# Job Description – EPSRC DTP Internship: Stochastic simulation of phytoplankton bloom in a cold environment

*“EPSRC’s Vacation Internships scheme gives undergraduate students a taster of what it is like to do research. The students are given practical, first-hand experience of working on and carrying out research in a UK university.”*

Source: [Internships and placements – UKRI](https://www.ukri.org/councils/epsrc/career-and-skills-development/studentships/flexibility-for-funders/internships-and-placements/)

To be eligible for an EPSRC Vacation Internship you **must**:

* be an undergraduate or Masters student in a STEM subject area.
* not have completed your degree studies before the planned end of the internship. An internship should generally take place in the summer vacation **before** your final year of study.
* have a right to work in the UK and carry out the placement whilst resident in the UK. We are **not** able to sponsor visas for the internship.

**About the Role**

Phytoplankton is a critical component of Earth’s carbon cycle, playing an important role in the climate system. One specific example where environmental conditions may be related to the dynamics of the plankton ecosystem is an unusual massive phytoplankton bloom observed beneath the ice pack in the Arctic Ocean. An international and interdisciplinary team, consisting of the Open University, University of Exeter, University of Dayton in the USA, and the Chesapeake Biological Lab in the USA, explores how conceptual mathematical models can efficiently characterize and quantify Arctic phytoplankton under nonlinear dynamics.

The candidate will work within our team to conduct simulations of phytoplankton growth. The model is based on a system of stochastic differential equations describing light and nutrient transport in plankton ecosystems. The model will be parameterized using remote sensing and oceanographic data. The applicant will be responsible for running provided scripts using real data, debugging the model's code in case of numerical errors, and collecting and visualizing simulated data. The candidate will also take part in data analysis to reveal possible critical phenomena and early warning signals in the model.

The role will develop skills and experience in:

* Coding in MATLAB/Python
* Numerical simulation of physical/biological process
* Data analysis and visualization

**About the Unit**

The [School of Mathematics and Statistics](https://www5.open.ac.uk/stem/mathematics-and-statistics/) has diverse research agenda including research in Applied Mathematics and Theoretical Physics.  This group includes 14 academics and 7 PhD students. The Group has been funded recently by the EPSRC grants and hosts regular visitors and seminars. The School provides a supportive and flexible working environment, where diversity is celebrated. The School is active in challenging injustice and promoting equitable treatment for those from marginalised or under-represented groups. It holds an Athena Swan Silver award for its work in gender equality.

**Key Responsibilities**

* Run numerical simulations in the model using available data and ensure the stable operation of the provided model scripts.
* Identify and report numerical errors in the scripts and demonstrate the ability to resolve most of them.
* Collect simulated data and proficiently visualize the results of numerical simulations.
* Conduct a comprehensive analysis of the obtained simulated data.

**Skills and experience**

Essential:

* Programming skills in MATLAB/Python.
* Prior knowledge of basic differential equations.
* Prior knowledge in basic statistics and data visualization.
* Strong oral and written communication skills.
* Access to a computer/laptop and the Internet.

Desirable:

* Experience in writing scripts in MATLAB/Python.
* Prior knowledge of numerical analysis.
* Prior knowledge in data analysis and visualization.

If you would like further details about the role before making an application, then please email stem-research-student-support@open.ac.uk quoting the reference number and job title.