

About Essex

Our team is based at the University of Essex which is one of the leading research-intensive universities in the UK.

The School of Life Sciences is the largest science department in the University with over 50 teaching and academic staff. The quality of research in the School has been confirmed in the 2014 Research Excellence Framework (REF) where two-thirds of our research was rated as 'world leading' or 'internationally excellent'.

Our staff have expertise in the areas of environmental microbiology, plant productivity and photosynthesis, biophysics, biochemistry, bio-organic chemistry, and cell/molecular biology. This broad-based structure provides for a strong multidisciplinary environment involving collaboration between chemists, biochemists and biologists, providing additional scope to develop technology and innovative approaches to problems.

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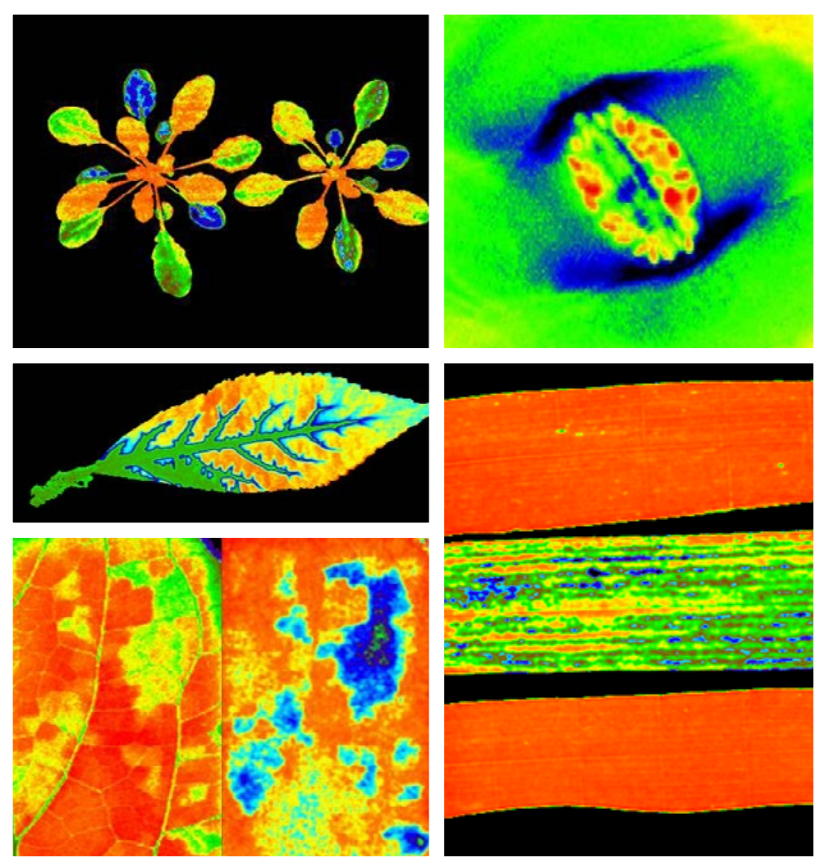
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Plant Productivity Research

Plant Productivity Research



Murchie EH, Lawson T. J. Exp Bot. 2013 Oct;64(13):3983-98. by permission of Oxford University Press.

Plant Productivity Research at Essex

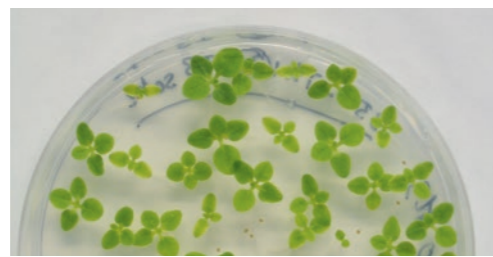
The demands of a growing world population for food and fuel are putting greater pressure on the need for higher yielding crop varieties that do not rely on a high input and demand of chemicals or water. We respond to this challenge by taking a whole organism approach to identify key genes and processes that determine productivity in plants in constantly changing environmental conditions.

Crop yield is ultimately determined by photosynthetic productivity which is then impacted on by environmental factors (e.g. light, water, temperature, nutrient availability). Research at Essex focuses on all of these limitations as well as direct manipulation of plant pathways to enhance plant capacity and performance.

About the Team

We are a team of internationally respected plant science researchers based in the School of Life Sciences at the University of Essex. We are united around understanding the physiological and genetic basis of crop yield. Collectively we have a great deal of knowledge and experience in Plant Science, with an excellent track record in funding and conducting our research and maintaining our international reputations in these areas.

You will find us flexible and innovative in proposing ideas and working together with you to find solutions to your problems. We aim to foster a professional relationship around R&D projects aimed at solving a specific problem or creating a new commercial opportunity.



Expertise and Technology available to partners

We are interested in applying our expertise and technology to your businesses' challenges and opportunities. Some potential applications of our research include:

Monitoring techniques to determine crop performance and plant health

- **Plant Performance monitoring:** We are using innovative non-invasive imaging technologies allowing us to monitor plant performance under varying conditions ranging from water stress to nutrient deficiency to infestation or infection.
- **Crop Stress and Spoilage:** We can screen for a range of developmental and physiological responses of plants to changes in the environment (using novel high throughput approaches).
- **Highly sensitive non-invasive monitoring of plant volatile compounds:** We use highly specific and sensitive methods for detecting a wide range of volatile compounds in the surrounding atmosphere in contained environments that indicate stress responses, attraction of pollinators and repulsion of pests, altered flavour and aroma characteristics.

Technologies and know-how to manipulate plant growth and post-harvest performance

- We have considerable experience using LED lighting technologies to extend day length with specific light qualities to improve crop yield.

- We have produced genetically modified plants (both models and crops) to improve plant growth and productivity. We have many candidate genes still to be tried.

Genome-wide methods for discovering and exploiting traits for molecular breeding programmes

Examples include:

- Physiological methods of screening populations.
- Statistical support and design of experiments.
- Genome-wide analysis and bioinformatics.

We are eager to develop links with commercial partners to exploit further the many research leads we have generated

- We have a large collection of genes and gene sequences identified as key determinants of photosynthesis, yield, and stress tolerance, disease resistance and secondary product metabolism.
- Many of our candidate genes and our ideas about them have not been published nor disclosed. We are interested in progressing these ideas with your business.

We are well-experienced in training personnel in various plant physiology and molecular genetic techniques and can devise a bespoke training programme that will meet with your training needs.

Ways to Work With Us

We would welcome the opportunity to engage with you to find out about the challenges and limitations you face in growing and producing crops. There are a number of ways our Plant Science team can work with partners. The exact model depends both on the project and your business. There are a number of government funded schemes available to support collaborative research projects in the Agritech sector between industry and universities. These include

student internships, collaborative PhD studentships, programmes such as Knowledge Transfer Partnerships and funding for collaborative research and development projects. We have a good track record in securing external funds for our research and would be happy to discuss the range of funding options available with you.

