

Typical NST Progression at Cambridge

Part IA:

Physiology of Organisms

This course offers a contemporary understanding of integrated organismal functioning, comparing plant and animal physiology.

Biology of Cells

This interdepartmental course provides an introduction to cell biology, metabolism and molecular processes.

Evolution and Behaviour

The course introduces evolutionary theory, origins of life, the evolution of plants and animals, through to behaviour.

Mathematical Biology

This allows students to consolidate mathematical and statistical skills needed for the Natural Sciences Tripos.

Part IB:

Plant and Microbial Sciences

This course tackles the fundamentals of Plant and Microbial systems via molecular, cellular and ecological approaches, as integrated through key global issues of plant productivity for food, fuel and sustainable diversity, and whether limited by environmental stress or pathogens.

Cell and Developmental Biology

A second year cell and molecular primer, is taught by Plant Sciences, Genetics, Zoology and Biochemistry.

Ecology

An interdepartmental introduction to the relationships between plants, animals and the environment, as well as conservation and behaviour.

Part II:

Plant Sciences Part II allows you to tailor your interests, whether molecular or ecological, offering learning with a research perspective in plant and/or microbial processes. Lectures and innovative teaching methods help to develop learning across molecular, cell and developmental systems to ecological, population and community, levels. You can specialize by means of an 8 week research project and an extended "Trends"-style essay.

Departmental Contacts

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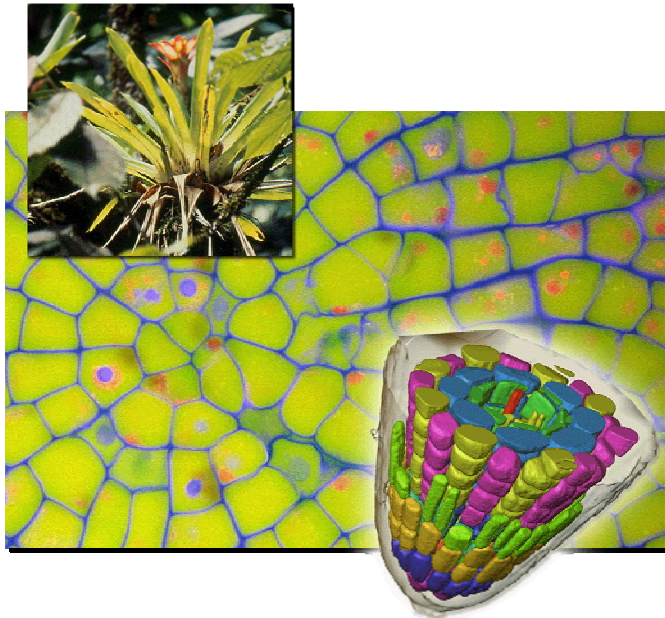
Web: <http://www.botanic.cam.ac.uk/>

Careers in Plant Sciences:

These are exciting times for plant scientists at Cambridge. The forthcoming opening of the prestigious Sainsbury Laboratory-University of Cambridge at the Botanic Garden, focussed on research in Plant Development and Diversity, will provide tremendous collaborative opportunities. This leaflet provides a snapshot of key research and teaching interests which provide opportunities for scientists now, and offer a vital role for student participation in the future.



Plant Sciences at Cambridge



PLANTS REALLY MATTER: Plant productivity is the basis to Life on Earth. Research into fundamental plant processes informs teaching and learning, as we discover how plants continue their vital role: from providing food and sustainable fuel sources, to sequestering carbon, maintaining diversity and ecosystem services. Learn how plant selection and crop improvement- or even designer plants- will be needed to tackle environmental stress, pests and pathogens, so as to feed a burgeoning population and offer a sustainable future.

Biodiversity and Climate Change

Terrestrial forests and marine ecosystems are currently sequestering 2/3 of man's carbon emissions. Will these sinks endure?

- Will deforestation and water availability in a changing climate turn tropical and boreal forests from carbon sinks to CO₂ sources?
- We use plant distribution and isotopic composition along altitudinal gradients in the Amazon basin to track climate change processes using epiphytes
- Find out how largescale datasets are used to map chronosequences in New Zealand
- See how ecological theories on forest diversity and scaling of carbon gain and water use relate to forest dynamics and turnover
- Discover how to monitor land use change and forest fragments and model climate envelopes predictively
- See how ecosystem services allow local people provide local solutions to sustain diversity and carbon sequestration

Cloudforest in Trinidad



Join the debate on Food and Fuel Security

The population of the world is set to increase by 2-3 billion people over the next 50 years, as we deplete fossil fuels and recognise the dangers of carbon emissions

- Can we continue to trade in stored sunlight? Fossil fuel deposits arose from only 70 years' photosynthesis!
- Should we try to convert grain into ethanol, altering the costs of basic foodstuffs in the developing world?
- How much fossil fuel is consumed by the crop cultivation, relative to biofuel production?
- What are the prospects for second generation biofuels, whereby plant biomass or algae are used for targeted bioenergy production?
- Should we grow miscanthus for biomass instead of wheat and maize?
- Find out how to manipulate algae whether for biomass, lipid or hydrogen production



Sustainable Crop Productivity

A second green revolution is required if we are to feed the world. Plant Scientists are at the forefront of identifying fundamental plant molecular processes and their translation into agricultural productivity

- Discover how the circadian clock helps to maximise crop productivity
- Can we engineer plants to express a photosynthetic turbocharger such as the C4 pathway in rice?
- Develop mathematical models of plant epidemiology and spread of disease- from sudden oak death to sugar beet
- Understand ion transport and cell signaling to optimize nutrient uptake
- Designer plants from synthetic biology
- Discover the amazing complexities of RNA silencing in controlling viral immunity, as well as chromosome structure, transposon suppression and gene expression (see below)
- Join the GM debate: whether NIMBY or NANNY'D, become informed, it is your future!!

RNAi - silencing in *Nicotiana*

