E-SLATE

American Academy of Underwater Sciences (AAUS)

EDITORIAL NOTE – March 2009

Welcome to the March issue of the E-Slate. This month the AAUS Symposium will be held at the Georgia Aquarium in Atlanta. We look forward to seeing you there. Kathy Johnston has created a beautiful painting for the Kathy Johnston Scholarship Raffle. Tickets are available online (www.aaus.org). Do not miss the opportunity to win a beautiful unique piece of art and to support the AAUS scholarship fund.

The E-Slate is a newsletter from and for the scientific dive community. We welcome submission of news, announcements, job positions, new citations, and images with captions of underwater work. Please email submissions to aaus@disl.org. Current and past issues of the E-Slate are available at www.aaus.org.

NEWS/ANNOUNCEMENTS

2009 AAUS Kathy Johnston Scholarship Raffle

The AAUS Kathy Johnston Scholarship is funded by the continuing support of artist Kathy Johnston. The original watercolor painting will be sold with a portion of the proceeds donated to the Scholarship Fund. Kathy's print depicts the Aquatic Menagerie at the Georgia Aquarium. Kathy had the unique experience of diving in the aquarium to really get a feel for the aquatic life. This 35" x 41" framed author's proof is being raffled. It is signed and numbered 1 of 1 by Kathy Johnston. This print is valued at $1200. Only 250 tickets will be sold. Do not miss the chance to have this awesome one of a kind print hanging in your home or office. Tickets may be purchased online (www.aaus.org) for $10 each or 6 for $50. Smaller prints are also available for $300 of which $85 is donated to the AAUS Kathy Johnston Scholarship. Support your scholarship fund!

2009 Board of Directors Election

The AAUS is seeking individuals interested in running for the Board of Directors (BOD) in 2009. This election cycle consists of three positions: Director, Secretary, and President-Elect. To qualify to run for the position of Director or Secretary, individuals must qualify as voting members in good standing with the Academy for at least two consecutive years prior to nomination. To qualify to run for President-Elect, the individual must have previously served as a member of the AAUS Board of Directors. The Director position is for a three year term starting January 1, 2010. Specific committee duties will be assigned by the 2010 incoming President, Christian McDonald. The Secretary position is a two year term beginning January 1, 2010. Additional committee duties are assigned by the incoming President. The President-Elect position serves two years as President-Elect beginning January 1, 2010, and will assume the Presidency January 1, 2012 for a two year term. The list of nominees along with candidate bios will be presented to the BOD on March 31, 2009. Candidates will be asked to submit responses to several questions to be provided to the AAUS membership as part of the election process. Balloting will open May 1st and close June 30th. Interested individuals should contact Nominating Committee Chair, Steve Sellers, at sellerss@ecu.edu, or 252-328-4041.

BOD Meeting

The AAUS Board of Directors will be conducting their annual meeting in association with the 2009 AAUS Symposium on Sunday, March 16th, 2009 at the Crown Plaza Airport in Atlanta, GA from 0800-1700. This meeting is open to membership.

Diving for Science 2009 - AAUS Symposium

The 28th scientific AAUS symposium will be hosted by the Georgia Aquarium March 10-14 in Atlanta, GA. Events include presentations on an array of scientific diving and underwater science topics and several workshops. Hotel accommodations are reserved at the Crown Plaza Airport Atlanta (866-750-3365). To register for the symposium: https://web.memberclicks.com/mc/quickForm/viewForm.do?orgId=aaus&formId=50293 to go directly to the registration form or visit www.aaus.org for more information. The draft program follows:

2009 AAUS Symposium Program

March 13th

0800-0810 - Opening Comments

0810-0900 - **Scientific Diving and the Law: an Evolving Relationship**
Dennis Nixon, Ph.D.
College of the Environment and Life Sciences, University of Rhode Island, Kingston, RI

0900-0925 - **Commercial Diver Exposure Scenario for the Portland Harbor Risk Assessment**
Sean Sheldrake, Dana Davoli, Michael Poulsen, Robert Pedersen, Bruce Duncan
USEPA, Region 10, Environmental Cleanup Office, Seattle, WA

0925-0950 - **Submerged Cultural Resource Discoveries in Albania: Surveys of Ancient Shipwreck Sites in the Ionian Sea**
Derek Smith
Hawai'i Institute of Marine Biology, 46-007 Lilipuna Rd, Kane'ohe, HI

0950-1015 - Break

1015-1040 - **The Minerals Management Service's Seafloor Monitoring Program**
David Ball
Minerals Management Service, 1201 Elmwood Park Blvd, New Orleans, LA

1040-1105 - **Convenient Fish Acoustic Data Collection in the Digital Age?**
Kathryn E. Kovitvongsa, Phillip S. Lobel
Boston University, Biology Dept., Boston, MA

1105-1130 - **Underwater Acoustic Ecology**
Phillip S. Lobel
Boston University, Biology Dept., 5 Cummington St, Boston, MA

1130-1155 - **Use of Technical Diving to Study Deep Reef Environments in Puerto Rico**
Clark Sherman, Milton Carlo, Richard Appeldoorn, Michael Nemeth, Hector Ruíz, Ivonne Bejarano
Department of Marine Sciences, University of Puerto Rico-Mayagüez, Mayagüez, PR

1155-1300 - Lunch

1300-1325 - **NOAA's Office of National Marine Sanctuaries and the American Academy of Underwater Sciences: A Look to the Past and the Road Ahead**
Mitchell Tartt, Greg McFall
Office of National Marine Sanctuaries

1325-1350 - **The 2008 Battle of the Atlantic U-Boat Survey: Archaeological Recording in the Graveyard of the Atlantic**
Joseph C. Hoyt
Office of National Marine Sanctuaries

1350-1415 - **Habitat-Mediated Signal Reception by a Passive Acoustic Receiver Array as Determined by Scuba Transects: Implications for the Design of Fish Movement Studies**
James Lindholm[1], Ashley Knight[1], Jeremiah Brantner[1], Les Kaufman[2], and Steven Miller[3]
[1] Institute for Applied Marine Ecology, California State University Monterey Bay
[2] Boston University
[3] University of North Carolina at Wilmington

1415-1440 - **From Torrid Seas to Icebound Lakes: Shipwreck Investigations within NOAA's National Marine Sanctuaries**
Tane Casserly
Office of National Marine Sanctuaries

1440-1505 - **Flower Garden Banks National Marine Sanctuary and Texas A&M University at Galveston - A Case Study: Building a Research and Learning Partnership**
Kevin Buch[1], Emma Hickerson[2]
[1] Texas A&M University Galveston; [2] Office of National Marine Sanctuaries

1505-1530 - Break

1530-1555 - **Exceptional Areas, Significant Challenges, a Perfect Opportunity: The National Marine Sanctuary University Partnership Program**
Brad Barr, Bob Pavia
Office of National Marine Sanctuaries

1555-1620 - **The 2009 ONMS Science Needs Assessment: A To Do List for Marine Conservation**
Mitchell Tartt
Office of National Marine Sanctuaries

1620-1645 - **The Etiology of Spinal Cord Decompression Sickness: A Literature Review**
Dawn N. Kernagis
Center for Hyperbaric Medicine and Environmental Physiology, Duke University Medical Center, Durham, NC

1645-1710 - **The Haldane Effect**
Michael A. Lang[1], Alf O. Brubakk[2]

[1] Smithsonian Institution, Office of the Under Secretary for Science, PO Box 37012 - MRC 009 Washington, DC
[2] Norwegian University of Science and Technology, Department of Circulation and Medical Imaging, 7491 Trondheim, Norway

March 14th

0800-0805 - Opening Comments

0805-0830 - **Community Science for Marine Resource Management: Building a Best Practices Toolkit for Sustainable Fisheries Research**
Richard B. Carey[1], Richard V. Ducey[1], Carolyn Winter[2], Miriam Kelty[1], Sally Hornor[1], Bruce Macphail[2]
[1] Magothy River Association Scientific Dive Team, Severna Park, MD
[2] World Bank, Washington, DC

0830-0855 - **Assessing Seasonal Variation in Benthic Macroinvertebrate Biodiversity with a Focus on Polychaete Biomass on Protected Oyster Reefs in the Magothy River**
Elizabeth J. Ducey
Department of Biology, St. Mary's College of Maryland, St. Mary's City, MD

0855-0920 - **Exploring the 'Marine Twilight Zone' in the Gulf of Eilat, Red Sea, Israel**
Oded Ben-Shaprut
Interuniversity Institute for Marine Sciences in Eilat POB. 469 Eilat 88103 Israel

0920-0945 - **FPGA-Based Fish Detection Using Haar Classifiers**
Bridget Benson, Junguk Cho, Deborah Goshorn, Ryan Kastner
Department of Computer Science and Engineering; University of California San Diego

0945-1010 - **The Science of the National Association for Cave Diving (NACD): Water Quality, Hydrogeology, Biology, and Psychology**
Donald (Skip) F. Kendrick
National Association for Cave Diving (NACD) and Department of Psychology, Middle Tennessee State University, Murfreesboro, TN

1010-1035 - Break

1035-1100 - **Assessing the Health of Coral Reefs: Relative Dominances of Benthic Indicator Groups and Top-Down/Bottom-Up Tipping Points**
Mark M. Littler, Diane S. Littler
Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, DC

1100-1125 - **Methodologies for Benthic Invertebrate and Shellfish Population Assessments in Sheffield Harbor, Norwalk, Connecticut**
Ryan D. Patrylak, Robert B. Whitlatch
Department of Marine Sciences, University of Connecticut, Groton, CT

1125-1150 - **Collaborative Diving for Science: A Report on the Diving Equipment, Techniques and Collaborative Approach Used to Conduct Subtidal Shellfish Surveys in Coos Bay, Oregon**
Vallorie Hodges[1], Caren E. Braby[2], Alix M. Laferriere[2]
[1] Oregon Coast Aquarium, Newport OR
[2] Shellfish and Estuarine Assessment (SEACOR), Oregon Department of Fish and Wildlife, Coos Bay, OR

1150-1300 - Lunch

1300-1325 - **Oxygen and Hydrogen Isotopes Suggest Two Sources for Little Salt Spring**
Noelle Joy Van Ee, Rick Riera-Gomez
University of Miami

1325-1350 - **Time Series Observations of Species Composition and Behavioral Interactions of Fish at an Ocean Observatory off the Coast of Georgia**
Amy E. Paquette[1], Peter J. Auster[2], Michael D. Arendt[3]
[1] University of Connecticut, Department of Marine Sciences
[2] University of Connecticut, Department of Marine Sciences
[3] Marine Resources Research Institute South Carolina Department of Natural Resources

1350-1415 - **Maritime Archaeology in Middle Georgia's Ocmulgee River**
Stephen A. Hammack
78 CEG/CEVOS, Robins AFB, GA

1415-1440 - **Tourist Charge Capacities for Recreational Scuba Diving in Marine Protected Areas and Establishment of Interpretative Underwater Paths**
Vicente Munoz-Fernandez, Alejandro Ramirez-Cordero, Eduardo Rios-Jara
Laboratorio de Ecosistemas Marinos y Acuicultura, Departamento de Ecología. Centro Universitario de Ciencias Biológico Agropecuarias (CUCBA). Universidad de Guadalajara Apartado Postal 52-114, Zapopan, Jal. 45110, México

1440-1505 - Break

1505-1530 - **Algal Garden Cultivation and Guarding Behavior of Dusky Damselfish on Coral Rubble and Intact Reef in Dry Tortugas National Park**

Valentina Di Santo, Christopher M. Pomory, Wayne A. Bennett
Department of Biology, University of West Florida, Pensacola, FL

1530-1555 - **Population Analysis of an Introduced Coral Species, *Tubastraea coccinea*, in Florida**

Tonya L. Shearer
Georgia Institute of Technology, School of Biology, Atlanta, GA

1555-1620 - **Design and Evaluation of Cold Water Diving Garments Using Super-Insulating Aerogel Fabrics**

M. Lew Nuckols
Mechanical Engineering and Materials Science Department, Duke University, Durham, NC

1620-1645 - **Underwater Paleontology: Recovery of a Prehistoric Whale Mandible Offshore Georgia**

Scott E. Noakes, Erv G. Garrison, Greg B. McFall

1645-1710 - **Sea Shadow: The Next Generation of Underwater Exploration Vehicles**

Mark Feulner[1], James W. Musser[2], H. Dale Nute[1]
[1] Florida State University Panama City, Panama City, FL
[2] General Dynamics Information Technology, Panama City Beach, FL

1710-1720 - Closing Comments

FROM THE PRESIDENT

Economic challenges will face everyone during the next year but the Academy has several projects near completion that should help stressed diving programs - the AAUS self-study training module and the new Scientific Diving logging software. Significant effort went in to the development of these products and we hope that your diving program will benefit from them. As always, AAUS is here to help support your program. During tough economic times administrators are often forced to make hard decisions about program cuts based on little information. If your program is being reviewed and you need to educate your administration or others about Scientific Diving, AAUS has a useful tool available. The "Introduction to AAUS and Scientific Diving" PowerPoint is available once you have logged in to your AAUS user account at www.aaus.org. Go to 'Community' and then 'Bulletin Board'. At the bottom of the Bulletin Board page is the link for the Power Point.

The E-Slate provides a useful monthly reminder of what is going on in Scientific Diving and Alma Wagner (aaus@disl.org) will be happy to add your program administrators' names to the distribution list if you wish. The E-Slate is most useful if you also forward items of interest to the Academy for inclusion.

Another product planned for release this year is the Scientific Diver Training Verification Card. The BOD received many comments during the development of the certification programs and tried to implement them in the 2009 AAUS business plan. The plan is available for review at: http://www.aaus.org/mc/bulletinBoard/viewPostList.do?topicId=448063&forumId=205814&page=0

If you would like to comment on the plan or have other comments for the board, please feel free to send communications to aaus-divesafe@memberclicks.com. Alternatively, all members of the Academy are welcome to attend the BOD meeting that will be held Sunday, March 15, 2009 at the Crown Plaza Airport in Atlanta, GA.

Sincerely,

Jeff M. Godfrey

UPCOMING EVENTS

Diver's Alert Network (DAN) will be conducting training programs and Instructor/Instructor Trainer Updates in Atlanta, GA at the Hampton Inn Atlanta-Buckhead on March 11-12, 2009. DAN Instructors and Instructor Trainers can complete updates and/or qualify to teach DAN's newest training program, Dive Medicine for Divers. All DAN Instructors maintaining active status are eligible. You can register at: http://www.diversalertnetwork.org/Events/Event.aspx?EventID=657)

DAN ITW (Wed/Thur 0830-1700)
Dive Medicine for Divers IQC/ITW (Wed/Thur 1730-1930)
DAN Instructor Update 2009 (Wed 1945-2130)
DAN Instructor Trainer Update 2009 (Thur 1750-1930)

Location: Hampton Inn Atlanta-Buckhead, 3398 Piedmont Road NE, Atlanta, GA 30305; 404-233-5656.

For additional information on this event, or becoming a DAN Instructor or Instructor Trainer, please visit the DAN website or call 800-446-2671.

DAN Diving Medical Technician Course

A Diving Medical Technician (DMT) course will be held in Durham, NC April 19-24. The program includes a lecture series and hands on experience at local recompression facilities. Participants who complete the certification course receive DMT certification through the National Board of

Diving and Hyperbaric Medic al Technology (NBDHMT). For registration or more information visit: http://www.diversalertnetwork.org/training/courses/dmt.

UAF Cold Water Diving Course

The University of Alaska Fairbanks is offering a cold water diving course May 11-15 2009 at the Kasitsna Bay Laboratory in Alaska. Introduction to Cold Water Diving will train certified scuba divers in drysuit use and maintenance. The course will stress drysuit safety and buoyancy skills and will include practical experience in a cold-water rescue. Students will be beach and small boat scuba diving. Students will graduate with a PADI Drysuit certification.

Professor: Dr. Brenda Konar
Prerequisites: AAUS scuba certification (www.sfos.uaf.edu/dive/index.html)
Costs: $598 + tuition (in-state tuition for all students)

To register visit: http://www.uaf.edu/summer/.
Prospective students are encouraged to contact bkonar@guru.uaf.edu

NEW PUBLICATIONS

Arieli R, Boaron E, Abramovich A. The combined effect of denucleation and denitrogenation on the risk of decompression sickness in rats. J Appl Physiol. 2009 Feb 19. [Epub ahead of print]

We have previously hypothesized that the number of bubbles emerging on decompression from a dive, and the resultant risk of decompression sickness (DCS), may be reduced by the process of denucleation (DNC). Exposure to hyperbaric oxygen (HBO) would result in oxygen replacing the resident gas in the micronuclei, to be subsequently consumed by the mitochondria when the oxygen pressure is reduced. This would shrink and eliminate effective gas micronuclei that might otherwise have formed bubbles on decompression. Support for the validity of our hypothesis may be found in our previous studies on the transparent prawn and the reduction of DCS in the rat. In all of these studies, HBO pretreatment was given before supersaturation with inert gas at high pressure. The purpose of the present study was to compare DCS outcome in rats which underwent nitrogen washout (denitrogenation - DNT) alone (9 min O_2 at 507 kPa) after exposure to air at high pressure (33 min at 1266 kPa), and rats treated by both procedures (DNT-DNC) (8 min of O_2 breathing followed by 5 min air breathing, both at 507 kPa) after high-pressure air exposure. This was done with the same nitrogen load in both groups before the final decompression (a nitrogen pressure of 467 kPa in fatty and 488 kPa in aqueous tissue). Six of the 20 rats in the DNT-DNC group died, compared with 13 in the DNT group ($p<0.03$). Three rats in the DNT-DNC group suffered mild DCS, recovering completely within 2 h of decompression. The present study indicates an advantage in considering both denitrogenation and denucleation before decompression. This may have practical application before escape from a disabled submarine, when aborting a technical dive, or in the preparation of aviators for high altitude.

Castagna O, Gempp E, Blatteau JE. Pre-dive normobaric oxygen reduces bubble formation in scuba divers. Eur J Appl Physiol. 2009 Feb 14. [Epub ahead of print]

Oxygen pre-breathing is routinely employed as a protective measure to reduce the incidence of altitude decompression sickness in aviators and astronauts, but the effectiveness of normobaric oxygen before hyperbaric exposure has not been well explored. The objective of this study was to evaluate the effect of 30-min normobaric oxygen (O_2) breathing before diving upon bubble formation in recreational divers. Twenty-one subjects (13 men and 8 women, mean age (SD) 33±8 years) performed random repetitive open-sea dives (surface interval of 100 min) to 30 msw for 30 min with a 6-min stop at 3 msw under four experimental protocols: "air-air" (control), "O_2-O_2", "O_2-air" and "air-O_2" where "O_2" corresponds to a dive with oxygen pre-breathing and "air" a dive without oxygen administration. Post-dive venous gas emboli were examined by means of a precordial Doppler ultrasound. The results showed decreased bubble scores in all dives where preoxygenation had taken place ($p<0.01$). Oxygen pre-breathing before each dive ("O_2-O_2" condition) resulted in the highest reduction in bubble scores measured after the second dive compared to the control condition (-66%, $p < 0.05$). The "O_2-air" and "air-O_2"conditions produced fewer circulating bubbles after the second dive than "air-air" condition (-47.3% and -52.2%, respectively, $p<0.05$) but less bubbles were detected in "air-O_2"condition compared to "O_2-air" ($p<0.05$). Our findings provide evidence that normobaric oxygen pre-breathing decreases venous gas emboli formation with a prolonged protective effect over time. This procedure could therefore be beneficial for multi-day repetitive diving.

Kot J, Sićko Z, Michałkiewicz M, Lizak E, Góralczyk P. Recompression treatment for decompression illness: 5-year report (2003-2007) from National Centre for Hyperbaric Medicine in Poland. Int Marit Health. 2008; 59(1-4): 69-80.

A serious diving accident can occur in recreational diving even in countries where diving is not very popular due to the fact that diving conditions there are not as great as in some tropical diving locations. The estimated number of injured divers who need recompression treatment in European hyperbaric facilities varies between 10 and 100 per year depending on the number of divers in the population, number of dives performed annually, and number of hyperbaric centres in the country. In 5 years of retrospective observation in Poland (2003-2007) there were

51 cases of injured recreational divers recorded. They either dived locally or after returning home by air from a tropical diving resort. All of them were treated with recompression treatment in the National Centre for Hyperbaric Medicine in Gdynia which has capability to treat any patient with decompression illness using all currently available recompression schedules with any breathing mixtures including oxygen, nitrox, heliox or trimix. The time interval between surfacing and first occurrence of symptoms was significantly lower in the group of patients with neurological decompression sickness or arterial gas embolism (median 0.2 hours) than in the group of patients with other types of decompression sickness (median 2.0 hours). In both groups, there were different types of recompression tables used for initial treatment and different number of additional sessions of hyperbaric oxygenation (HBO) prescribed, but the final outcome was similar. Complete resolution of symptoms after initial recompression treatment was observed in 24 cases, and this number was increased to 37 cases after additional HBO sessions (from 1 to 20). In the final outcome, some residual symptoms were observed in 12 cases. In two cases initial diagnosis of decompression sickness type I was rejected after initial recompression treatment and careful re-evaluation of diving profiles, risk factors and reported symptoms.

Pontier JM, Guerrero F, Castagna O. Bubble formation and endothelial function before and after 3 months of dive training. Aviat Space Environ Med. 2009; 80(1): 15-9.

INTRODUCTION: It has been suggested that repeated compression-decompression cycles reduce diver susceptibility to decompression sickness (DCS). This study examined whether intensive scuba dive training would reduce bubble formation and modulate endothelial function as shown by skin circulation. METHODS: There were 22 military divers who were studied before and after a 90-d program of physical training and open-sea air diving (mean 67 dives total). Skin blood flow in the forearm was measured at rest (baseline), during post-occlusive hyperemia (endothelium-dependent vasodilatation), and with local heating to 42 degrees C (maximal vasodilatation). Subjects were also examined by pulsed Doppler for venous bubbles 30, 60, and 90 min after surfacing from a hyperbaric exposure to 400 kPa (30 msw) for 30 min in a dry chamber. RESULTS: None of the divers experienced DCS during the training period. There was no change in weight, body mass index, maximal oxygen uptake, or endothelial function. Bubble grades by the Kisman Integrated Severity Score were significantly decreased immediately after the diving training period (3.6±9.2 vs. 16.4±14.3) and increased 3 mo after this period (10.3±13.9 vs. 3.6±9.2). DISCUSSION: The results highlight that repeated scuba dives and regular physical exercise activity reduce bubble formation and probably have a protective effect against DCS risk. Although this phenomenon has been observed for decades, the mechanism remains complex and the results cannot elucidate the effects of physical exercise and NO production. Bubble formation could activate the stress response which could be the basis for diving acclimatization.

Scott P, Wilson N, Veldtman G. Fracture of a GORE HELEX Septal Occluder following PFO closure in a diver. Catheter Cardiovasc Interv. 2008 Nov 13. [Epub ahead of print]

Decompression illness (DCI) is more common in divers with a patent foramen ovale (PFO), and transcatheter PFO closure is being increasingly performed in patients with an episode of DCI who want to continue diving. A range of closure devices are available and the choice in an individual case depends on operator preference and PFO anatomy. The GORE HELEX Septal Occluder, introduced in 1999 primarily for secundum atrial defect closure, is a compliant non self-centering device composed of a wire helical framework on which a microporous membrane is mounted. The device is fixed in place by a unique interlocking mechanism that passes through the center of the device from the left to the right atrial disc, thereby securing it onto the interatrial septum. Here, we present a case of a locking loop fracture and review the literature concerning this unusual complication.

The mission of the American Academy of Underwater Sciences is to facilitate the development of safe and productive scientific divers through education, research, advocacy, and the advancement of standards for scientific diving practices, certifications, & operations.

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AAUS BOARD OF DIRECTORS