2023

Algaculture for Biotechnology

TRAINING COURSE PROGRAMME

18-19 APRIL 2023
EACH DAY 09:00 - 16:45 GMT

Culture Collection of algae & protozoa

SAMS Scottish Association for Marine Science

WELCOME

Scottish Association for Marine Science (SAMS) and Culture Collection of Algae and Protozoa (CCAP) look forward to welcoming you to our online *Algaculture for Biotechnology* Course. This programme details the logistics for the course including timings and tutors.

WHEN

Time of course - runs each day from 09:00 - 16:45 GMT on the 18th and 19th April 2023. A full course schedule is detailed below and a MS Teams link will be provided.

You will be provided with a link to access all the course documents.

WHERE

The Algaculture for Biotechnology course will run from CCAP by video conference. This course will comprise of short lectures, pre-recorded video demonstrations, and Q&A sessions with the experts.

CCAP acknowledges generous support from:

UKRI Natural Environment Research Council

DAY 01

18th April 2023

9.00	Welcome & Housekeeping	Dr Mikey Ross
LECTURE SESSION: BIG PICTURE AND ALGAL FUNDAMENTALS		
09.10	VIDEO: CCAP VIRTUAL TOUR	
09.30	Algal Biodiversity and Taxonomy	Cecilia Rad-Menéndez
10.00	Algal Nutrition	Prof. John Raven
10.30	Algal photosynthesis - implications to algal culture	Prof. Michele Stanley
11.00	Tea/Coffee Break	
PRACTICAL SESSION: MEDIA PREPARATION & STERILISATION		
11.20	Demonstration video - followed by live Q&A	Karen MacKechnie
12.10	Lunch Break	
PRACTICAL SESSION: STRAIN COLLECTION, ISOLATION, AND PURIFICATION		
12.55	Demonstration video - followed by live Q&A	Cecilia Rad-Menéndez, Naomi Thomas, Rachel Allen
LECTURE SESSION: ALGAL BIOTECHNOLOGY		
13.50	ALGAE IN BIOTECH: Opportunities and challenges	Dr Alla Silkina
14.20	Microalgae in Industry	Dr Andrew Spicer
14.50	Q&A with Guest Speakers	
15.15	Tea/Coffee Break	
15.30	Student Flash Presentations	Alberto Rock, Eleanor Wood, Carla Ruiz & Priyadharshini Elanchezhian
PRACTICAL SESSION: ALGAL MAINTENANCE TECHNIQUES		
16.00	Demonstration and video followed by live Q&A	Cecilia Rad-Menéndez & Joanne Field
16.45	Wash-Up Q&A	
17.00	Finish	

DAY 02

19th April 2023

LECTURE SESSION: MOLECULAR PHYCOLOGY & BIOINFORMATICS		
09.15	Algae as Genetic Resources	Dr David Green
09.45	CCAP Bioinformatics Gateway - overview and discussion	Dr David Green & Dr Fred De Boever
10.15	Novogene - Molecular Service Provision	Dr Nahuel Manzanaro Moreno
Q&A AND QUIZ: BIOINFORMATICS GATEWAY TEST EXAMPLES		
10.45	Tea/Coffee Break	
PRACTICAL SESSION (3): ALGAL ENUMERATION AND CULTURE QUANTIFICATION.		
11.00	Speakers Videos followed by live Q&A	**Joanne Field** (Microscope methods) **Naomi Thomas** (Coulter Counter) **Dr Marie-Mathilde Perrineau** (Plate Readers) **Elaine Mitchell** (Flow Cytometer)
12.30	Lunch Break	
PRACTICAL SESSION: LONG-TERM MAINTENANCE - CRYOPRESERVATION		
13.30	Cryopreservation	Joanne Field & Prof Imke Lang
LECTURE SESSION: CCAP-ARIES, LARGE-SCALE CULTIVATION, AND METABOLOMICS		
14.15	Large-scale Microalgal cultivation	Dr Francisca Vermuelen
14.45	CCAP-ARIES system slides & video	Dr Mikey Ross, Karen MacKechnie, & Dr Francisca Vermuelen
15.15	Tea/Coffee Break	
15.30	Algal Metabolomics	Dr Matt Davey
16.00	ARIES and Wash-up Q&A	Dr Matt Davey, Dr Mikey Ross, Karen MacKechnie, Conor Drysdale
16.45	Finish	

TRAINING COURSE LECTURERS

Delivered by leading algal scientists from SAMS algal scientific team, including the Culture Collection of Algae and Protozoa (CCAP). This course is one of the best introductions to algaculture.

GUEST SPEAKERS

GUEST SPEAKER: Dr Alla Silkina

Dr Alla Silkina is a Research Officer in the Centre of Sustainable Aquatic Research (CSAR) at Swansea University.

Alla is working in the applied biotechnology sector with expertise on algal physiology and algal pigments. Her skills include mass cultivation of microalgae, PBR maintenance and the optimisation of growth kinetics. Her expertise is based on assessments of growth and algal physiology in response to culture conditions utilising small and large scale optimisation reactor designs.

More about Alla

GUEST SPEAKER: Dr Nahuel Manzanaro Moreno

Nahuel arrived in the UK 8 years ago to undertake a MSc in Synthetic Biology and Biotechnology at the University of Edinburgh, and then proceeded straight into a PhD in Synthetic Biology at the SynthSys/UK Centre for Mammalian Synthetic Biology, University of Edinburgh. His PhD involved working with yeast and resource allocation in variable carbon and stress conditions, focusing on ribosome economy. He graduated in 2021 and did a short postdoc at the IGC (Institute of Genetics and Cancer, University of Edinburgh) working with Covid sequencing from wastewater samples.

GUEST SPEAKER: Prof John Raven

In my 56 years of scientific publication, I have published over 450 papers and two books (one co-authored). As an emeritus professor I do not have a laboratory or the ability to be principal investigator on research funding applications. However, I am still active in publication. In addition to my algae-related publications since 2017, I have also published in that time period on resource acquisition mechanisms of terrestrial and aquatic embryophytic plants and their consequences for ecology, agriculture and ecosystem services.

More about John

GUEST SPEAKERS

GUEST SPEAKER: Dr Andrew Spicer

Andrew is the CEO and founder of Algenuity Ltd and Algenuity Ingredients Ltd. He is a molecular and cell biologist with a broad expertise based in gene discovery, regulation and gene production function.

He acts as scientific advisor on several national and international algal biotechnology research projects, is an industry representative on the CCAP Steering Committee, and an elected member of the European Algal Biomass Association (EABA).

More about Andrew

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GUEST SPEAKER: Prof. Imke Lang

Imke is a Professor of Marine Biotechnology at the University of Applied Sciences in Bremerhaven, Germany. She has worked in the field of applied phycology for more than 15 years, including several years of work in an algal biotechnology company. She is familiar with culture collection activities including cell banking and strain isolation techniques. At the university, she is teaching Microbiology, Marine Natural Products, Algae Biotechnology, and Bioprocess Engineering. Her main research interest is the use of microalgae as resource for bio additives which can be applied in food, cosmetic and chemical industry.

SPEAKERS

Dr Matt Davey

Matt is a Senior Lecturer in Algal Biotechnology specialising in algal physiology, innovation and ecology. His research interests are in the diversity and plasticity of metabolic traits, especially in extreme habitats. Using a translational approach to apply the unique techniques and expertise he has developed in these ecosystems to produce sustainable and innovative solutions in the bio-economy.

More about Matt

Dr David Green

David is a molecular microbiologist and leading international researcher in algal-bacterial interactions. He has an active research programme in marine biotechnology developing marine biopolymers for commercial exploitation, cultivation of novel bacteria and exploiting their genomic potential. He also undertakes fundamental research focused on marine microbial sulphur and iron biogeochemistry. Recently he has been contributing to CCAP Genome and Microbiome research.

More about David

Professor Michele Stanley

Michele has worked on applied phycology projects for >20 years. Over the last 10 years, she has initiated and led research investigating marine biomass, both macro- and micro-algal, as forms of biofuels at SAMS and is also developing other areas of applied research investigating the biotechnology application of algae. She a member of EPSRC's Energy Strategic Advisory Team; a member of the steering board for the European Algal Biomass Association; a member of the UK Cross Research Councils Bioenergy Group and Chair for the Scientific Advisory Board of the Industrial Biotechnology Innovation Centre (IBioIC).

More about Michele

Dr Michael Ross

Mikey is the manager of the Culture Collection of Algae and Protozoa (CCAP) and a Senior Researcher in Algal Biotechnology at the Scottish Association for Marine Science (SAMS). I have a very broad interest in applied algal biotechnology and have researched microalgae, cyanobacteria, and macroalgae for the production of biofuels, food/feed, and for the production of high-value products, namely pigments and carotenoids for inclusion into nutraceutical and cosmetic markets. My Ph.D. research undertaken at the University of Edinburgh and with SAMS, investigated the potential of a filamentous macroalgae to remove nutrients and heavy metals from wastewater.

More about Michael

Cecilia Rad-Menédez

Ceci is the CCAP curator. She has worked in the collection for over 15 years isolating, characterising, and maintaining different groups of cyanobacteria, microalgae, macroalgae and protozoa. She is responsible for the molecular characterisation of CCAP strains and has developed several cryopreservation protocols for both, micro and macroalgae. Her main interest is protistan diversity and unveiling some of the mysteries hidden within this extraordinary group.

More about Cecilia

Dr Francisca Vermeulen

Francisca Vermeulen is a postdoc in Algal Biotechnology with an interest in cultivating microalgae for a variety of biotech applications. She is currently involved in assessing environmental factors associated with harmful algal blooms and identifying future risks and impacts. Her previous research focussed on optimizing cultivation conditions for commercially important microalgal species. She has experience working in an industrial environment with commercial scale algal cultivation systems which are used to produce algal based nutraceuticals.

Dr Fred De Boever

I am a microbial ecologist with a focus on microbe-host interactions. I use laboratory model systems, sequencing technologies, and bioinformatic approaches to dissect the genetic underpinnings of complex ecological interactions such as symbiosis and parasitism. I have a particular interest in how such interactions (co)-evolve, comparative genomics, and taxonomy.

STUDENTS

Alberto Rock

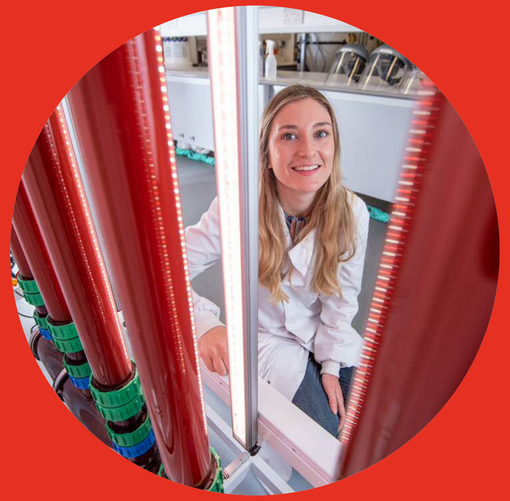
I am a SAMS MRes Student in Algal Biotechnology. Though the course of my project I aim to develop the use of a novel CRISPR protein (BRAIN Engineered Cas (BEC); BRAIN Biotech AG) in the heterokont algae Nannochloropsis sp. to increase omega-3 fatty acid yields for commercial applications. Specific aims of the project are to optimize electroporation and transformation efficiencies using a cell-synchronization principle, and to develop vectors able to deliver and express BEC in Nannochloropsis sp. for gene editing through homologous recombination.

More about Alberto

Carla Ruiz González

I am a marine scientist with an interest in the sustainable exploitation of algae. Through my PhD project, I'll be researching the limits of life of snow algae. Physiology experiments and metabolomic results will reveal how snow algae survive under extreme conditions.

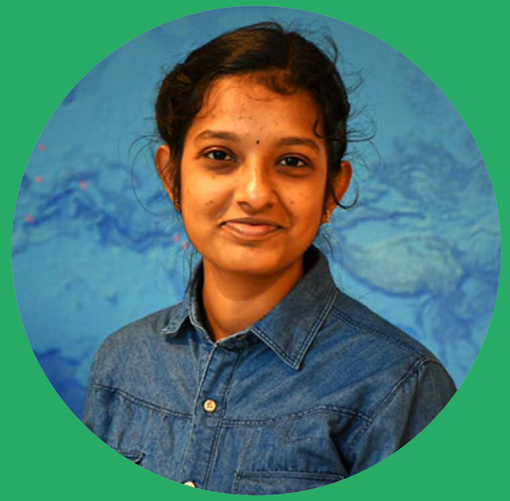
More about Carla



Eleanor Wood

I am in the final year of my PhD at SAMS which is in collaboration with Xanthella Ltd and funded by IBioIC. My project investigates biorefinery techniques and approaches on the microalgae Chromochloris zofingiensis and Porphyridium aerugineum. Biomass optimisation, cell disruption, and product separation have been investigated alongside biochemical analysis of the whole biomass and different fractions.

More about Eleanor



Priyadharshini Elanchezhian

I am a Plant biology postgrad with great interest in different aspects of working with algae to serve solutions for present day problems. My PhD focusses on maximizing the bromoform content in a marine red macroalga, Asparagopsis taxiformis to reduce methane emission in livestock.

COURSE DEMONSTRATORS AND CCAP STAFF





Naomi Thomas

Joanne Field

Karen MacKechnie

Rachel Saxon

Conor Drysdale

Jamie Rowell





Rachel Allen

Elaine Mitchell

Dr Marie-Mathilde Perrineau

Cecilia Rad-Menédez

TRAINING COURSE LOGISTICS

SAMS is a leading scientific institution researching and delivering Marine Science. SAMS is a partner of the University of Highlands and Islands (UHI). CCAP is a Biological Resource Centre and is supported by the Natural Environment Research Council (NERC), part of the UK Research and Innovation (UKRI) as an internationally renowned National Capability service. SAMS and CCAP has expertise in Biogeochemistry and Earth Science, Ecology, Microbial and Molecular Biology, Physics, Sea Ice and Technology. If you are interested in collaborating with SAMS or CCAP or have any commercial opportunities you would like to discuss, please let us know and we will endeavour to set up the relevant meetings.

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SAMS, SAMS-ENTERPRISE, AND CCAP OFFER A RANGE OF OTHER COURSES AND DEGREES RELATING TO ALGACULTURE

THESE INCLUDE:

MRES DEGREE IN ALGAL BIOTECHNOLOGY
david.green@sams.ac.uk

TAUGHT MSC IN ALGAL BIOTECHNOLOGY
matt.davey@sams.ac.uk – coming Autumn 2023

THE SEAWEED ACADEMY is the UK's only dedicated seaweed industry facility, offering 1-day, 2-day, and 1-week training courses.
seaweed@sams-enterprise.com – throughout 2023

EIT FOOD ALGAL BIOTECHNOLOGY AND SUSTAINABLE AQUACULTURE workshops with an industrial and entrepreneurial perspective.
matt.davey@sams.ac.uk – throughout 2023.

FURTHER INFORMATION:

We hope we've been able to provide all the information you require to enjoy your time with us, but if you have any further questions, please email ccap@sams.ac.uk

FEEDBACK FORM:

Please complete the feedback form and e-mail it to ccap@sams.ac.uk

WE LOOK FORWARD TO MEETING YOU (VIRTUALLY) ON THE COURSE.

SAMS
Scottish Association for Marine Science

CONTACT US

Visit our online shop to order algae & protozoa

www.ccap.ac.uk

Contact and follow our team to learn more about our tailored products and services

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