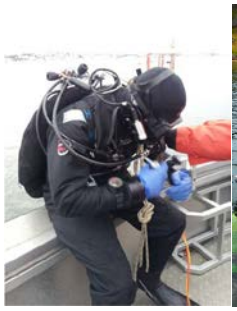
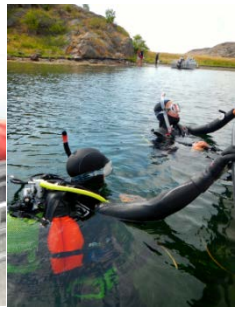
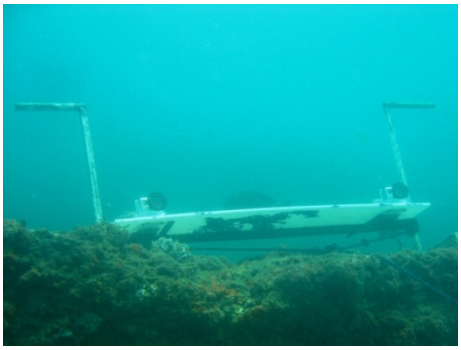
UNIVERSITY OF GOTHENBURG

THE SVEN LOVÉN CENTRE
FOR MARINE SCIENCES


2nd International PhD-student Course in *Scientific Diving and Documentation Techniques (4ECT)*

Period: August 17th – 28th, 2015
Location: The Lovén Centre Kristineberg, Fiskebäckskil, Sweden

Deadline for application: May 31st, 2015

Syllables:

- Illustration techniques using scientific diving underwater digital photography; handling of photographic equipment, in water, optimization of lighting, macro- and wide angel photography, composition of picture, imaging in Photoshop.
- Underwater digital photography for empirical studies including stereo-photography to quantify changes in the environment, quantification by visual census methods, underwater photography to study distribution and coverage and alternative methods such as sledges, drop-videos and underwater observatories.
- Stereo-video system techniques for quantitative analysis and behavior of mobile organisms.
- Medical examination and CPR course, which are required for diving during the course.
- Rules and regulatory frames of Scientific Diving, dive planning and risk assessment, repetition of dive medicine and rescue techniques

For more information about the Lovén Centre: www.loven.gu.se

Article about last year's course: http://goo.gl/fhacRW

Video footage from last year's course: http://goo.gl/ZnN6ds

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Teachers involved in the course Scientific Diving and Documentation Techniques 2015:

Anders Salesjö is a marine biology teacher and one of Scandinavia's topmost underwater photographers. He has won both the Nordic and Swedish championships in underwater photography and has represented Sweden at several world championships organized by CMAS (Confédération Mondiale des Activités Subaquatiques). He is an elected member of the Association of Nature Photographers. He is best known for his macrofauna photographs from Nordic waters but also from other part of the world.

Lars-Ove Loo is a researcher in marine ecology and has worked with benthic-pelagic coupling in different ecosystems, mapping of different marine habitats and currently analyzing and processing historical marine biological data. He uses photography and filming as a tool in his research.

Eduardo Infantes Oanes a researcher in marine ecology mainly focusing on bio-physical interactions between seagrasses and hydrodynamics, and restauration of seagrass meadows. Scientific diving is extensively used within his research and he uses underwater documentation to illustrate and for his empirical analysis.

Helén Nilsson Sköld is a researcher in marine zoology focusing on developmental biology like cell proliferation, reproduction and ageing but she also work on fish coloration in a behavioral or ecological framework.

Fredrik Pleijel is a researcher in marine zoology specialized in polychaete phylogeny and taxonomy based on combined morphological and molecular data. Currently he has a grant from the Hasselblad Foundation to photo-illustrate Swedish marine in-vertebrates.

Matz Berggren is a researcher in marine zoology specialized in crustacean taxonomy and ecology. He is using both diving and photographing as tools for collecting and illustrating taxa of interest in his research. Working with habitat specialization by higher crustacean he illustrates this by building chosen habitats in aquarium and photographing the animals in it! He has been working in many different environments from tropical to temperate and to optimize the sample success he has developed own different techniques to sample the fauna of interest.

Jon Havenhand is a marine ecologist specializing in the evolutionary ecology of fertilization and early life-stages of marine invertebrates. *In situ* underwater experimentation, and optimizing experimental designs to maximize useful results per unit effort, have both been key aspects of his research: primarily because he's lazy and doesn't like having to repeat experiments! Jon has taught several graduate level courses in experimental design and analysis. His current research projects are investigating the extent to which key marine invertebrates can respond to simultaneous ocean warming, freshening and acidification.

Linus Hammar is a researcher focusing on risk assessment of offshore renewable energy and have conducted his PhD on Chalmers Technical University. The aim of his work has been to generate knowledge to support that these new energy technologies are used in an environmentally friendly manner. The studies include resource mapping, field experiments on fish, and ecological risk assessment at the landscape level. In the field experiments he has used stereo-video system

techniques to record and quantify detailed fish movements. He is currently working at Swedish agency for Marine and Water Management.

Martin Gullström is a researcher in marine ecology. His research interests focus on marine spatial ecology, landscape/seascape ecology, ecological connectivity, trophic interactions, fish/fisheries-related ecology; and sea grass ecology/ecophysiology related to carbon sequestration, ocean acidification and climate change. Most of the research is linked to spatial resource management and nature conservation of the coastal marine environment. Scientific diving and underwater visual mapping methods are regularly used in Martin´s research.

Maria Asplund is a researcher in marine ecology and the Diving activity supervisor at the Lovén Centre. She is also the course leader.

Preliminary examiner: Per Jonsson, department of Biology and Environmental Sciences, University of Gothenburg.

Contact information:

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Course description and entry requirements:

Disciplinary domain: Science

Host: Sven Lovén Centre for Marine Sciences and the department of Biological and Environmental Sciences, University of Gothenburg

Main field of study: Marine Science and Scientific Diving

1. Number of participants

12 PhD students in marine science disciplines
(Master students and post-docs may also be accepted)

2. Course description

Scientific diving (SD) is an important tool for marine researchers to visit, document and perform empirical studies in the environment that they work with. Many terrestrial sciences have a great advantage compared to marine sciences in that natural phenomena can be observed first hand. This alone can create a greater understanding of the environment that is studied. Referring to the European Scientific dive panel, SD is defined as "diving that is science-led and is needed to support professional research and education and for the protection, conservation and monitoring of the natural and cultural environment".

Aim: To give you important tools about using SD documentation techniques when illustrating your research and conducting empirical studies in the marine environment using SD techniques. Several of the skills provided during the course are required for the European Scientific Diver (ESD) certification. Documentation after this course can then be used if you apply for the ESD certificate.

The course will be conducted as a 12 day intensive course at the marine field station Kristineberg, Sven Lovén Centre for Marine Sciences (for more info: www.loven.gu.se) in Fiskebäckskil, Sweden. The course will comprise a few introductory lectures but will mainly focus on practical hands-on sessions using scientific diving documentations techniques and learning how to conduct safe practice scientific diving.

3. Position in the educational system

Elective course; third cycle education.

4. Entry requirements

Admitted to third cycle education, graduate students.

A short abstract (max 200 words) describing the applicants research and how the applicant can foresee the usage of scientific diving documentation techniques within their research (if applicable), should be sent in with the application to the course.

A dive certificate; either a recreational (sports-) dive certificate corresponding to CMAS** or PADI rescue diver or a professional Swedish S30 or any other, according to IDSA level 1 standards. A documentation (log book) of at least 20 logged dives whereof at least 5 dives with a max depth of at least 18 m. Documentation of previous cold-water diving and experience of diving with drysuit. A medical health examination for work diving according to Swedish Work Environment Authority's provisions AFS 2006:5 or corresponding foreign health examination less than 5 years ago (if below 40 years of age) and less than 2 years ago at the time for the course.

5. Preliminary Schedule

Day 0 Arrival

Day 1 Introduction, safety regulation and practical dive safety for scientific divers:

- Introduction to the course and examples of scientific diving in science
- Practical CPR training and emergency first responses training including administration of oxygen **
- Theoretical repetition of Dive medicine and dive physics, dive rescuing techniques
- Lecture on Swedish Diving legislations, Gothenburg University dive rules, Code of praxis for Scientific Diving. Scientific diving in other countries. European scientific diver and Advanced European scientific diver mobility certifications.
- Group work with dive planning and risk assessments for scientific diving.

Day 2

- Refreshment dives, dive planning, risk assessment of safe practice scientific diving techniques and rescue scenario training

Days 3-6 Illustrating your marine research using scientific diving underwater digital photography:

- Hands-on handling of photographic equipment for underwater documentation
- Lecture on the difference of photography on land and in water, optimization of lighting and position of strobes during underwater photography, macro- and wide angel photography, composition of picture
- Practical sessions with underwater photography both macro- and wide angle while diving
- Practical use of macro and wide angle photography in science, examples from for instance seagrass ecology, coloration and color change of organisms, following short-term and long-term changes, revisiting of localities used in previous previous scientific projects etc.
- Hands on Imaging in Photoshop (element)

Days 7-9 Using scientific diving underwater digital photography for empirical studies:

- Hands on practice with in-field practice and image analysis of underwater stereo photography to quantify changes in the environment
- Hands on practice with in-field practice and image analysis of underwater photography to study organisms distribution, coverage, volumes and coloration
- Practical sessions using quantification by visual census methods
- Alternative techniques, such as MOV (underwater sledges) and drop-video techniques for observation and quantification in the marine environment
- Visit to Lovén Centre Underwater Observatory

Days 10-11 Stereo-video system techniques for quantitative analysis and behavior of mobile organisms:

- Introductory lecture on the stereo-video system techniques

- Practical session with calibration of stereo-video unit
- Dive transects and stationary positioning of the stereo-video system
- Hands on analysis of the films, measuring of distance, mobility and behavior, size of marine organisms

Day 12 Examination:

- Presentation of scientific diving documentation produced during the course and how they plan to apply these techniques within their research

Day 13: Departure

6. Outcomes

1. Knowledge and understanding

After completion of the course the Ph.D. student is expected to have received tools needed to use SD methods and scientific diving documentation techniques:

- to illustrate their marine research

- to be able to conduct empirical studies in the marine environment using SD techniques

2. Skills and abilities

Several of the skills provided during the course are required in the European Scientific Diver (ESD) certification, which is a mobility certificate within Europe. Therefore documentation after the course will be provided to the students, which can then be used when they apply for the ESD certificate.

3. Judgement and approach

We need to foster the new generation of researchers so that they can implement scientific diving into their marine research. Further, the candidates will learn how to adapt to the new legislations and practice safe scientific diving.

This course aims to be a prototype that further can be used for competence enhancement of researchers within the EMBRC.

6. Required reading

The required reading will be sent out prior to the course and will include:
-Research papers describing scientific diving documentation techniques that will be used during the course.
-Diving work The Swedish Work Environment Authority's Provisions on Diving Work and General Recommendations on the implementation of the Provisions 2010:16
-Code of praxis for scientific diving
-Dive rules for Gothenburg University (STYRDOKUMENT Dnr V 2013/511)

7. Assessment

Required steps in order for a student to pass the course:

1. Oral presentations of the documentation produced during the course and how the PhD students aim to apply the scientific documentation techniques in their research
2. Showed proof that they can make a dive plan and a risk assessment for scientific diving
3. Active participation during the course

4. All scheduled moments during the course are mandatory

8. Grading scale

The grading scale comprises Fail, (U), Pass (G)

9. Course Evaluation

The course evaluation is carried out together with the Ph.D. students at the end of the course, and is followed by an individual, anonymous survey. The results and possible changes in the course will be shared with the students who participated in the evaluation and to those who are beginning the course.

10. Language of instruction

The language of instruction is English.