# The consequences of temperature-resource interactions for the future of marine phytoplankton communities

## Fact Sheet

Project Information

**TROPHY**

Grant agreement ID: 794264

Project website

**DOI**
10.3030/794264

Project closed

**EC signature date**
13 March 2018

**Start date**
1 April 2018

**End date**
31 March 2020

**Funded under**
EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions

**Total cost**
€ 212 194,80

**EU contribution**
€ 212 194,80

**Coordinated by**
DANMARKS TEKNISKE UNIVERSITET
Denmark

## Objective

Temperature, nutrients and light drive the growth of phytoplankton, aquatic photosynthetic microbes responsible for nearly half of global primary production. Because phytoplankton influence global biogeochemical cycles, carbon sequestration and climate, accurately modelling their growth is vital to forecasting our future. However, the models we use for global ecosystem forecasts do not consider how these factors interact, even though the interactions lead to qualitative and

quantitative differences in outcomes. My goal is to therefore build a mechanistic understanding of how temperature and resources interact to influence phytoplankton growth, productivity and biogeochemical cycles.

This project has three objectives (i) develop statistical models describing how phytoplankton growth changes as a joint function of temperature, nutrients and light, (ii) develop mechanistic models characterising how temperature and resources influence cellular processes in phytoplankton, and ultimately their growth, and (iii) implement dynamic versions of the mechanistic model to forecast how marine phytoplankton communities will respond to future changes in temperature, resources and predation.

My work will involve applying machine learning techniques to published laboratory and field datasets to understand complex interactions between the three factors. By combining this understanding with insights from ecological theory, I will generate an accurate mechanistic model of growth, and then test the power of this model to predict patterns in the ocean using independent field datasets. Finally, I will use the validated mechanistic model to forecast changes to global patterns in phytoplankton growth and primary productivity.

This project will enable us to generate credible forecasts of phytoplankton productivity and biogeochemical cycles in a warming ocean, and improve our understanding of fundamental ecological processes by uniting major fields of ecological theory.

## Fields of science (EuroSciVoc)

social sciences > economics and business > economics > production economics > **productivity**

natural sciences > biological sciences > ecology > **ecosystems**

natural sciences > biological sciences > biological behavioural sciences > ethology > **biological interactions**

natural sciences > mathematics > applied mathematics > **statistics and probability**

natural sciences > computer and information sciences > artificial intelligence > **machine learning**

## Programme(s)

H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions MAIN PROGRAMME

H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility

## Topic(s)

MSCA-IF-2017 - Individual Fellowships

## Call for proposal

H2020-MSCA-IF-2017

See other projects for this call

## Funding Scheme

MSCA-IF-EF-ST - Standard EF

## Coordinator

**DANMARKS TEKNISKE UNIVERSITET**

Net EU contribution

**€ 212 194,80**

Total cost

**€ 212 194,80**

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**Denmark**

Region

**Danmark > Hovedstaden > Københavns omegn**

Activity type

**Higher or Secondary Education Establishments**

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

**Last update:** 6 September 2024