE SEARCH-AND-RESCUE SATELLITE-AIDED TRACKING SYSTEM (SARSAT)

**Capt. Michelle M. Thornton**

Today’s modern technology assists rescue agencies in locating people faster than ever. New devices are narrowing the search of search-and-rescue. Learn how emergency electronic devices such as EPIRBs (Emergency Position-Indicating Radio Beacons), ELTs (Emergency Locator Transmitters) and PLBs (Personal Locator Beacons) connect to rescue coordination centers worldwide to help take the “search” out of search-and-rescue.

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