Training the next generation of Atmospheric Scientists
The National Centre for Atmospheric Science (NCAS) pursues and supports internationally leading research and works to advance the application of atmospheric science for the benefit of society.

Drawing upon its expertise in atmospheric science research NCAS offers a diverse range of training for PhD students and early career scientists. The training we offer is rooted in the fundamentals of a career as an atmospheric scientist. Primarily our courses focus on the knowledge and skills needed to support and develop the next generation of atmospheric scientists.

NCAS has almost 10 years experience of running summer schools and courses for PhD students in the UK. We pride ourselves on making courses stimulating, relevant and at the cutting edge of atmospheric science.

This brochure gives details of the courses that NCAS currently delivers. As a DTP partner we offer priority places on our existing courses to your students or we can work with you to design bespoke training and development that meets your exact requirements.

If you are interested in any of the courses, have suggestions for how they could be tailored to your students or have any questions about how NCAS can support your DTP please contact NCAS by e-mail, training@ncas.ac.uk, with details of your enquiry.
Earth System Science

The NCAS Earth System Science Training provides students with a background in a wide range of earth systems and their interactions. A wider knowledge of the Earth's systems allows students to place their research into context and encourages collaborations across disciplines.

This course uses a mixture of lectures and practical sessions to deliver content that provides both scientific knowledge and hands-on experience. Students will gain experience of field work, with a day spent in the field studying geological aspects of the earth.

The lecture course introduces the fundamentals of each topic to the students but will also draw upon the expertise of the world class lecturers. Insights into the cutting edge of a wide range of earth system science mean that students are inspired by current research.

Students will present their own work, allowing them a relaxed environment to develop presentation skills and to learn about each other's research.

"All of the lecturers were engaging, interesting and communicated clearly with the audience."

Topics covered
- Atmospheric Science
- Earth Science
- Ecology
- Hydrology
- Marine Science
- Oceanographic
- Polar sciences
- Climate change economics and policy.

Format
- 12 day residential course
- UK based
- Fees apply
Climate Modelling Summer School
This is an intensive course aimed at advanced PhD students and post-doctoral researchers working in the natural sciences. Eminent climate scientists from around the world deliver the material providing a comprehensive overview of this technical subject. The lectures are complimented by a number of hands on sessions where students apply the knowledge from the lecture course to real climate models. Evening seminars and events, including a formal dinner with an invited after dinner speaker allow the students to network with each other and the lecturers. Students also present their own work, allowing them a relaxed environment to practise and improve presentation skills, and learn about each other's research.

Topics Covered
- The fundamental principles of the science contained in climate models
- How the different areas of science in modern climate models are interconnected
- How models are implemented and operated on modern supercomputers
- How to assess the quality of the model results and how to perform high-level analysis
- How climate science is used for policy making.

Format
- 12 day residential course
- UK based
- Fees apply
Introduction to Atmospheric Science

This course is designed for first and second year PhD students with a general science background. The syllabus introduces theoretical atmospheric science; covering all of the fundamental principles.

Delivered by expert atmospheric scientists from across the UK who draw upon their research and teaching careers to produce a course tailored for general science graduates providing a perfect introductions for those entering into atmospheric science research.

Introduction to Atmospheric Science allows students to broaden their understanding of atmospheric process, interactions and develop a strong base to apply to their research.

"Had a fantastic time over all. Will recommend to colleagues"

Lectures include:
- Synoptic meteorology and weather forecasting
- Satellite atmospheric observations
- Atmospheric chemistry and field measurements
- Atmospheric aerosols
- Data analysis and interpretation

Format
- 5 day residential course
- UK based
- Fees apply
Making atmospheric measurements

Atmospheric Measurement Summer School
The Summer School in Atmospheric Measurement is a ten day field course aimed at atmospheric science PhD students entering their first or second year of research and early career researchers.

Pre-requisites
Students should have attended the Introduction to Atmospheric Science lecture series or appropriate equivalent.

Practical Fieldwork
The school is an intensive field measurement programme involving activities such as:
- Practical weather forecasting using synoptic charts and other data.
- Investigation of hydrostatic balance in the atmosphere.
- Profiling the atmosphere using radiosondes, tracking of pilot balloons and surface measurements on a mountain.
- Investigation of atmospheric radiation balance.
- Investigation of atmospheric trace gases and aerosols.

Format
- 10 day residential course
- This course is normally run in May on the Isle of Arran, Scotland
- Fees apply

"Launching a radiosonde was a great experience"
**Introduction to Scientific Computing**

This course provides scientists with an overview of programming concepts and handling data in a scientific environment. At the end of this course students will be equipped to start using computers for cutting edge environmental science.

The course will cover:

- Shell programming
- Introduction to python programming
- Introduction to data handling
- Visualising basic data

"I found the whole course, well presented, really informative and pitched at a challenging but accessible level “

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**Technical training courses**

**Unified Model**

This course introduces new users to the Met Office Unified Model (UM) systems and provides practical experience of setting up and running experiments. UM software management system, file formats, utilities, and configurations are discussed. Users will be led through a series of exercises designed to encourage best practice and scientific exploitation of the Earth System Model (ESM).

**United Kingdom Chemistry and Aerosols (UKCA)**

The UKCA model is a community chemistry-climate model which is part of the Met Office Unified Model. UKCA contains state-of-the-art schemes for tropospheric, stratospheric, and whole-atmosphere chemistry and components representing a range of aerosol types: sulphur, sea-salt, dust, secondary organic etc. It is an essential tool for composition-climate studies.

The training offered will ensure that the future users of UKCA will have a firm foundation in both the theory behind UKCA, and experience in both using the standard chemistry and aerosol options, and expanding the model schemes for their own research purposes.

"I feel confident that I'll be able to complete the tasks on my own away from the course“

**Weather Research and Forecasting—WRF**

Training in using the WRF model. Delivered by experts from NCAR and NCAS. The WRF course takes the form of tutorials where the emphasis is on WRF functionality and use of the model. The tutorials include lectures, question-and-answer sessions, and practical sessions to provide hands-on experience.

"I found the whole course, well presented, really informative and pitched at a challenging but accessible level “
NCAS Summer School Alumni

NCAS has been running summer schools for almost 10 years. Over these years we have built up a large number of connections with both UK and overseas students. We aim to stay in contact with these students and to build a network of talented atmospheric scientists. We organise networking events, forums and other scientific events for the benefit of this alumni group and look forward to supporting their careers over many years to come.

Alumni events are usually co-located with other scientific events and we encourage students from all years and summer schools to attend.

By attending a summer school students learn a great deal, make life long friends, and become an NCAS summer school alumnus.
Your Options
1. Contact us to secure places on existing courses—training@ncas.ac.uk.
2. Allow us to tailor a course for your students. Bespoke courses can be run for between 15 and 45 students depending on the course. Most courses are run annually, but if you would like to discuss the benefits of running a course specifically for your DTP students then please do not hesitate to contact us.
3. Contact us regarding a training need that is not covered by the courses detailed in this booklet.

Locations
Most of the NCAS courses can be run in a number of locations, certain locations will incur higher charges and certain courses are tailored for certain locations. Please contact training@ncas.ac.uk for further information.

Fees
Attendance on all courses is subject to payment of a course fee for each student. As part of our commitment to excellence in the scientific community training costs are subsidised by NCAS and no charge is made for staff time. Some of the 2014/15 courses have been funded by NERC ATSC awards, a number of fully funded places will be available for these events.