

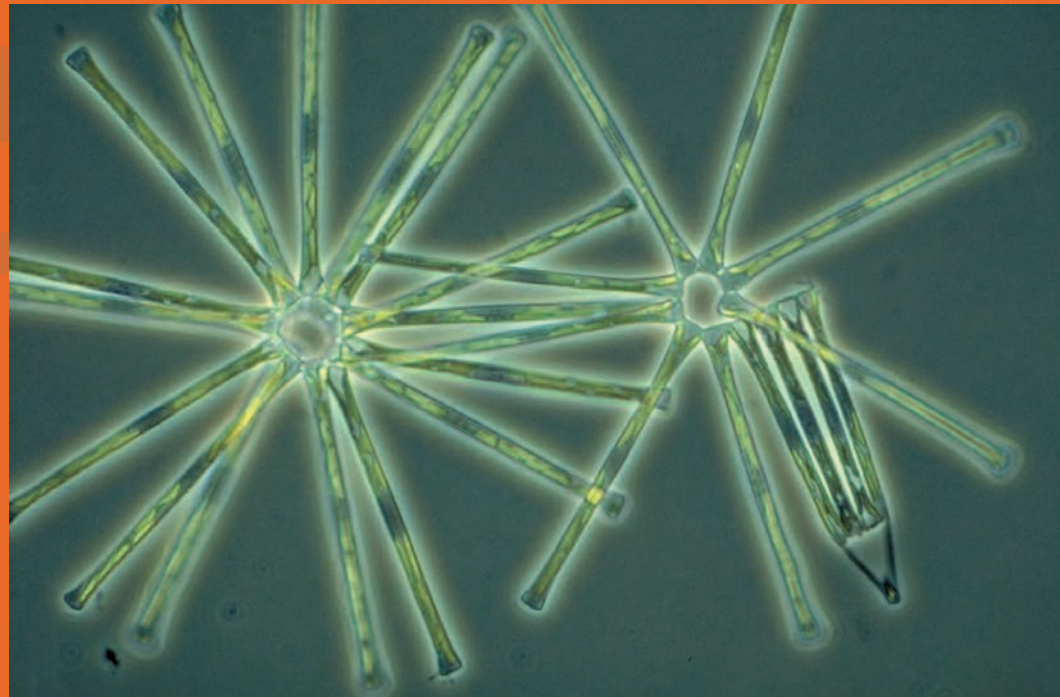
# The Phycologist

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**The Newsletter of the British Phycological Society**

Editor: Dr Jan Krokowski

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We hope you all enjoyed the 2015 BPS Annual Meeting in London, together with the 6th European Phycological Congress, hosted jointly with the Federation of European Phycological Societies (FEPS). Details of this are included in this issue. We haven't included oral and poster presentation abstracts, as normal, since these were produced and provided separately by Taylor and Francis to all attendees and were included in the welcome pack. If you weren't able to receive one, I hope you will be able to get your hands on a copy.

This issue details a number of student bursary reports to read, a number from the EPC6 and BPS meeting, provides an update to the Freshwater Algal Flora of the British Isles, reviews a UK workshop hosted by Scottish Environment Protection Agency for algologists working on phytoplankton as used to assess ecological status of our freshwater lakes and lochs, details the winner of the 2015 Hilda Canter-Lund Competition, and also details a couple of new algal discoveries.

Lastly, apologies to Alan Pentecost for his article on *Tetracyclus* in the last issue. The article attracted a number of queries but unfortunately the editor (that's me!) forgot to include the details of who the author was.

Remember - do keep sending in your contributions. Write to us with your phycological views, news, work events, or any matter you wish to share with readers of *The Phycologist*. YOUR input is required; all relevant material will be considered (job adverts, science reports, book reviews, news items of topical interest, meeting announcements, research news, and suggestions for future articles are always welcome). Without YOU the newsletter would not exist

As a reminder, previous issues of *The Phycologist* can be downloaded at <http://www.brphycsoc.org/phycologist.lasso>

**Cover image:** *Asterionella*

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# The 6th European Phycological Congress and Annual British Phycological Meeting in London

Chris J. Williamson and Anne D. Jungblut, Life Sciences Department, Natural History Museum, London, UK

The 6th European Phycological Congress was held in London this August in the blazing English sunshine. The meeting was organized by FEPS and held jointly with the annual British Phycological Society summer conference. Overall it was a great success, being attended by nearly 450 people that included phycological experts from Europe as well as across the globe including Canada, the Americas, Australia, Africa, Japan and China. Each morning was kicked-off with fascinating plenaries by Ellen van Donk (NIOO-KNAW), Georg Pohnert (Jena, Germany), John Archibald (Dalhousie University) and Ester Serrao (University of Algarve) providing new insights into chemical interactions in phytoplankton, evolution of complex life and the impact of climatic change on seaweeds. Throughout the week, keynote and invited presentations were given under 13 different symposia ranging from algal taxonomy, diversity in extreme environments, phylogenomics, lipids, biogeography, photophysiology, to climate change, transcriptomics and applied phycology.

Thanks to the numerous student grants awarded by FEMS and the BPS, a large number of students were able to attend the meeting, with some of them taking part in the Irène Manton Student Prize hosted by the BPS. Selection for this year's Irène Manton Prize was based on the submission of a 2-minute video clip in which students had to introduce their work whilst demonstrating their honed communication skills. Naturally the videos produced were fantastic, with some of them exceeding the brief, resembling small works of art more than a short scientific presentation. Based on the clips, 10 brave students were invited to give presentations, each performing admirably under the strain and pressure that has come to be associated with the prestigious Manton session. A long discussion and tough decisions ensued, and the judges were pleased to award the first prize to Sohail Keegan Pinto (University of Hokkaido) for his presentation on the "Diversity and Phylogeny of the benthic dinoflagellate genus *Testudodinium* (Dinophyceae)".

In the hope of extracting some knowledge and wisdom from high-ranking phycologists and members of other scientific fields, this year's congress also saw the coming together of student representatives from various European phycological societies (Belgian, British, German, Greek, Italian, Macedonian, Polish and Spanish), to organize a dedicated 'Student Symposium'. The audience was treated to a blow-by-blow account of the exemplary career path of Angela Falciatore (Université Pierre et Marie Curie), the

dos and don'ts of squeezing funding from those overworked and under-appreciated grant reviewers by Claire Gachon (The Scottish Association for Marine Science), a discussion on the importance of building bridges with the applied phycology sector led by Michelle Stanley (also of SAMS), and a delve into the new world of open-source / open-access science and publishing by the ever-so-slightly anti-establishment Ross Mounce (The Natural History Museum, London). It was a great success with plenty of food for thought for students as well as early career researchers.

Other highlights from EPC6 included the public lecture given by Jason Hall-Spencer (Marine Biology at Plymouth University) on "How will marine life cope with ocean acidification?", and the BPS Presidential Address by Christine Maggs (Bournemouth University). Jason managed to convey the intricacies of ocean acidification and the threat it poses to marine ecosystems in his usual engaging and accessible manner, before jet-setting off on an undoubtedly low-carbon flight (!) to Miami. Chris' talk took on more of a personal touch, describing her work and career that has taken her around the world to study seaweeds, discover several new species, and author the guide to seaweeds for Britain and Ireland. We were treated to an insight into the choices (never *Chondrus!*) and dedication that led to a successful phycological career and reign as BPS President. This reign came to an end during EPC6, at which our next fearless leader, Gill Malin, was sworn into office.

Despite the London weather living up to its stereotype of five solid days of rain, the conference ran very smoothly under the oversight of the Co-Chairs Jane Francis and Elliot Shubert, the Science Organizing and Local Organizing Committees, and their dedicated team of volunteers who helped with registration, presentations, t-shirts, mugs and even a lost earring. As with everywhere, irrespective of whether you are on a ship in the middle of the ocean or stuck at a remote desert station, also here at EPC6, the excellent food provided by the Hammersmith Hotel Novotel chefs kept everybody happy and concentrated through long days of diverse research topics and cutting edge sessions. Last but not least, everybody had a great time at the excellent conference dinner, working out the stresses of conference with a well-deserved dance on the Phycology inspired seaweed carpet. So, this really means, time to recover from the conference and get some science done for the 7th European Phycological Congress in Croatia!

# Student Bursary Award Reports

## Attendance at the 6th European Phycological Congress,

London, August 2015

I am deeply thankful to have the opportunity to present a talk at the EPC6 congress held in London, August 2015, in the Manton Session. This was a meeting organized jointly for the first time by the British Phycological Society and the Federation of European Phycological Societies. Personally I think this congress was really successful and enjoyable for every attendee.

Unlike most of us, I am not a phycologist and my research project was truly interdisciplinary, comprising natural product chemistry, microbiology and chemical ecology. Indeed, within the Fungal Natural Products chemistry team of the Natural History Museum of Paris (France), I studied the role of natural products produced by algae-derived fungi to the pathogenic microbiome of the host. The fungal taxonomic diversity as well as the characterized bioactive compounds have been detailed and this research received good and positive opinions. Especially we have now started a new collaboration in order to expand our pathogen range thanks to the numerous coffee breaks and poster sessions during the EPC6 congress. Indeed this conference offered me the opportunity to meet new researchers and it was an important stage for developing my network as an early career scientist.

Although this international congress wasn't my first one, it was certainly one of the richest one with a great research fields diversity represented. I was equally honoured to have helped with the organization and to see the behind the scenes. This has been a really rewarding experience and I greatly thank all the members of the organization team. Also, besides the fabulous conference dinner, I had the opportunity to participate in the excursion to Stonehenge and Salisbury, as well as to visiting one of the oldest famous Gothic cathedral in the world. It was a good opportunity to increase my knowledge not only on phycology but also on English history. In conclusion, I am really grateful for the British Phycological Society for giving me the financial support to be able to attend the conference.

Marine Vallet, Natural History Museum of Paris, FRANCE, mvallet@edu.mnhn.fr



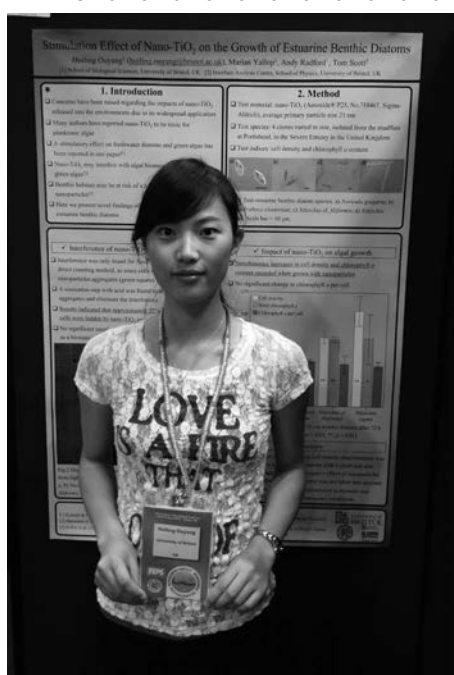
Harvesting the brown algae with Dr Claire Gachon (SAMS)



Isolating the fungal endophytes with my supervisor Prof. Soizic Prado (MNHN)



Cultivable fungal endophyte associated to brown algae



I was very grateful to be able to attend the 6th European Phycological Congress (EPC6) held in London during 23-28 August, 2015. I would like to thank British Phycological Society for the Student Bursary Award that helped me to attend

the conference. The conference I attended was the 6th meeting of its kind and it brought together over 400 phycologists from across the world to share and debate the latest discoveries in this field.

I presented some novel findings during my PhD in a poster entitled "Stimulation Effect of Nano-TiO<sub>2</sub> on the Growth of Estuarine Benthic Diatoms". Risks of nano-TiO<sub>2</sub> were proposed due to its widespread application and extremely high surface area to volume ratio. My PhD focus on the impact of nano-TiO<sub>2</sub> on estuarine biota, which is considered to at risk of a higher exposure to nanoparticles but few work has been done with it. I noticed stimulation effects of nano-TiO<sub>2</sub> on estuarine benthic diatoms in laboratory conditions, which was contrast to most of the results reported with freshwater planktonic algae. I received positive feedbacks from others during poster session. I also met some experienced researchers in my field. This allowed me to ask questions and method details which was only briefly presented in their papers. They were very friendly and provided some useful suggestions for the problems

I came across during my PhD research.

In addition, the interesting talks and posters presented during the meeting offered me lots of information about the latest progress about algae. My previous researches (master and PhD) were all about toxicology and algae were only used as representatives of primary producers in the ecosystem. This conference provided a fantastic opportunity for me to understand algae more in several aspects, including taxonomy, photosynthesis, evolution, and etc. Specifically, I was very surprised by the promising application of algal lipids as biofuel, which would help build a greener future.

Overall, this meeting was extremely beneficial in providing a platform to meet other researchers and present my work to international audiences. It also made me to think about the upcoming future career after PhD. I really enjoyed the meeting and thanks very much for the financial help from British Phycological Society.

Huilong Ouyang, School of Biological Sciences, University of Bristol, huilong.ouyang@bristol.ac.uk

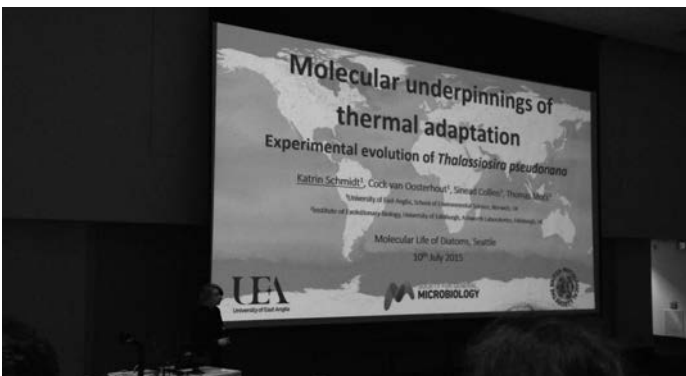
## Attendance at the 6th European Phycological Congress, London, August 2015

The European Phycological congress, in its sixth year, provides a place for phycologists and general enthusiasts in phycology to discuss, enhance and promote algal research. This year it was held in Hammersmith, London at the Hotel Novotel London West between the 23<sup>rd</sup> and 28<sup>th</sup> of August 2015. This was a very broad conference which spanned 16 symposia covering a wide range of topics including algal lipids, phylogenomics, global change, stressful environments, species delimitation and algae-microbiome interactions. Four highly interesting plenary lectures covering symbiosis, chemical information transfer, microalgal chemical signals and genetic diversity driven by climate change kicked off each day of interesting talks. Two highlights for me were 1) the BPS presidential lecture by Prof. Christine Maggs, a highly interesting and funny talk about her life and love of seaweeds and 2) the public lecture by Prof. Jason Hall Spencer on the effects of ocean acidification on marine life, a topic after my own heart. We got to see lots of highly stimulating visuals of marine ecosystems and the impact of increased levels of CO<sub>2</sub> on them.

I was lucky enough to present some of my PhD work in the Manton prize session titled ‘The importance of revealing cryptic diversity in relation to assessing the structural integrity of the maerl bed habitat’. A daunting experience that I thoroughly enjoyed, which got a great response including some constructive comments to take back to Bristol with me. The poster session was a great informal way to find out more about the research out there and speak to people on a one to one basis. Overall my experience at the congress was truly great, I was able to meet a lot of researchers in similar fields, find out about the innovative research in phycology and to take a renewed sense of enthusiasm back with me to my own research. For that, I would like to thank the BPS for the funding which enabled me to attend this brilliant conference.

**Leanne Melbourne (PhD Research Student)**  
**University of Bristol, l.melbourne@bristol.ac.uk**

## Molecular Life of Diatoms, Seattle, July 2015



This July I was fortunate enough to be able to attend the Molecular Life of Diatoms conference, which was held in Seattle. Because the conference was during the high season, flight prices were high so I decided to apply for a BPS travel award. The positive outcome of my application partly covered my flight costs.

Seattle is also called ‘The Emerald City’ due to the lush, green forest of Washington and the plenty parks around the city. From the conference halls we were able to see Mt. Rainier if the weather permitted, which added to the relaxed and friendly atmosphere of the meeting.

The meeting kicked off with a socialiser in a nearby hotel bar. This was a great opportunity to catch up with attendees

from the last Molecular Life of Diatoms meeting in Paris two years ago. The talks were divided by research topic varying from Biotechnology, to Physiology, Evolution and Oceanography. I was most interested in the Evolution session as my research focuses on experimental evolution. Lunch breaks provided a great opportunity to test the different restaurants in the university district, which has a high variety of international cuisines.

On the last day of the meeting, I was given the opportunity to present my PhD research as part of the Evolution session. I was really nervous to give my first talk at a conference. I received lots of great feedback afterwards and useful tips for further analyses.

Attending this conference gave me the opportunity to present my ongoing research to leading scientists in the field of experimental evolution. Interacting with most of the participants was very helpful in creating a network for future project opportunities but also to meet scientists from similar fields.

I am very grateful to the British Phycology Society for their financial support to cover my travel expenses in order to attend this great conference in Seattle, USA.

**Katrin Schmidt K.Schmidt@uea.ac.uk**  
**University of Washington, Seattle, USA**



The molecular life of diatoms conference is held every other year, and this year I was fortunate to attend the meeting at the University of Washington in the beautiful city of Seattle. Funding from the British Phycological Society allowed me to attend and present a poster on the development of a transformation system in the polar diatom *Fragilaropsis cylindrus* and preliminary data on a potential silica-associated transcription factor. This was a fantastic experience to present my work and receive feedback from the diatom research community. It was also a great opportunity to meet both lea-

ders of the field, as well as many young career scientists, and to hear about their most recent work. There were a number of excellent talks and poster presentations on topics including genetics, evolution, biotechnology and in particular several on silicification in diatoms. This was very useful for my project but also gave me a broader insight into many other areas of diatom research. Several people presented new methods for molecular biology in diatoms including transformation by bacterial conjugation, CRISPR-Cas, TALENs and yeast one-hybrid system which many, including myself,

are looking forward to applying to their own work. There were many opportunities to network including the poster presentations in the evenings and the gala dinner in which the city's famous salmon and excellent local beers were served on a boat overlooking Seattle. There was also a free afternoon built into the itinerary which allowed us to explore Seattle. This conference has grown over the years from a small handful of people to a few

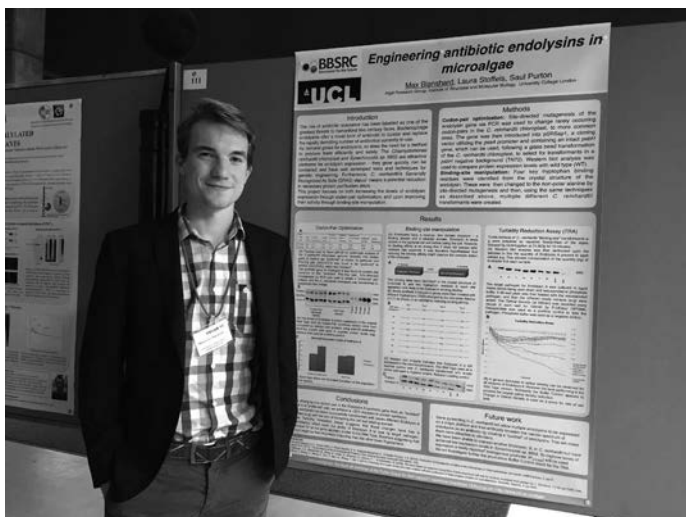
hundred, all striving to understand diatoms and with a multitude of interesting projects on show it's not hard to understand why. I have come away from this conference with a host of new experiences, new contacts and many new ideas and methods which I'm looking forward to applying to my own work.

**Amanda Hopes, University of East Anglia**  
[a.hopes@uea.ac.uk](mailto:a.hopes@uea.ac.uk)

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## **Sixth International Conference on Plant-Based Vaccines, Antibodies & Biologics (PBVAB), Lausanne, 8th July 2015**

### **Antimicrobial endolysins in the *Chlamydomonas reinhardtii* chloroplast**



I am a second year PhD student at University College London, where my research focuses upon expressing antimicrobial endolysins in the *Chlamydomonas reinhardtii* chloroplast.

We arrived in Lausanne for the Sixth International Conference on Plant-Based Vaccines, Antibodies & Biologics (PBVAB) on the 8th June 2015. In true Swiss fashion, our immaculate train presented us precisely on time at Lausanne University Hospital (CHUV), where the conference was to be held.

Charles Arntzen, of Arizona State University, greeted us and introduced the special opening plenary session, which was to focus upon Ebola virus. We were treated to half a dozen fascinating talks, describing multiple aspects of the Ebola crisis, and the ac-

companying therapeutic efforts. Larry Zeitlin, of MAPP Biopharmaceuticals, spoke of his role in designing ZMapp – the drug based upon three chimeric antibodies used to treat Ebola victims in West Africa last year. When the crisis in West Africa became apparent, this drug was still in development and Kentucky Bio-Processing were called in to scale its production as quickly as possible using *Nicotiana benthamiana*. These were a fascinating group of talks, which really inspired the whole room and it was amazing to see how rapidly things can be done in an emergency.

The three-day conference was liberally dissected by coffee breaks, during which I was able to present my poster “Production of protein antibiotics in microalgae” to numerous attendees, including both those from academic and industrial backgrounds. Despite the conference being mainly plant focused, there were still many people who were working with microalgae too. I received some extremely helpful feedback, ideas, and offers for collaboration, as well as making friends with other scientists from all over the world.

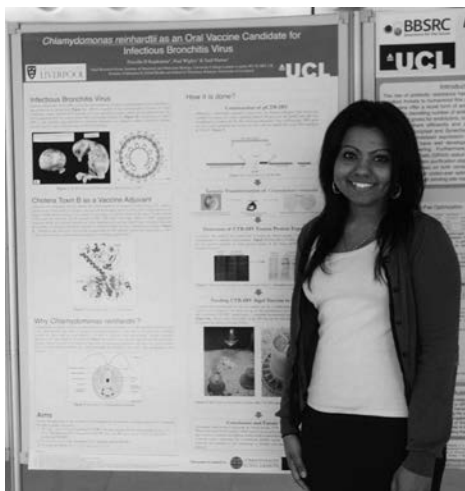
All in all the conference was not only interesting and insightful, but also inspirational. Here were many examples of plant-based therapeutics that were at first, second and even third stage clinical trials, and it was hugely motivational for me - something which is always welcome at this stage of a PhD!

I'd like to thank the British Phycological Society for their financial support to attend this conference and to present my PhD research to others in the field. It was a fantastic experience.

**Maximilian Blanshard**  
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### **Production of peptide vaccines in the algal chloroplast, and the efficacy of engineered algae as a low-cost oral vaccination for the poultry and fish farming industry**



I am currently a third year PhD student in the University College of London under the supervision of Professor Saul Purton. My research focuses on the production of peptide vaccines in the algal chloroplast, and the efficacy of engineered algae as a low-cost oral vaccination for the poultry and fish farming industry.

In early June this year, the Plant-Based Vaccines, Antibodies and Biologics (PBVAB) took place at the University of Lausanne, Switzerland. This is an international conference that reviewed the current technology in plant protein expression systems as well as the down stream processes and challenges involved in this field of research. This meeting also discussed recent effort involving the development of vaccines, monoclonal antibodies, and human enzymes as well as how to use this technology to prevent diseases in animal and aquaculture. Therefore, the PBVAB provided a good platform for postgraduate students like me to present our research.

Besides that, the 2015 PBVAB brought together many experts from different fields such as vaccinology, immunology and biotechnology. Therefore, it was a good opportunity to compare the algal vaccine that was developed in the Purton lab to other expression systems. All talks in this conference were very interesting, however, I particularly enjoyed the talk on “Plant-made vaccines and antibody to prevent/treat Ebola”. It was fascinating to know about how a group of researchers in the United States produced an Ebola drug called Zmapp comprising of three monoclonal antibodies that were made in plants. All these talks encouraged me to think how much more research we can do with microalgae.

Attending this international conference certainly gave me a chance to meet and build a network with fellow researchers from various institutes and universities around the world. I am very grateful to the British Phycological Society for funding me so that I could attend and present my work at this important conference.

**Priscilla Rajakumar <p.rajakumar.12@ucl.ac.uk**

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**Our President Gill Malin represented the BPS at the Algae Around the World Symposium in Cambridge in March 2015, where the BPS sponsored a £100 poster prize. The winner was.... Priscilla Rajakumar and below is her second report. Congratulations to Priscilla.**



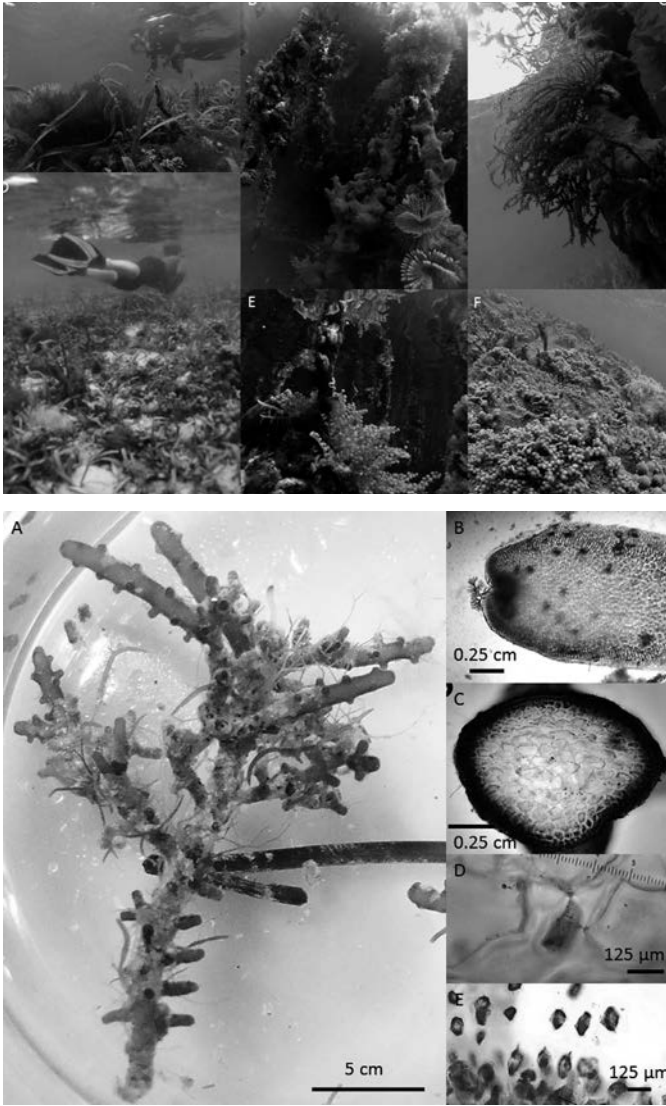
I am a final year PhD student in Dr. Saul Purton’s lab at University College London and my PhD programme is fully funded by Commonwealth Scholarship UK. My PhD research focuses on the production of Infectious Bronchitis Virus (IBV) peptide vaccines in the algal chloroplast, and the efficacy of the engineered algae as a low-cost oral vaccine for chickens. I have genetically modified the chloroplast of *Chlamydomonas reinhardtii* with regions of IBV gene and expressed it as a fusion to a protein adjuvant, Cholera Toxin B (CTB) with a view to using it as an edible vaccine for chickens. Currently, these transgenic lines are being tested for its efficacy as an oral vaccine at the University of Liverpool, a collaborating partner of this project. Furthermore, I am also exploring the potential of this technology to produce an oral algal vaccine for the fish farming industry.

This project is very challenging because viruses like IBV have high number of antigenic variants. However, I enjoy carrying out my project simply because it holds the potential of preventing diseases in the poultry and fish farming industries especially in under developed countries.

My supervisor often encourages me to participate and present in conferences and symposiums, so therefore, I have had many opportunities to present my project at conferences within and outside the UK. In addition, these conferences give me an opportunity to network with other researchers in similar fields. I find that the feedback that I receive at conferences is very encouraging, relevant and useful to my research.

I recently attended was the Algae Around the World Symposium, which was held at the University of Cambridge on 19th March 2015 (<http://www.bioenergy.cam.ac.uk/abc-directory/algae-around-the-world-symposium>). At this symposium, I presented my research on ‘*Chlamydomonas reinhardtii* as an oral vaccine candidate for infectious bronchitis virus’ and was awarded the £100 best poster prize sponsored by the British Phycological Society (BPS). Last year, BPS also funded me to present at the Young Algaeer Symposium in Montpellier and Narbonne, France. Therefore, I take this opportunity to thank BPS for generously funding and making awards to postgraduate students like me. These awards have definitely encouraged and given me more confidence to present my PhD research at international conferences. Thank you BPS!

## Tropical Field Phycology course



I was privileged to be accepted on the recent Tropical Field Phycology course offered by the Smithsonian Tropical Research Institute. This marine field course was run from their Bocas del Toro Research Station on the Caribbean coast of Panama. Fifteen other lucky early career researchers attended from all around the world with representatives from Argentina, Belgium, Brazil, Canada, Costa Rica, Cuba, Mexico, the host nation, and the USA. Our instructors also travelled from afar (USA).

Under the instruction of our instructors Wilson Freshwater, Suzanne Fredericq and William Schmidt we spent almost every waking hour of an intense fortnight collecting, identifying, characterising and ultimately preserving a diverse range of tropical marine flora. The course focused on the development and enhancement of necessary practical skills with sampling forays into a diverse range of marine environments (e.g. mangroves, seagrass meadows, sponges communities, coral reefs, and rocky sheltered and exposed intertidal regions) within the Bocas del Toro Archipelago (Figure 1). Identification and characterization were undertaken within the fully equipped STRI laboratory using both dissecting and compound microscopes, available literature and expert guidance from both course participants and instructors. Sectioning and staining was encouraged and images were captured at all stages of investigation allowing the formation of individual species plates (Figure 2). Both students and instructors shared a wide range of specialised expertise with knowledge exchange prevalent throughout the 2 week

period. Preservation for subsequent molecular analysis occurred by both press and silica gel, whilst morphologically identified specimens were preserved by press alone. In some instances preservation in formaline also occurred. A specimen of all new species was preserved in pressed form for archiving by the University of Panama. Individual species plates of species new to the region were also generated, and old plates amended where appropriate. These plates included descriptive photos (e.g. in the field, whole mounts in the laboratory, sections, and other distinctive features). STRI has plans to create a local phycology guide from these plates, however for now they will contribute to the established Bocas del Toro Biodiversity Inventory.

In addition to practical work, the course instructors gave daily lectures on the basics of macroalgal taxonomy and morphological and molecular identification techniques specific to functional groups of macroalgae from filamentous reds to calcified greens. The instructors and participants also gave individual presentations on their area of research. My presentation on the long-term change of large brown macroalgae in the British Isles was well received, with many questions throughout the fortnight. Considering the specialised nature of the course, presentations were exceedingly diverse, and varied from morphological and molecular taxonomic studies of functional groups (e.g. filamentous browns or encrusting red coralline algae) or genus (e.g. the filamentous green *Cladophora* spp.), through ecological assessments of in situ seaweed communities on a national scale (e.g. on the Argentinian coast) or within a specific habitat (e.g. in Rhodolith beds or seagrass meadows), to anthropogenic uses and growth of seaweed.

Although based in the tropics, I would recommend this course to any budding marine phycologist. I gained experience and understanding of wholly new ecosystems, complete with genera and species I had never seen before, whilst reinforcing practical skills essential for investigation of seaweed communities, ecology and taxonomy that are applicable in any part of the world. Each new survey site was filled with new and exciting discoveries. I have never seen such diversity in green seaweeds from the shaving brush of the *Penicillus* spp. to moniliform *Chaetomorpha* spp. Additionally I formed many rewarding links with a wide range of people from many different backgrounds all with a passion for marine phycology. I have returned to the UK with renewed energy and enthusiasm for my research, more confidence in my own abilities, and additional drive to further my career within this field. I am truly grateful to the British Phycological Society for their generosity in awarding me a bursary for attending this field course. Without your support this would not have been possible.

**Figure 1 (top left): Variety of survey locations. A. *Dasya* spp. in a seagrass bed. B. Mangrove root community with sponges, polychaetes and the green macroalgae *Caulerpa verticillata*. C. *Acanthophora spicifera* on Mangrove root. D. Sampling over shallow seagrass beds. E. *Caulerpa ramosa* on mangrove root. F. *Caulerpa ramosa* on coral community.**

**Figure 2 (bottom left). External and internal morphology of *Yuzura* spp. (cf. *porteau* var. *gemmifera*). A. Whole specimen demonstrating thallus habit. B. Branch tip featuring apical pit complete with tuft of trichoblasts. C. Transverse section featuring distinct cortex and medulla. D. Stained transverse section highlighting central cell with 2 pit connections to pericentral cells. E. Pointed cortical cells.**

Laura Bush

## 12th Marine Biological Association Postgraduate Conference, Queens University Belfast 18th- 22nd May 2015

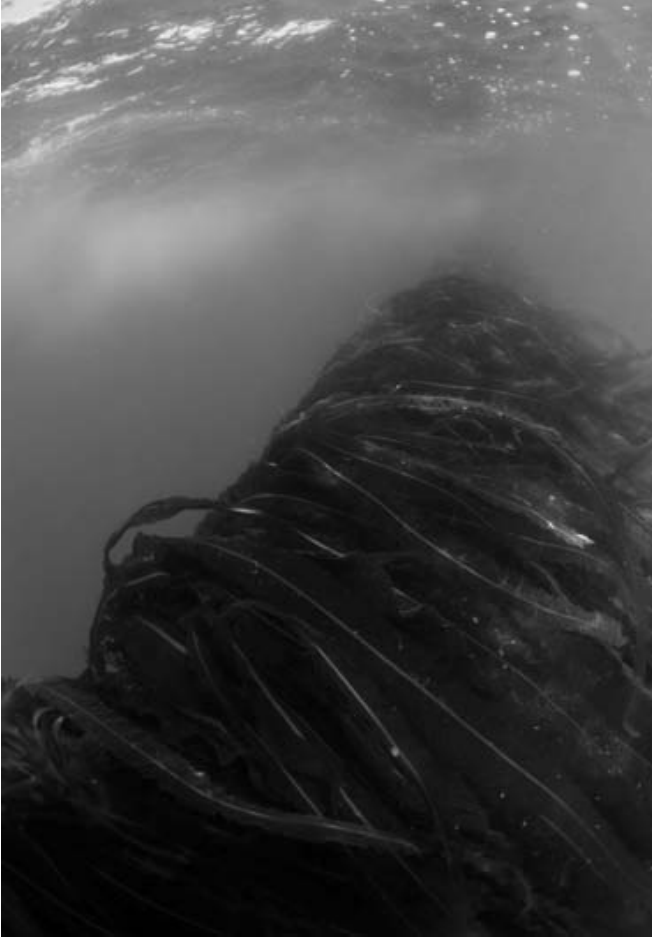


Fig 1. *Alaria esculenta* seaweed longline. Photo by Benoit Queguineur

Fig 2. Conference delegates outside QUB. Photo by: Lawrence Eagling



In May 2015 I was delighted to obtain funding from the British Phycological Society to attend my first (and hopefully not my last) Marine Biological Association Postgraduate Conference. This is a 4 day meeting uniquely organised by postgraduates for postgraduates and was held in Queens University Belfast this year and culminated in a field trip to the universities Marine Biology Laboratory in the beautiful setting of Portaferry on Strangford Lough. Delegates included Masters and PhD students from all aspects of marine and aquatic biology, from genetics, community ecology to fisheries management and everything in between. This meeting provided a great opportunity for early career scientists to present and discuss our research in a friendly environment with other researchers at the same stage in their careers. For many delegates this was the first time they presented their research to outside audiences and while large conferences can sometimes be very daunting for new researchers, the MBA conference had a very relaxed atmosphere which provided an excellent platform to showcase our research.

With over 30 talks on such varied topics such as photoreception in brittle stars, the cyclical nature of saltmarshes within resilient estuaries and Paeovirus presence and detection in the Laminariales 2 life-cycle phases (gametophytes and sporophytes), it was thoroughly enjoyable to see the range of research being undertaken by my peers. Even though only some of the research was directly relevant to my own, some of the techniques and methods could be applicable to me. I gave an oral presentation on preliminary findings of the “Successional changes of epibiotic fouling communities of the cultivated kelp *Alaria esculenta* (Linnaeus) Greville”. Some delegates were unaware that seaweed is cultivated in British and Irish waters and I found it exciting to discuss the cultivation industry and this relatively new area of research with them. Some of the delegates were particularly interested in the environmental impact of seaweed farming which gave me the opportunity to talk about other aspects of my PhD, including an assessment on how the benthic community underneath the farm are affected by its presence.

It was really enjoyable to engage with other students and to not only discuss our project topics but to also discuss the ups and downs of life as an early career scientist. It was great to make contacts and friends with whom I hope keep in contact with and have made plans to meet up again at other conferences around the UK.

Aimee Walls  
[aimee@galwaydiving.com](mailto:aimee@galwaydiving.com)

# The effect of Salinity on DMS Production and DMSP concentration in *Ulva clathrata*



Photosynthetic organisms in general have the majority of my academic attention. So, naturally, during the first year of my Marine Biology BSc I had a keen interest in algae and during the first few months of my degree it turned into a passion. This pushed me into asking the question of what algal research was really like. Motivated by this cause I sought out Dr Michael Steinke, a lecturer at the University of Essex whose research has been based much on algal research. After a few meetings and discussions over research that could be carried out over the summer we generated and submitted an application in November 2014 to the British Phycological Society for funding support for a salinity stress experiment on the common chlorophyte seaweed *Ulva clathrata*.

After a few months of suspense we finally received acceptance of funding for the project. As a result I delightfully started working on the project in June 2014 just after I had finished my second year examinations. The project itself consisted of growing *U. clathrata* in varying salinities (17, 34, 51 and 68) and quanti-

fying the production of the climate-cooling marine trace gas dimethyl sulfide (DMS) and its precursor dimethylsulfoniopropionate (DMSP), an osmolyte in marine algae. We stressed grown seaweed in opposing salinities, for example if the seaweed was grown at a salinity of 17, it was stressed in 68, measured the outputs for DMS and DMSP and then compared it to controls that remained at 17. My work then took me to the University of East Anglia for 2 weeks working with Dr Jonathan Todd and Dr Andy Curson in order to quantify cellular metabolites and activities of DMSP-biosynthesis enzymes in frozen samples of my seaweed.

Both experiences have allowed me to expand my knowledge on practical techniques used in a laboratory when studying algae whilst simultaneously giving me an invaluable insight into the research within this field. This project has inspired me to continue academia into what I hope to be a fruitful career in the phycological field. The skills gained in this project are in no doubt a great asset to help me achieve my academic goals and for that I am grateful to the British Phycological Society for the opportunity provided to help me expand my chances of succeeding in the competitive academic climate.

Sometime in the future I hope to attend one of the annual meetings of the British Phycological Society and present what we have found. I am grateful to University of East Anglia for allowing me to perform the metabolite and enzyme analyses in their lab but most of all I am extremely appreciative of the funding and support provided by the British Phycological Society without which none of this would have been possible. This project provided a great opportunity to expand my scientific skills and will fuel my learning during the 3rd year of undergraduate study.

**Duncan Sweeney, BSc Marine Biology, School of Biological Sciences, University of Essex, dsween@essex.ac.uk**



# 6th European Phycological Congress, London, 23-28 August 2015

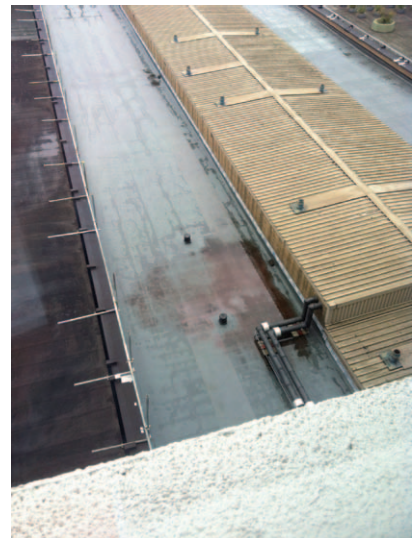


Above: Registration desk

Right: *Haematococcus* on London hotel roof

Below and next page: Poster and Oral presentations, including BPS President Christine Maggs during her BPS Presidential lecture

Bottom right: Hilda Canter-Lund Award 2015 winner Günter Forsterra "Octopus's garden"





# 2015 Hilda Canter-Lund Competition



The winner of the 2015 Hilda Canter-Lund Competition is Günter Forsterra for his spectacular underwater landscape “Octopus’s garden”. Günter is the Research Coordinator at Huinay Scientific Field Station in Chilean Patagonia where he studies fjord ecosystems. He is especially interested in the ecology of cold-water corals and the forces which determine species distribution within Chilean Patagonia. His picture shows macroalgal communities, principally *Lessonia negrescens*, on the bottom of the Beagle Channel. These provide habitat and substrate for a variety of invertebrates and shelter or food for fish,

Günter’s photograph, along with all the other shortlisted images, can be seen on the BPS website ([http://www.brphycsoc.org/Canter-Lund\\_2015/index.lasso](http://www.brphycsoc.org/Canter-Lund_2015/index.lasso)) and were also on display at the European Phycological Congress in London. Thanks to everyone who took part this year and congratulations to all those who were shortlisted, but particularly to Günter.

Martyn Kelly

## Student Representative



**Paul Cherry,**  
[student.rep@brphycsoc.org](mailto:student.rep@brphycsoc.org)

Fundamental physiology, biotechnology or nutrition? Where do your interests in phycology lie? For me it’s mostly the latter, but finding out about other phycology research is important too. I’m Paul, a PhD student at Ulster University and I’m fortunate to be your BPS student representative for the next two years. Firstly, thank you for joining BPS as a student member (if you haven’t already, please do!). I’m sure you’re aware that membership is great for your CV - it demonstrates a commitment to phycology and broadens your knowledge of wider research/activities. If you’re new to BPS, I hope the summary below details available opportunities. If you’re a seasoned student member, I hope it serves as a gentle reminder of what you can utilise.

Be active: How can we improve? What would you like from the society?

- Talks/events about careers/further study in phycology.

- Training/workshops.
- A discussion forum.
- Science communication – Can we begin a student section within *The Phycologist*? Or a student led publication/blog? This would give you an opportunity to write an article, for example, a summary of an individual research project, an overview of your research/study, or a journal club style summary of a publication.

Capitalise on funding opportunities:

- Student bursaries for attending phycological meetings, field courses and workshops.
- Summer undergraduate research projects.
- Four deadlines: 1st of February, May, September, and December, but be aware, you must be a BPS member for at least 3 months before applying for funding!

- More information is available at [www.brphycsoc.org](http://www.brphycsoc.org)

Network at conferences:

- Annual BPS meeting and affiliated conferences (i.e. European Phycological Congress).
- Student symposia (presentations, talks, forums).
- Student competitions (oral and poster presentations).

Membership:

- Annual student membership is only £10 and you can apply/renew online.
- Increase student membership and participation – mainly my job, but you can spread the word too!
- How can we reach out to a wider audience?

Let us make the most of available opportunities and develop new experiences for current and prospective student members. Please feel free to contact me with ideas, issues, requests and feedback - your suggestions are always welcome!

I look forward to hearing from you.

Best regards, Paul

Best regards, Paul

Best regards, Paul

Best regards, Paul

Best regards, Paul

# Freshwater Algal Flora of the British Isles – Update 4

The winner of the 2015 Hilda CaThe current update to information published in the 2nd edition of The Freshwater Algal Flora of the British Isles (John et al., 2011) takes account of nomenclatural/taxonomic changes and taxa newly recorded from Britain and Ireland. All references relating to taxonomic and nomenclatural changes are given in AlgaeBase (Guiry & Guiry, 2015). In parentheses are new code numbers and these will be changed or added to the present on-line version of the coded list of British freshwater algae (Whitton & John, 2014).

- p. 285. *Chrysocapsella paludosa* (West et G.S.West) Bourrelly change to *Chrysocapsa wetherbeeii* R.A.Andersen (09090030); see Andersen et al. (2015).
- p. 298. *Gloeochrysis turfosa* (Pascher) Bourrelly change to *Goeochrysis turfosa* Pascher (09260010).]
- p. 313. *Mallomonas acaroides* Perty change to *Mallomonas ploesslii* Perty (09310460).
- p. 303. *Spiniferomonas bourrellyi* Takahashi to *Paraphysomonas bourrellyi* (Takahashi) Preisig et D.J.Hibberd (09550020).
- p. 303. *Spiniferomonas serrata* K.H. Nicholls to *Chromophysomonas serrata* (K.H.Nicholls) Preisig et D.J.Hibberd (09600010).
- p. 305. *Spiniferomonas trioralis* E. Takahashi to *Chromophysomonas trioralis* (K.H.Nicholls) Preisig et D.J.Hibberd (09600020).
- p. 305. *Uroglena eustylis* Skuja to *Uroglenopsis eustylis* (Skuja) R.H.Thompson et Wujek (09550030).
- p. 305. *Uroglenopsis europaea* Pascher to *Uroglena europaea* (Pascher) Skuja (09540060).
- Ear) that is located on the machair plain along the west coast of South Uist in the Outer Hebrides, Scotland (Lang et al., 2015a).
- Cosmarium distentum* (G.S.West) Coesel et Meesters (27052780): collected in an animal drinking trough at Boxgrove, West Sussex, England (Carter et al., 2015, as *Cosmarium laeve* Rabenhorst var. *distentum* G.S.West).
- Cosmarium dovrense* Norstedt (27050620): collected on the fell known as Pen-y-Ghent in the Yorkshire dales, England (Pentecost & Williamson, 2013).
- Dictyosphaerium subsolitarium* Van Goor (17220060): recorded from two ponds in Cambridge, namely Botton's Pit Newnham and Cambridge Science Park (Belcher et al., 2008).
- Dinobryon stokesii* Lemmermann var. *neustonicum* Petersen et Hansen (09230150): collected from Loch Flemington, Nairnshire, Scotland (Lang et al., 2015b).
- Synura hibernica* Škaloud et Škaloudová (09530070): recorded from several loughs in the west of Ireland by Škaloud et. al. (2014).

## Reference

- Andersen, R.A., Kim, J.I., Tittley, I. & Yoon, H.S. (2015) *Chrysotila dentata* comb. nov., *Chrysotila roscoffensis* comb. nov. and *Chrysocapsa wetherbeeii* sp. nov. *Phycologia* 54: 321-322.
- Belcher, H., George, E. & Swale, E. (2008) A new algal flora of Cambridge (Vice-county 29), III. Phylum Chlorophyta, Class Chlorococcales (first part). *Cambridge Naturalist* 50: 37-43.
- Carter, C.F., Williamson, D.B. & Mat-  
cham, H.W. (2015) A first record of *Cosmarium laeve* Rabenhorst var. *distentum* G.S.West from the British Isles. *Quekett Journal of Microscopy* 42: 387-391.

## New Records

*Bitrichia ollula* (Fott) Fott (09030030): collected in a plankton sample from East Loch Ollay (= Loch Olaidh an

searched on 29 August 2015.

John DM, Whitton BA, Brooks AJ (eds) (2011) The Freshwater Algal Flora of the British Isles An identification guide to freshwater and terrestrial algae. Second edition. Cambridge University Press, Cambridge. 878 pp.

Lang, P., Mullen, E. & Krokowski, J. (2015a) The newly recorded chryso-  
phyte, *Bitrichia ollula* (Fott) Bourrelly: an intriguing find from a Hebridean machair loch, and its ecological niche compared with two similar species occurring in Scottish freshwaters. *The Glasgow Naturalist* 26: in press.

Lang, P., Meis, S., Spears, B.N., Krokowski, J., Milne, I. & Pottie, J. (2015b) *Dinobryon stokesii* var. *neustonicum* in Loch Flemington, Scotland: a rarely observed variety of golden alga new to UK freshwaters. *The Glasgow Naturalist* 26: in press.

Pentecost, A. & Williamson, D.B. (2013) Rediscovery of *Cosmarium dovrense* Nordst. in the British Isles. *Quekett Journal of Microscopy* 42: 19-24.

Škaloud, P., Škaloudová, Procházková, A. & Němcová, Y. (2014) Morphological delineation and distribution patterns of four newly described species within the *Synura petersenii* species complex (Chrysophyceae, Stramenopiles). *European Journal of Phycology* 49: 213-229.

Whitton, B.A. & John, D.M. 2014. Coded List of Freshwater Algae of the British Isles 2014 World-wide Electronic Publication ([http://www.ceh.ac.uk/data/algae/algae\\_index.html](http://www.ceh.ac.uk/data/algae/algae_index.html)).

**David M John and Brian A. Whitton**  
**Life Sciences Department, Informatics and Diversity Division, Natural History Museum, Cromwell Road, London SW75BD, UK (d.john@nhm.ac.uk) and School of Biological and Biomedical Sciences, Durham University, Durham DH1 3LE, UK (b.a.whitton@durham.ac.uk)**

# Scottish Environment Protection Agency hosts specialist algal workshop for UK phytoplankton experts

In April 2015, a contingent of nine algal specialists from Scottish Environment Protection Agency (SEPA), the Environment Agency and Centre for Ecology & Hydrology, together with several consultancies (APEM Ltd, Beacon Biological and ENSIS Ltd), collectively known as the UK Phytoplankton Expert Group or 'UK PEG', gathered at SEPA's Angus Smith Building (Figure 1). The primary objective was to discuss and agree a harmonized way forward for phytoplankton sampling and analysis across Britain and Ireland, in line with upcoming amendments to technical guidance proposed by the European Committee for Standardization (CEN). This was an especially important meeting because phytoplankton is one of the 'biological quality elements' (BQEs) used by UK environment agencies to measure the ecological status of our freshwater lakes, as required under the EU Water Framework Directive (WFD), and to evaluate the effectiveness of lake management programmes. As CEN's recommendations are expected to be integrated into an annex of the WFD sometime in the near future, we contemplated their implications, related to the way UK phytoplankton experts routinely operate and steered discussion on how existing procedures may need to be adapted to accommodate these changes (Figure 2). Overall, UK PEG felt comfortable adopting CEN's suggestions and migrating towards a more streamlined, coherent approach.

During the workshop Pauline highlighted a number of phytoplankton taxa, discovered in samples collected from SEPA-monitored lochs, which are completely new to the British Isles. This was intended to promote a co-ordinated effort across UK PEG for recording new or rare planktonic algae from a biodiversity perspective and raise discussion about how we should deal with these practically, at the database level, for water quality assessment purposes. SEPA leading by example in this area, has so far, published 9 papers documenting these new phytoplankton records to ensure the wider scientific community are aware of their ecological distribution and also officially lodged them with Algaebase. Elsewhere in the UK, other taxonomic records may be going under-reported and we agreed to improve communicating this 'hidden' information by taking a more joined-up approach to our algae-based work in the future.

Afterwards, everyone headed to the Ecology lab where we continued to share expertise by working through a range of phytoplankton samples and gather a consensus of opinion on problematic taxa (Figure 3). It is customary at these specialist workshops for delegates to bring along some of their own specimens, though SEPA provided a suite of phytoplankton samples, representing ranging environmental conditions, to challenge our expert identification skills.

Since 2006, UK PEG has met every 2 or 3 years at a variety of locations including the Lake District. However, this is the first time a workshop has visited SEPA Angus Smith



Building and we intend on meeting more regularly to build on our network of expertise and the successful outcomes of this particular reunion. Forthcoming workshops are also likely to be hosted by SEPA, as our external delegates were impressed with the excellent facilities on offer at our Angus Smith Building, which enabled us to easily shift between a conference format and practical laboratory work. We have also agreed to lead development of a phytoplankton quality control scheme, an exciting inroad to improving consistency across UK PEG. We are now busy facilitating the many actions which emerged from this workshop and already looking forward to welcoming our fellow algal experts back to SEPA in 2016!

**Pauline Lang, SEPA, Ecology Assessment Unit,  
Pauline.lang@sepa.org.uk**

Figure 1. UK Phytoplankton Expert Group 2015 participants (L-R) Dr Pauline Lang (SEPA), Dr Sian Davies (EA), Helen Woods (CEH), Sarah Pritchard (Beacon Biological), Dr Jan Krokowski (SEPA), Richard Bassett (APEM Ltd), Dr Laurence Carvalho (CEH), Dr Gina Clarke (ENSIS Ltd) and Elizabeth Mullen (SEPA).

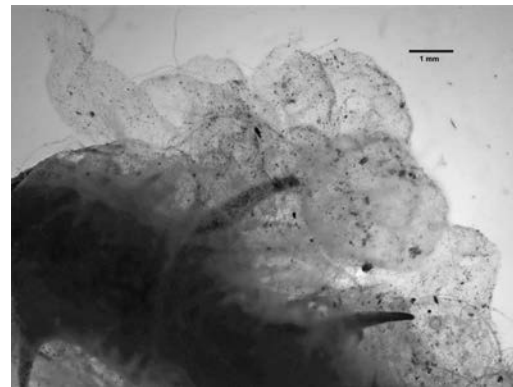
Figure 2. UK PEG in the midst of discussing future ways of working together.

# *Gloeochloris smithiana* Pascher, a xanthophyte new to the British Isles

During examination of samples from a Northamptonshire (VC32, UK) drainage ditch between 2013 and 2015 very pale, yellow-green, mucilaginous colonies of an alga were discovered on the submerged stems of a bramble (*Rubus*). The colonies appear to be a member of the Class Xanthophyceae (Ochrophyta/Heterokontophyta) and closely correspond to the little-known *Gloeochloris smithiana*, a species only known previously from North America. The ditch was of special interest because, after an earlier clearance, it briefly contained colonies of the rare stonewort *Tolypella intricata*. It lies close to the edge of an SSSI which is an ancient woodland and is adjacent to what is probably a drove road bordering agricultural land. Many deer paths cross the ditch whose water is alkaline (pH 7.7) and mesotrophic (conductivity 680  $\mu\text{S}/\text{cm}$ ) and contains conjugating filamentous algae as well as stoneworts. There is a complex pond system nearby which has been designated an 'Important Stonewort Area' and the whole SSSI lies on a raised dome of 'boulder clay', probably of Wolstonian age.

The colonies form macroscopic, gelatinous masses whose boundary is soft and whose cells are largely confined to the outer region. Cells are oval/cylindrical in shape, 9-10  $\mu\text{m}$  long and 6-7  $\mu\text{m}$  wide, contain 3 to 5 parietal, disc-shaped chloroplasts and dense leucosin granules (very evident using phase contrast microscopy). Time lapse photography has not provided any conclusive evidence of the presence of contractile vacuole. It is unlikely that the spores and cyst-like structures found within the mucilage are stages in the life history of *Gloeochloris*. Older parts of the colonies almost invariably contained filaments of *Chaetophora* and a few chrysophytes were also observed. Ageing colonies eventually fragment and disperse.

It is possible that this *Gloeochloris* has been overlooked in such alkaline lowland situations and, possibly, on cursory examination, has been mistaken for the gelatinous colonies of such green algae as *Tetraspora*, *Chaetophora* and *Gloeocystis*. Only on microscopic examination are revealed several yellow-green chloroplasts in each cell as well as granules and vacuoles that assist in characterizing the species. The presence of several chloroplasts in each cell distinguishes what distinguishes *Gloeochloris smithiana* from *G. planctonica*, the only other species currently recognized. *Gloeochloris smithiana* is a new addition to the freshwater algal flora of the British Isles and belongs to a morphologically simple and incompletely described genus requiring revision using a molecular approach and close comparison with related genera (e.g., *Heterogloea*, *Gloeobotrys*). One of the last workers reported to have seen *Gloeochloris smithiana* in the USA (Richard Meyer) has now been contacted, but reports that his own specimens failed to find a group that would be willing to do such work and were destroyed when he retired.



Christopher F. Carter, David M. John

# The New Algal Recording Site

## <http://www.bpsalgalrecords.com/>



British Phycological Society  
Seaweed and Freshwater Algae  
Recording Site



Our knowledge of the ecology and distribution of freshwater/subaerial algae in the British Isles lags far behind that of seaweeds. Much of the most reliable site-specific data that exists is scattered and rarely stored in accessible and searchable databases. To resolve this problem, the seaweed recording portal on the BPS website has been expanded to enable the input of British and Irish records of freshwater (including terrestrial) algae and renamed 'Algal Recording'.

The algal recording site includes an interactive map for pinpointing record locations, a photo upload facility, a drop down calendar for selecting recording dates, a facility for selecting the species name based on the National Biodiversity Network's UK 'Species Inventory' to ensure correct spelling of names, and allows for summarizing and exploring the database. The new version has attribute fields appropriate for non-marine algae including various categories of flowing and non-flowing water, type of subaerial surface, etc.

Records can be added individually or large numbers of records can be imported together using a downloadable spreadsheet template. The system detects any problems in the file and indicates whether any records did not import and gives an option to re-input the corrections to just the problematic entries. Those individuals who add records are requested to indicate whether "certain", "likely" or "uncertain" since it is important to have some idea as to

whether there is any doubt attaching to the identification. Verification rules have been drawn up by Juliet Brodie for seaweed recording and similar ones will be developed for non-marine algae. Those recording freshwater microalgae are encouraged to import good quality photomicrographs, especially of rare or unusual taxa.

I am keen to encourage all those who have site-specific records of seaweeds and non-marine algae to upload them to the recording site. Only by means of such a searchable database will it be possible to follow changes in our algal flora relating to climate change, non-native introductions and other factors. The database can also be used to create and refine existing distribution maps, assesses the conservation status of individual taxa and determine future conservation priorities.

The expansion of the recording site would not have been made possible without financial support from the BPS. My thanks go to John van Breda for redeveloping the website, Juliet Brodie for help and advice and Roy Merritt for allowing the import of his *Vaucheria* records.

**David M John, Life Sciences Department, Informatics  
and Diversity Division, Natural History Museum,  
Cromwell Road, London SW75BD, UK,  
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# When Saturn fell to Earth: an algal genus new to the British Isles found in peatland pools

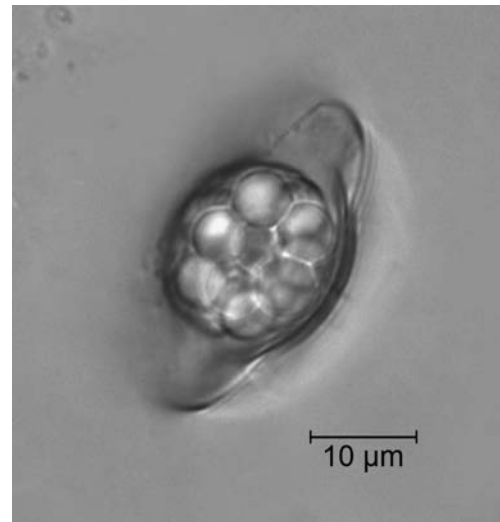
Jeannie is a Ph.D. student at the University of Leeds supervised by Lee Brown and Joseph Holden. Her project is funded by the Natural Environment Research Council with the RSPB as a CASE partner.

Who would have thought that studying for a PhD on the ecological impacts of peatland restoration would take us to another ‘planet’? The planet in question is a microscopic Saturn, complete with rings, and it’s living in man-made bog pools in Cumbria. What’s more, this beautiful alga, *Saturnella saturnus*, has apparently never been recorded in the British Isles. Previous documented finds come from the same, peaty habitat type in Bohemia (now part of the Czech Republic), Sweden, parts of the old USSR (e.g. Western Siberia and Latvia) and New Zealand (1957); its appearance in bog pools at Moor House National Nature Reserve in the North Pennines was an exciting moment, and is surely great news for the restoration agenda.

Blanket peatlands are a globally scarce habitat, but commoner in the British Isles where they cover approximately 7.5 % of the total land surface. They have a high conservation value and are a UK Biological Diversity Action Plan priority habitat. Some expanses of blanket bog are home to naturally-occurring, open-water pools. These pools can be well-vegetated by *Sphagnum* mosses and have low pH, low levels of primary production and nutrients but high levels of dissolved organic matter. They are most prevalent in the northerly, oceanic regions of Britain, with some particularly spectacular examples in the Flow Country of Caithness and Sutherland. However, further south (e.g. in the Pennines) conditions necessary for pool formation are less favourable and they were scarce until restoration measures created hundreds of thousands of them.

The restoration was necessary because the British uplands (including vast swathes of blanket bog) were extensively drained after World War II in a failed attempt to ‘improve’ the peaty soils, mainly for agriculture and forestry. The actual result was degraded, eroding peatlands which led to problems with water discolouration in upland streams, lower rates of carbon accumulation and a loss of biodiversity. In the 1980s, land managers started to block the drains, usually with dams made from peat turves, and pools formed behind these dams. It’s a rare case of freshwater habitat creation, providing living space for aquatic species (macroinvertebrates, amphibians and vegetation) as well as vital food and water sources for the many species of moorland birds that utilise blanket bog.

The main focus of the PhD research is macroinvertebrates. However, the algae present were intriguing and this was what led to our cooperation. Samples from five artificial pools at Moor House showed many flagellated motile species such as *Chlamydomonas* and *Synura* but the



identity of a certain saucer-shaped alga present in two of the pools remained a mystery until, with the help of some old texts, the first British record of *Saturnella saturnus* was confirmed.

Dr. Elizabeth Haworth, curator of the Fritsch Collection of Algal Illustrations, provided copies of the three existing record sheets for the species and also corrected our original nomenclature: the species name in some European texts was *Saturnella saturna* but the correct name is *Saturnella saturnus* (Steinecke) Fott (see the note on Algaebase by Mike Guiry). We still have a lot of work to do before a fuller account can be presented: our observations do not entirely accord with those of Steinecke in 1916 or Skuja in 1959. Fott (1960) has provided an important review of knowledge to that date, necessary because of multiple name assignments by different workers who were unaware of each other’s studies.

In the meantime, the presence of *Saturnella* indicates that peatland restoration measures are helping biodiversity on a wider scale than was perhaps at first envisaged. It’s not just the *Sphagnum*, the dunlins and the dragonflies that benefit; it’s also the microscopic organisms which help to sustain the entire food chain of these beautiful landscapes.

Reference. Fott, B. (1960) Zur Kenntnis der Gattung *Saturnella* (Chlorococcales). *Nova Hedwigia* 2 273-278.

**Jeannie Beadle, School of Geography, University of Leeds, Chris Carter, 6 Church View, Wootton, Northampton. With help from Lee Brown and David John**

# Obituary



*John Walter Guerrier Lund*, CBE, DSc, FRS, FIBiol, FCIWEM, the influential phycologist, algal physiologist and microbial ecologist, was born 27 November 1912. He died on 21 March, aged 102.

Distinguished Microbial Ecologist whose methods were emulated by three generations of scientists

John Walter Guerrier Lund of Ambleside was acclaimed for his work on microalgae and, especially, the ecology of the planktonic diatom, *Asterionella*, that continues to dominate the spring algal “bloom” in the waters of Windermere of almost every year. The alga occurs in many other temperate lakes, where, despite its microscopic size (cells barely 0.1 mm in length), popular familiarity with its beautiful star-shaped colonies owes in no small way to the work of Lund, his late wife, Hilda, and the research group he founded at the Windermere Laboratory of the Freshwater Biological Association. Dr Lund sadly passed away at his home in Ambleside on Saturday, 21st March at the age of 102

JWG Lund, CBE, DSc, FRS, FIBiol, FCIWEM, was born in Manchester on 27 November 1912. He attended Sedbergh School, then still in Yorkshire, before starting the next stage of his studies at Manchester University, where he gained his B.Sc. and M.Sc. degrees. He was attracted initially to zoology but changed to botany obtaining the only first class honours of the 1934 year class, despite having no science education at school. In 1935 he moved to University College, London to work on benthic algae under Professor F. E. Fritsch, then one of the country’s leading phycologists, and gained his Ph.D. in 1939. He then worked at the West Midlands Forensic Science Laboratory in Birmingham, for several years as a forensic botanist. However, in 1944, he joined the staff of The Freshwater Biological Association (FBA) as an algologist. He began his work on the ecology of planktonic algae of the English Lake District, initially at Wray Castle and then from 1950, at the Association’s famous premises at The Ferry House. He continued in this post until retiring, officially, in 1978, as a Deputy Chief Scientific Officer, although he continued

to work several days a week at The Ferry House until 2005.

John Lund’s research work on the nature and activity of phytoplankton was always imaginative and thorough and extremely influential. He discovered, described and brought into laboratory culture, many new species of algae, especially of the rarer chrysophyceae and xanthophytes. His studies on the distribution, seasonality, population dynamics and ecological requirements of various planktonic species were prolific and often detailed. The accumulated data on *Asterionella* has remained a prime example for the conduct of analytical research. John often devised experiments, of growing scale and ingenuity, to test his hypotheses about the mechanisms controlling algal growth. In the 1960s, he began a series of field experiments employing *in-situ* artificial enclosures of increasing size, realism and complexity: these passed from the cylindrical “bags” deployed in Buttermere, the partitioning of Blelham Tarn with plastic curtains and, ultimately, to the majestic butylite enclosures, or mesocosms, placed in that Tarn. They each measured 45 m in diameter, extended 11-12 m to the bottom mud and each enclosed some 18,000 m<sup>3</sup> of water. They became known as the “Lund Tubes”. Using such lake-sized isolates, it became fully possible to investigate and experiment with natural populations of phytoplankton under contrived and manipulated conditions. These “Lund Tubes” continued to be used by other scientists at the FBA and from elsewhere, until 1984.

During this time, he worked with a fellow scientist, Hilda Canter, whom he later married. Together, they studied the intriguing range of fungal parasites that infect algae, publishing a series of papers on their taxonomy and life-histories which have scarcely been emulated. Rather later on (1995), they published their handsome album of photographs, *Freshwater Algae – their microscopic world explored* (Biopress, Bristol), with Hilda providing the photomicrographs and John the text. This remains an excellent introduction to the remarkable beauty of these organisms, unknown and possibly unimaginable to many people and was awarded the Prescott prize by the American Phycological Society in 1997.

Another of John’s activities concerned the curation of the remarkable Fritsch Collection of Algal Illustrations. This archive of line drawings, copied from the contemporary literature, and started by Professor Fritsch, was given to John and the FBA in 1955; aided by a series of able and dedicated assistants, it was curated, catalogued and progressively expanded at The Ferry House, into a quite unique world resource, supporting the identification and taxonomy of freshwater algae.

A feature of John’s work was the close working collaborations he formed with colleagues. These included Dr Jack Talling FRS, the ecophysiologicalist whose work on algal photosynthesis revealed the great importance to productivity of the scale and extent of the variability in underwater light conditions. He collaborated extensively with chemists, John Mackereth and Jack Heron, and zoologist-turned-physicist Clifford Mortimer FRS. He also encouraged a series of assistants and students to develop special interests and talents, in various specialisms – culturing algae, algal bioassays, sediment accumulation and stratigraphy, eutrophication (artificial enrichment of waters with fertilisers and sewage effluents). In doing so, he promoted the continuing ability of freshwater science to cultivate the good biological management of lakes, reservoirs and rivers that is so often threatened by ignorance and inexpert supposition.



John was an admirable colleague. Apart from his sharp intellect, he had an acute memory. He was still able to supply clear details of people and events occurring through his career, even up to and slightly beyond his 100th birthday! His sense of humour was legendary. His laughter, robust and hearty, penetrated the corridors and stair wells of The Ferry House. He – abetted frequently by John Mackereth – would sometimes devise elaborate, convincing practical jokes, often directed towards his colleague Clifford Mortimer.

John travelled extensively, contributing at scientific meetings or advising on projects overseas. He learned to read and speak Russian, quite fluently and wrote at least one paper in Russian on the suspension of another, common but perplexingly heavy, planktonic diatom, *Melosira* (later renamed *Aulacoseira*). It is said, though with little factual accuracy, that John was minded to learn Russian so as to be able to translate the mammoth volume on algal taxonomy by Korshikov, only then to discover that it was written not in Russian but in Ukrainian!

At home, John collected many accolades, including election as a Fellow (for a time Chairman) of the Royal Society in 1963, the award of a C.B.E. in 1965; and President of the British Phycological Society. He remained loyal to the FBA, championed its work ethic and, indeed, its very existence. He despaired over its contraction in the face of Government-inspired reorganisations of its science base and the dissipation of its expertise. Throughout, John nevertheless remained as many of us had come to know him: charming and unassuming, warm, friendly and caring, with this wonderful sense of humour. He will be greatly missed. Our condolences extend to his son and to his daughter and their families.



Top left: John Lund at FBA in 2005

Top right: John Lund at Goosey Foot Tarn in 2003

Bottom left: John Lund in November 2012

Bottom right: Lund and Lishman at FBA cricket match in 1968

# **“What John Lund did for me!!”**

## ***a personal tribute based on a birthday letter!***

Elizabeth Haworth EHaworth@fba.org.uk

In 1965 my Tutor at UCNW Bangor, Peter Grieg-Smith, telephoned John Lund and asked if he could use an M.Sc. student and I heard him say ‘right I’ll send her up’!! I can recall feeling very nervous crossing the ferry for the first time and walking into Ferry House. John Lund’s greeting in the hallway was “Hallo, I am going to be away for 10 days but I have a list of possible projects for you to consider.” Luckily I was able to tag along with Brian Whitton’s student field course for that week to explore the area and the projects. We stopped in Ennerdale after one field trip for good old fashioned Ham & Eggs, and Brian insisted no one was to miss Meg’s supper.

Having chosen to study the diatom sequence in the sediments of Blea Tarn, Langdale a 6m core was obtained with the Mackereth corer by George Thompson and Brian Walker. My introduction to palaeolimnology was followed by the occasional hasty visits by Winifred Tutin! With John’s help I began learning to identify diatom species and thus came to know the value of the Fritsch Collection of Algal Illustrations, on the landing outside John’s office. Joyce Heron worked with John on adding to the Fritsch Collection and not being an algologist her usual response to visitors was “...I just cut and stick”!! I soon learned that if John appeared too busy to respond to my question I should just to creep away as he would appear later with the answer. John was always busy, his lab was full of jars and cylinders full of greenish algae looked after by his assistant George Jaworski; Colin Reynolds was also there preparing to study Crosemere. It was also the year of the International Biological Programme in which John was very much involved and the team, with algologist George Ganf, was preparing to go to Lake George Uganda.

John took me to visit Irene Manton at Leeds to try and solve some identification problems. This was our introduction to electron microscopy and we were so overawed by the machine and Manton’s use of it that when her assistant, Ken Oates, grabbed a hand heading for the wrong knob with a harsh ‘No you don’t’, we both shook!

Thanks to John Mackereth, I spent 1967 in the USA at the Limnological Research Center at the University of Minnesota. There I met Ev Gorham and Jo Shapiro and when I sat in on their limnology course it sometimes became a duet with me supplying the FBA information. John came to the official opening of the University’s Itasca Field Centre, where Alan Brook was working, and we both went on to the Eutrophication Symposium in Madison, Wisconsin attended by the well known limnologists of the time. As I sat next to John waiting his turn to lecture, the previous speaker was so clearly pre-empting some of his lecture that

I feared he was going to tear up his notes.

Thanks to the FBA’s decision to form a Quaternary Research unit, I came back to Ferry House in March 1968, living in the annexe a further year and beginning the study of environmental history in Scottish Lochs with John and Winifred. Field Trips were fun in those days but fraught with the need to get good cores; one result was early scanning electron micrographs of *Fragilaria* spp.

This was the era of the Lund Tubes in Blelham Tarn that isolated lake water from any inflows from the catchment. When John added some fossil marine diatomite to the prototype tube it promptly sank, providing a wonderful sediment marker that one day will mystify those who do not read the FBA reports! I spent many mornings rowing in and out of the tubes, installed in 1970, to sample sediment traps for seston analysis, one of the ancillary studies to the main work of algal changes compared with open waters and available nutrients. One day John drew my attention to a new diatom species showing up in the long term plankton samples which led me to study *Stephanodiscus* and Blelham Tarn sediments over so many years and use John’s algal records to date the horizons before we had the use of caesium137 and lead210 analyses. The importance of the original log books was such that John’s change of mind as to the identity of a Chrysophyte was of crucial importance. He was always extremely tolerant of all my stupidities and must have got fed up with me at times.

The 1960s and 70s were very social times at Ferry House; summer students, visitors, Council Meetings and Fish Teas, swimming and cricket matches (John as spectator and George Jaworski as player). Listening to John Lund, John Mac. and others chatting at coffee time and chemistry lab tea time, scientifically and otherwise, were the best of times, John had a fund of reminiscences. There were group visits to Malham Tarn to search for *Cladophora* balls and trips to tarns to sample for desmids with Edna Lind and David Williamson.

At the start of the computer era, offers to computerize the Fritsch Collection were thankfully declined on the grounds that John would have found what he wanted before the machine warmed up. He continued to build and much enhance the Collection with the help of Gina Devlin and Elaine Monaghan, and used a Royal Society grant as funding became a necessary. When John officially retired there was discussion about future algology and I promised to be responsible for the Fritsch Collection but John generously carried on for so many years and kept us going. We had computers to help us and Gina and Lynda Durrell began making the Author Index searchable online.

Although the move out of the main Ferry House and eventually to the room next to the library in the Pearsall

building ended John's formal reign, he continued to support us and we did get a pilot digitization of half the sheets of desmids completed even if we did not get it online and staff departed due to lack of funding. Since then occasional volunteers help us and I would visit Ellerbeck to report on progress and have a good chat over tea and cake, as did many others. The most momentous visit was to celebrate John's 100th birthday in November 2012. John had a remarkable memory for a wide range of interests.

So –THANK YOU John for all that you have done for me. With love – Liz

P.S. In a new twist to family history an Australian recently said he was a scientific descendant of Professor Fritsch to which I replied that John Lund was his post graduate which meant that I and a large number of people are his and more specially John's scientific descendants:-

including Brenda Kipling; Frank Round, Colin Reynolds, Tony Irish, Tim Lack, John Box, Tony Bailey-Watts, David Livingstone.

And the next generation, includes a large number students of Frank Round' and Brian Moss - *Dick Crawford; David Mann; Eileen Cox; Margaret Harper; Lesley Edgar; Penny Dawson; Andrew Leitch; Paul Broady; Bulent Sen, Roger Tippett, Mike Hickman, John Eaton, Chris Happey-Wood, Judith Brown, Keith Crabtree, Debbie Oppenheim, Lynda Smith, Marie Brooks, Jenny Buzer*; some with students of their own. *Suzanne McGowan*, a student of Brian Moss and myself also extends the long algal time line!

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## **Norma J. Lang**

**25 July 1931 – 6 March 2015**

Professor *Emerita* Norma J. Lang died of heart failure on 6 March 2015, at Sutter Memorial Hospital in Sacramento, California. Her niece and nephew were with her.

Norma was born in Memphis, Tennessee to Dave and Mary Lang and after several family moves she graduated from high school in Toledo, Ohio. In 1948 she entered Bowling Green University. She completed her B.S. and M.A. degrees at Ohio State University in Columbus, Ohio, in 1952 and 1958, respectively. She studied with Dr. Richard C. Starr at Indiana University, Bloomington and received her Ph.D. in botany in 1962. Her research focused on the study of blue-green algae (or, cyanobacteria) using a then-new technology in biology, transmission electron microscopy.

Her post-doctoral work was at the University of Texas, Austin with Dr. Harold C. Bold, as a National Institutes of Health Postdoctoral Fellow. She accepted a position as Assistant Professor of Botany at the University of California at Davis in 1963 and was promoted through the faculty ranks. Her early research was funded by the National Science Foundation. In 1968, Dr. Lang was awarded a Guggenheim Fellowship for sabbatical studies at the University of London. Upon her return to campus in 1969, she resumed her research on blue green-algae and her teaching in phycology and general botany.

In 1969, Norma was awarded the Darbaker Prize by the Botanical Society of America for the best paper on microscopic algae published worldwide in the two previous years. In 1977 she described a new cyanobacterium species which she named *Starria zimbabwensis* Lang, in recognition of its origin from Zimbabwe and to honor her mentor, Dr. Richard C. Starr. She served as the President of the Phycological Society of America in 1975 following many active years with the organization.

During her lifetime she adored dogs and trained and showed several breeds in dog obedience competitions, winning several awards. Her last canine companion was her beloved, Chris, a Papillon.

Norma retired from UCD in 1991 but remained active in the community. She had numerous students through the adult literacy program of the Woodland Public Library for which she was recognized for her volunteer service by the California State Assembly in 2011.

Norma is survived by nieces Lana Lang Payne and Laura Lang Ellis and nephew William A. Lang, and their children and grandchildren, who along with her many lifetime friends in Davis and the surrounding area, remember her unique perspectives on life and living.

Dr. Judy Jernstedt, Department of Plant Sciences,  
University of California, Davis and Dr. Russell L. Chapman,  
Department of Oceanography and Coastal Sciences,  
Louisiana State University

# INSTRUCTIONS FOR CONTRIBUTORS

Copy which is submitted for publication in *The Phycologist* should be concise and informative. Articles should be scientifically sound, as jargon free as possible and written in a readable scientific magazine style. Unless absolutely essential references should not be included. All types of relevant material will be considered, these include job advertisements, scientific reports, book reviews, news items of topical interest, meeting announcements, grant awards, promotions, appointments, profiles of eminent phycologists and obituaries. If you are interested in submitting material that does not fall within any of these broad categories, or you are unsure of the appropriateness of a potential article, then contact the editor. Suggestions for future articles or a series of articles are welcomed.

Copy should be submitted, preferably as attachments to email or on disc (MS Word for Windows or Rich Text Format). **Illustrations and photos to accompany copy are welcomed and should be supplied as JPEG or TIFF file-format no less than 600 dpi resolution.** The editor reserves the right to edit the material before final publication.

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