



Earlham Institute

Decoding Living Systems

MEDIA KIT

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Brand assets.

Click [here](#) to access our brand assets, including logos, typefaces and images.

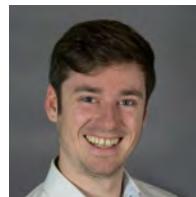
Press contacts.



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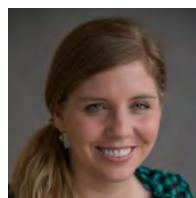
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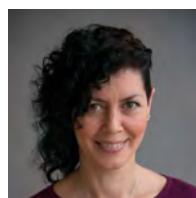
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Who and where.

The Earlham Institute (EI) is a cutting-edge, contemporary research Institute and registered charity, working in an area of rapid technological development and innovation to improve vertebrate and plant health, while tackling global issues of food security, climate change, environmental conservation and human well-being.

Established in 2009, EI is strategically funded by the BBSRC to lead the development of a skill base in bioinformatics and a genomics technology platform for UK bioscience.

The Institute is located on the Norwich Research Park, together with its partners: the John Innes Centre, the Quadram Institute, The Sainsbury Laboratory, the University of East Anglia and the Norfolk and Norwich University Hospital.

The Park has an excellent reputation for research in plant and microbial sciences, interdisciplinary environmental science and food, diet and health, to which EI contributes strengths in genomics and bioinformatics through cross-disciplinary research projects.

Existing close links between the NRP partners offer exciting new opportunities and initiatives for life sciences. Norwich Research Park received £26M of government investment to facilitate innovation and further develop infrastructure to attract science and technology companies to the Park to enhance the vibrant research environment and promote economic impact from research investment.



Our mission and values.

Decoding living systems is at the centre of our research activities and the impact of our work can be seen across diverse projects covering the breadth of life on earth that are helping us to improve human, animal and plant health, while aiding in researching healthier living systems.

El's vision is to improve plant, animal and human health by advancing knowledge through the development and application of innovative technologies.

We aim to achieve this by bringing together multi-disciplinary expertise in living systems using computational science and biotechnology to:

- Answer ambitious biological questions
- Generate enabling resources
- Train the next generation of scientists
- Work with industry to stimulate the bio-economy, and engage with policy makers, the public and stakeholders about our science.

El's mission is to advance and enable bioscience by applying computational and data driven approaches. El has developed into one of the leading and most innovative UK research centres. Our strategy has relied on the implementation of novel applications, establishing collaborative work to advance knowledge in biosciences, develop novel applications in biotechnology, and promote the growth of the UK bioeconomy.



Pursuing innovative approaches to high-impact science in an open, dynamic and collaborative environment.

What we do.

Our research in decoding living systems brings together expertise in biosciences, bioinformatics, high-performance computing, mathematics and statistics to understand complex biological systems in relation to improving crop yield and human, animal and plant health.

Our advanced genomics and computational platforms support our data-intensive research that embraces and confronts modern scientific challenges surrounding data scale and complexity. We develop and apply methods to process, store and analyse data and extract knowledge from computational analysis and integration of diverse datasets to facilitate bioscience research.

Our science.

Understanding genome evolution to drive trait improvement

Exploring how natural selection and domestication have shaped the genomes of economically important species.

We are researching existing diversity among populations and species to characterise genomic regions underlying traits of interest. Key elements of this work include:

- Selection in wild and domesticated populations
- Impact of genetic bottlenecks associated with domestication
- Co-evolution of host resistance and pathogen effector proteins

Understanding complexity in living systems

Identifying and understanding the functional roles of alleles in biological systems. By determining the effect of variation on allelic function within regulatory and host-microbe networks, we will deliver research impact across food sustainability, security and health.

Data Science for Integrative Biology

Utilising new technologies, algorithms and standards to provide 'omics data ready for analysis, interpretation and integration. Key areas include data standards, data integration, algorithms, and scientific and high-performance computing.

Our Science division conducts three types of research activities:

- Fundamental research to increase our knowledge base in bioscience
- Applied research to improve plant, animal and human health
- Enabling research to empower both academia and industry with new technologies and scalable bioinformatics approaches

The three scientific programmes at EI are shown, below.

[Find out more about our projects at EI here.](#)



Digital Biology

Computing hardware
and tool development



Organisms and Ecosystems

Plants and animals



Engineering Biology

Technology development



Our technology.

EI is a UK hub for innovative bioinformatics through research, analysis and interpretation of multiple, complex data sets. It hosts one of the largest computing hardware facilities dedicated to life science research in Europe. This has been boosted recently by an e-Infrastructure grant to expand the data storage capacity to a multi-petabyte unit, deploying a high-performance cluster and large-memory server enabling the allocation of processes requiring several terabytes of computing memory.

Earlham Institute operates one of the largest Research Council funded high-throughput sequencing and data analysis platform suites for life sciences. The [National Capability in Genomics and Single Cell Analysis](#) enables the provision of a dedicated, efficient, high-throughput genomics and single-cell analysis facility to support UK research communities, either in collaboration with EI, or as a provider of genomics services.

These facilities provide the UK bioscience community with access to state-of-the-art technologies and large data storage and computing resources for Big Data.

Our [Genomics Pipelines Group](#) provides access to a dedicated, high-throughput genomics facility, run by skilled and multidisciplinary staff who deliver efficient, cost-effective and ultra extremely high-quality sequencing projects across a number of platforms. Our genomics and single-cell analysis laboratories are at the leading edge of innovation, embracing novel methods and driving forward the development of novel technologies for rapid release to the bioscience community.

The Institute's knowledge, experience and technical expertise allows us to engage effectively with research groups in both academia and industry, providing advice on experimental planning and tailoring data generation to help answer key scientific questions.

We work with collaborators to advance analysis and interpretation of data through effective and efficient use of Earlham Institute's high-performance computing resources. This includes access to bespoke software tools and pipelines, user training, development and dissemination of computing best-practice.

Commercial arm and working with Industry.

Genome Enterprise Ltd (GEL) is EI's commercial subsidiary, through which we offer genomic and bioinformatics services on a trading basis and work with commercial providers on a partnership basis. The Earlham Institute also receives specific funding to enable knowledge exchange programmes which are supported across the Park's institute teams.

[Find out more about our Industry engagement here.](#)



Our training facilities are state-of-the-art and designed to enhance learning.

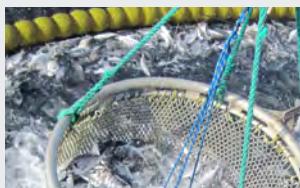
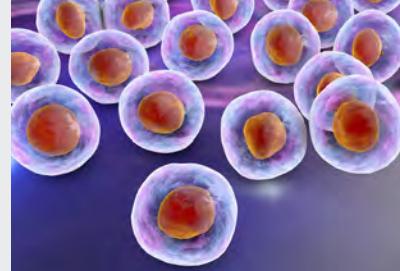
Pioneering training.

An important part of EI's mission is to provide high quality training to support the current and next generation of life scientists and bioinformaticians.

Our training courses aim to equip researchers with the necessary skills for advance genomics through either practical short courses or tailored personal training for visiting workers and students.



Our impact.



Making a difference.

Our research related to global food security has far-reaching impacts for the international scientific community, farmers, breeders and industries. [Entering a ‘wheat pan-genomics’ era from single to multiple wheat DNA references](#), our Genomics Pipelines Group and Science Division aims to diversify one of the world’s most complex genomes to improve yield quality and increase wider production of the critical food crop. EI have developed a new analytical method that is influencing industry and academia to further advance the field of wheat genomics into a multi-reference phenomenon by building key genetic resources for the purpose of crop breeding, preservation, and research.

Research highlights include using mutant databases to study reverse genetics in wheat, the evolution of plant immunity, the identification of wheat genes that increase disease resistance and applying machine learning algorithms to the imaging and surveillance of plants in the field.

Our varied research groups play a vital role in such scientific advances as exploring plant immunity in important crop plants to help breeders arm their yields against a swathe of emerging diseases; uncovering genetic difference in strains of salmonella to find those that are more of a threat than others and identify new targets for medical treatment; working with Japan to achieve the first genome sequence of the white Guinea yam, a staple crop that has huge economic and cultural significance in Africa; promoting biodiversity in Colombia through advanced genomics to encourage economic and civil prosperity; and helping fish farming to become more sustainable in Tanzania; as well as cross-collaboration with other Institutes to establish novel infrastructure platforms for genomics data and software dissemination.





Ash dieback.

Response to the ash dieback crisis by sequencing and annotating both disease-resistant and disease-susceptible ash trees and the infectious fungus, *Hymenoscyphus fraxineus*.



Yellow rust.

Greater understanding of crop pathogens including yellow (stripe) rust that poses a threat to UK wheat supplies, and potato blight, which was the major culprit in the 1845 Irish and 1846 Highland potato famines.



Salmonella.

Research into the microbiome of the human gut, an explosive new area of research which will benefit obesity and diabetes. The Earlham Institute will extend this area of research to understanding the microbiome at the soil-root interface.



Cichlid fish.

Research into fish focuses on the understanding evolution and phenotypic variation in the African cichlids of Lake Malawi. Knowledge gained will be applied to fish farmed for food.



Agriculture.

Greater genomic understanding of a range of agricultural crops including wheat, barley, strawberry, potatoes, oilseed, rice, sugar beet, red clover and Miscanthus (a grass under consideration for biofuel production).



Domestication.

Research into mammals, including understanding the genetic profile of dogs, so that, for example, the best puppies can be selected as guide dogs to improve the training success rate. Ferrets are being studied so that the genetics of domestication can be better understood.



Conservation.

Response to the near-extinction of the Mauritius pink pigeon, which reduced to just six wild birds. The population has now expanded and the genetic diversity of the restricted population is being analysed. The introduction of zoo birds to increase the genetic pool is now being considered.

Our boilerplate.

The Earlham Institute (EI) is a world-leading research Institute focusing on the development of genomics and computational biology. EI is based within the Norwich Research Park and is one of eight institutes that receive strategic funding from Biotechnology and Biological Science Research Council (BBSRC) - £5.43m in 2017/18 - as well as support from other research funders. - as well as support from other research funders. EI operates a National Capability to promote the application of genomics and bioinformatics to advance bioscience research and innovation.

EI offers a state of the art DNA sequencing facility, unique by its operation of multiple complementary technologies for data generation. The Institute is a UK hub for innovative bioinformatics through research, analysis and interpretation of multiple, complex data sets. It hosts one of the largest computing hardware facilities dedicated to life science research in Europe. It is also actively involved in developing novel platforms to provide access to computational tools and processing capacity for multiple academic and industrial users and promoting applications of computational Bioscience. Additionally, the Institute offers a training programme through courses and workshops, and an outreach programme targeting key stakeholders, and wider public audiences through dialogue and science communication activities.





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