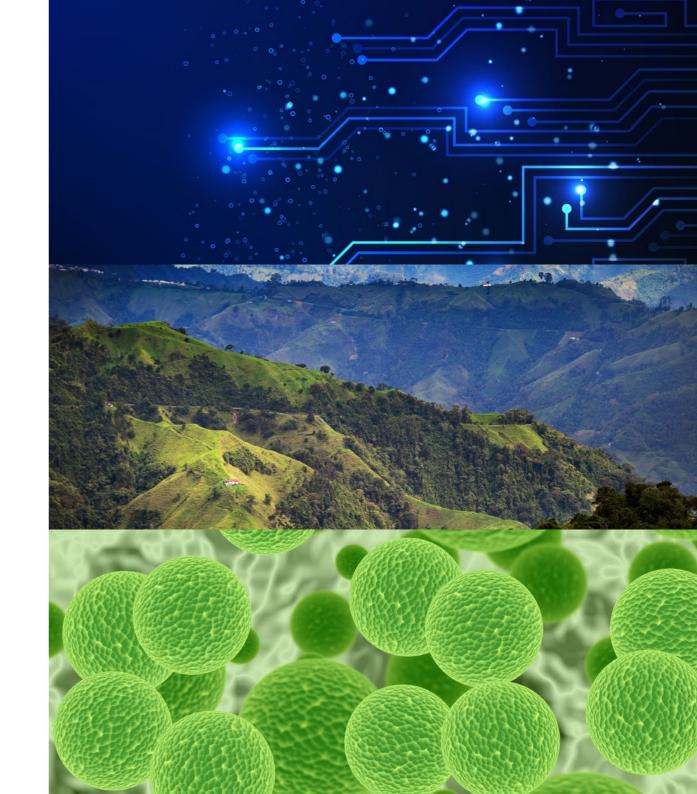


17 - 18 November 2021



Contents

2. Contents and Key themes

3. Digital Biology

- **Complex Genome Assembly** 4.
- E-Infrastructure for Data Sharing 5.
- In-field Sequencing 6.
- **High Resolution Microbiomics** 7.

8. Engineering Biology

- Single Cell Sequencing 9.
- **Engineering Plant Biology** 10.

11. Organisms and Ecosystems

- 12. **Crop Genomic Diversity**
- 13. **Biodiversity and Resilience**
- Functional Traits and Disease Targets 14.
- 15. **Biocontrol and Bioprospecting**
- Metagenomic Strain Tracking 16.
- 17. Precision Medicine Tools
- Single Molecule Analysis 18.

19. Projects

- Darwin Tree of Life 20.
- 21. ELIXIR-UK
- **GROW** Colombia 22.

23. Services

- Advanced Training 24.
- Earlham Biofoundry 25.
- **Genomics Services** 26.
- **Core Bioinformatics Services** 27.
- High Performance Computing 28.
- 29. Contact

Key themes

Fundamental research



Microbiomes and health

Applications and tools



Sequencing tools, techniques and platforms



Conservation and Biodiversity

<u>ہ</u>

Bioinformatic software and tools



Data storage, visualisation and sharing



Genomes and



Automation platforms for molecular and synthetic biology



2

Genomics for precision medicine



Scientific training





Agriculture and food security





Digital Biology













Agriculture and food security





Genomics for precision medicine

\square	
Ä	

Sequencing tools, techniques and platforms



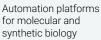




Data storage, visualisation and sharing









222

Scientific training





Bernardo Claviio

agricultural traits.



Bioinformatic Algorithms Group Leader

Clavijo Group

Complex crop genome assembly

markers associated with specific traits of interest.

Interested in connecting with:

The group specialises in complex genome assemblies, where the

references, for example to accurately reconstruct multiple copies of genomic regions with high similarity, such as repetitions or diverged haplotypes. The analytical methods and tools developed by the group

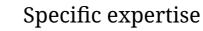
enable concurrent analysis of information from different sequencing technologies, integration of genomic and genetic data from markers and genetic maps, comparative genomics and identification of genomic

Academic groups and biotech companies interested in assembling

complex genomes to identify genetic mechanisms of important

current state-of-the-art methods are still challenged to produce reliable







Gonzalo Garcia Accinelli Assembly methods development and assembly quality control



Jon Wright Wheat genomics and methods testing







and health





Agriculture and food security

Genomes and

evolution

Conservation and





Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



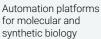
Data storage, visualisation and sharing



ممم











Scientific training



Robert Davey

Davey Group

E-Infrastructure

and application processing.

Head of Research e-Infrastructure

informatics.



The group specialises in developing bioinformatics servers and

and large-scale data visualisation. The Davey group focuses on building infrastructure to best manage, represent and integrate

algorithms and methodologies to develop tools for life science

Interested in connecting with:

repository platforms for data and software distribution, publication

data for knowledge sharing. This includes exploring new hardware,

Academic researchers and breeders interested in utilising wheat data in agriculture sector, and companies developing computer graphics



Specific expertise



Felix Shaw Fish trait image recognition and machine learning



Alice Minotto Data brokerage and publishing (Colaborative Open **Plant Omics**







Conservation and Biodiversity



Agriculture and food security

Genomes and



evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and





Automation platforms for molecular and synthetic biology



Scientific training



Richard Leggett Technology Algorithms Group Leader

Interested in connecting with:

agritech, biotech, and pharma sectors.

Leggett Group

sequencing

New methods for in-field and real-time

The group is focussed on developing methods (primarily software, but

antimicrobial resistance analysis and metagenome assembly in clinical

and environmental samples. The group has analysed diverse samples from sources including the human gut, oceans, rivers, air and soil.

Academic and industry researchers, and government bodies interested

in developing computational tools and pipelines for applications in

also wet lab) to take advantage of new sequencing advancements,

particularly in the areas of in-field sequencing, real-time analysis and nanopore technology. Applications include species classification,











Samuel Martin **Bioinformatics, mathematics and software engineering**



Darren Heavens Molecular biology, DNA extraction and sequencing technology

Specific expertise



Mark Alston Computational biology with expertise in metagenomics



0







Conservation and Biodiversitv



Agriculture and food security

Genomics for precision medicine







Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage. visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training

Quince Group

Developing Improved Methods to Understand the Complexity of Microbial Communities

Applied to the gut microbiome, the Quince group pioneered metagenomic analysis techniques that accurately capture the diversity in microbial communities. These approaches have been applied to urgent clinical conditions; to identify transmission, for targeted intervention, of non-viral gastroenteritis. Advance treatment of paediatric Crohn's disease & understanding the evolution antimicrobial resistance (AMR). The Quince group continually develop novel analytical approaches to a range of systems.

Interested in connecting with:

Academic researchers, biotechnology companies, microbiome therapeutics industry and the wider microbiology community interested in the improved genome resolved metagenomics for analysing large data sets from environmental & human associated environments.

> Chris Ouince **High-Resolution Microbiomics Group Leader**













0

Specific expertise



Sébastian Raguideau AMR genetic analysis of environmental microorganisms



Odin Manuel Moron Garcia Alan Turing Fellow, Metagenomic data interpretation through phenotypic ML



Empineering Biology











Agriculture and food security

Conservation and Biodiversitv



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



2021



Multi-omic approaches for single cell analysis

The group specialises in the development and application of highthroughput single cell sequencing and approaches, in particular in the development of novel "multi-omics" approaches - in which both the genome (or epigenome) and the transcriptome of a single cell can be assayed in parallel. These methods can provide key insights into biological heterogeneity at the single cell level, and address a diverse range of biological questions in both basic and translational science. The group routinely apply single-cell approaches to microbial, plant, animal and human cells.

Interested in connecting with:

Macaulay Group

Academic and industrial researchers interested in using single cell sequencing approaches for a diverse range of applications; biotech and instrumentation companies developing equipment and consumables for single cell sequencing.



lain Macaulay **Technical Development Group Leader**









Specific expertise



lain Macaulav **Cell isolation platforms**



Ashleigh Lister Single cell analysis protocols



Laura Mincarelli Applications of short- and long-read sequencing in single cell analysis







Biodiversity

Agriculture and food security

Conservation and



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools





Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training





Engineering plant biology

Patron Group

The group specialises in applying engineering approaches to investigate plant biology and advance plant biotechnology. The Patron group investigate and engineer gene regulatory networks that underpin complex traits such as responses to nitrate; identify novel bioactive molecules for health and agriculture; and engineer plants as photosynthetic biomanufacturing platforms for small molecules, including insect pheromones.

Interested in connecting with:

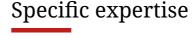
Researchers in academia, biotech companies or breeding companies interested in natural products, biomanufacturing, plant genome editing and engineering biology.

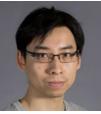


Nicola Patron **Group Leader**









Yaomin Cai Plant gene regulation



Tufan Oz Plant genome engineering



Melissa Salmon Genetics and biomanufacturing of natural products



Organisms and Ecosystems





and health



Conservation and Biodiversity



Agriculture and food security



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools











Automation platforms for molecular and synthetic biology



Scientific training



Anthony Hall

Head of Plant Genomics



Anthony Hall Group

diversity in crops

Computational tools to leverage genomic

The group is interested in mechanisms of genome evolution within

large complex genomes. The group deploys next generation genetic tools to explore evolution and genetic variation with a focus on wheat. From this fundamental interest the group have developed genome re-

sequencing genotyping approaches and tools/methods for exploring macro/micro genetic variation. In addition, these tools have been used to identify genes underpinning key traits involved in recombination,

Academic researchers, breeding companies, biotech companies and

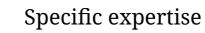
interested in new targets for improving key agricultural traits.

wider agrochemical sector developing new genotyping platforms, and

biological timing, heat, drought and yield robustness.

Interested in connecting with:







Anthony Hall Genetic diversity in wheat, increasing recombination



Joshua Colmer Machine learning techniques to analyse gene expression



Ben White **Bioinformatics tools for variant calling** and gene expression



Ben Ward **Computation biology and bioinformatics**







Conservation and Biodiversity



Agriculture and food security

Genomes and

evolution





Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



De Vega Group

Diversity of crops and soils to build resilience to climate change

The group specialises in agricultural biodiversity and genomics, soil guality health and climate adaption. The group are exploring the natural diversity in crop collections for advantageous adaptation that could be used to improve crop tolerance. The De Vega group also conduct metagenomic analysis to assess soil health and pests that impact arable fields.

Interested in connecting with:

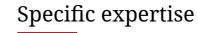
The agricultural community including plant breeders, researchers and gene banks that are interested in enhancing crop resilience as well as preserving and enhancing biodiversity.



Jose De Vega **Group Leader**









Janet Higgins **Crop diversity and collections**



Nasmille Larke-Mejía **Soil metagenomics**



Jose De Vega **Building the BIO economy**









Agriculture and food security

Conservation and Biodiversity



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools











Automation platforms for molecular and synthetic biology



ممم

Scientific training



Wilfried Haerty

targets in humans.

researchers.



Evolutionary Genomics Group Leader

Haerty Group

Exploring functional non-coding sequence for

desirable traits and disease targets

Interested in connecting with:

The group are experts in functional genomic and population and comparative genomics. The Haerty group specialises in characterising sequence variation within coding and noncoding

sequences critical to gene expression regulation through the

Pharmaceutical industry, oncology clinicians and academic

integration of genomic, epigenomic, and transcriptomic (short and long read) data. Industrial projects include identifying disease drug



Specific expertise



Tarang Mehta Tilapia genomic resources and population genetics



Adam Ciezarek Eukaryotic genomes and population genomics



Will Nash Non-coding RNA/sequences evolution, gene family evolution and splicing variation



Graham Etherington Single cell sequencing analyses











Agriculture and food security

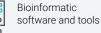




Sequencing tools, techniques and platforms

Genomics for precision medicine









Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



Hall Group

Evolutionary and population genomics

The group are experts in applying genomic methods developed from microbial species to more complex genomes. The Hall group focuses on evolution, population genomics and microbial single cell analysis, to understand how microbes evolve and adapt to different hosts. They work on bacteria, including Salmonella and eukaryotes for example, fungi and protists - and study their contribution to plant and animal disease, infection and resistance.

Interested in connecting with:

Academic researchers, agriculture sector, biotech/pharmaceutical industry interested in biocontrol and bioprospecting.



Neil Hall Director









Specific expertise



Mark McMullan Plant fungal pathogen, ash dieback, host-microbe



Matt Bawn Antimicrobial resistance and bacterial evolution



Ross Low Salmonella genomes and protist genome evolution



Biodiversity



Conservation and

Agriculture and food security



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



Falk Hildebrand **Group Leader**



Hildebrand Group

Parkinson's diseases.

Unravelling disease aetiology via bacterial

The group has expertise in combining microbial ecosystems,

bacterial evolution and gene transmissions. The Hildebrand group developed microbiome analysis pipelines for metagenomic strain

tracking, and to identify taxonomic signature and pathogenicity

Industry and academics interested in microbiome in health and

Interested in connecting with:

disease, strain tracking and bacterial evolution.

at the population level. These could be applied to both animal and human gut as a personalised treatment strategy, for example IBD and

evolution, metagenomics and population genetics





Specific expertise



Ezgi Ozkurt Defined biases in metagenomic sequencing experiments



Rebecca Ansorge Bacterial strains and their pan genomes



Joachim Fritscher High-resolution metagenomics, algorithm development







Conservation and Biodiversity



Agriculture and food security



Genomes and evolution



Genomics for precision medicine

\blacksquare	
Ä	

techniques and platforms





Bioinformatic software and tools

Sequencing tools,



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



Multi-scale analysis of human intestinal

Korcsmáros Group

Combining diverse experimental model systems with in-house developed computational pipelines, the Korcsmáros group carries out analysis using big multi-omics data for precision medicine applications. These systemsbased analytical tools can advance understanding of diseases such as infections, inflammatory bowel disease (IBD) and cancer, providing a valuable resource for researchers, clinicians and healthcare, pharma and Al industry.

Interested in connecting with:

Academics, industry and clinicians interested in exploring more representative model systems for IBD. Industry and clinicians with multiomics data on patients for stratification and biomarker discovery.



diseases

Tamás Korcsmáros **Tenure-track Group Leader**





Specific expertise



Isabelle Hautefort Intestinal models (including organoids) to study host-microbe interaction



Dezso Modos Precision medicine and network pharmacology



Marton Olbei Computational pipelines to analyse multi-omics and single cell datasets







Agriculture and food security

Conservation and Biodiversity



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools











Automation platforms for molecular and synthetic biology



ممم

Scientific training



Group Leader



Conrad Nieduszynski

Nieduszynski Group

stable replication of DNA.

Interested in connecting with:

pipelines for DNA replication stability.

Exploring the impact of DNA replication on the

Combining single molecular genome analysis, population genomics and

mathematical modelling, the Nieduszynski Group specialises in DNA

replication and genome stability underlying health and disease. These novel insights are applicable to human, bacteria, eukaryotes and synthetic

to patient diagnosis, or develop synthetic biology resource to maintain

Sequencing technology and genomic reagents providers, as well as

academics interested in developing single molecule advances and

genomes, and could be used to identify source of drug resistance, applied

stability of natural and synthetic genomes





Specific expertise



Sathish Thiyagarajan Computational biology, machine learning, algorithm development

Projects

.



Microbiomes



Conservation and Biodiversitv



Agriculture and food security



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms







Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training





Darwin Tree of Life

Investigating British biodiversity



and data brokering

Darwin Tree of Life (DToL) aims to sequence the genomes of all 60,000

Karim Gharbi Sequencing, automation



Specific expertise

Wilfried Haerty **Pollinator genomes**



Neil Hall **Genome evolution**



lain Macaulay Single cell extraction and library preparation protocols



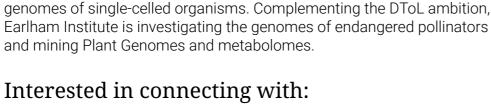
Nicola Patron Plant metabolites



20







eukaryotic species in Britain and Ireland, with the hope of transforming the way we do biology, conservation and biotechnology. Within this ambitious

project, the Earlham Institute is developing novel methods to read the

Wildlife trusts and conservationists for analysis of specimens and application of data. Sequencing centres and assemblers interested in advances in sequencing pipelines and methods. Biotechnology based companies looking for custom sequencing and pipeline development.











Agriculture and food security





Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



transformation.

NITED KINGDOM

Coordinating bioinformatics infrastructure in

Coordinating life science data resources across Europe under a single

together services central to many industrial researchers, particularly in

As the lead institute of the ELIXIR-UK Node with 20 member organisations,

infrastructure, ELIXIR - an intergovernmental organisation - brings

Earlham Institute provides coordination, data brokering, biological databases, cloud resources, and training for current data challenges.

Industry e.g. pharmaceutical, agritech etc, who would like to

engage and influence the consortium on FAIR (findable, accessible,

interoperable, reuseable) implementation for efficient and effective digital

the UK, for Europe and beyond

pharmaceutical, medical, and biotechnology sectors.

Interested in connecting with:

Neil Hall **Joint Head of Node**









Specific expertise



Catherine Hunter Project Manager



Hannah Norman **Community Engagement Officer**



Nicola Soranzo **Technical Co-ordinator, ELIXIR-UK**







Agrici

Agriculture and food security

Genomes and

evolution

Biodiversity

Conservation and



Genomics for precision medicine

Sequencing tools,

techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



Wilfried Haerty

Natural diversity

and conservation of

indigenous species





Preserving, restoring and managing Colombian biodiversity through responsible innovation

GCRF

GROW Colombia combines biological sciences, computational biology, and socio-economics to preserve, restore and manage the extensive biodiversity of Colombia. Its agricultural diversity programme includes the economically important crops coffee, banana, sugar cane and cacao. The natural diversity programme helps conservation efforts to save the spectacled bear and the unique Andean Paramos.

Interested in connecting with:

GROW

COLOMBIA growcolombia.org

Academics, start-ups and SMEs interested in sustainable breeding practices and identification of favorable crop traits to improve market value. Government bodies and the tourism industry requiring evidence based conservation recommendations aspiring to achieve sustainable bioeconomies.



Jose De Vega Agricultural diversity and soil health



















Biodiversity



Agriculture and food security



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



Emily Angiolini

Training

Head of Advanced

ADVANCED

Advanced Training

Our training programme is aimed at life scientists, who are increasingly engaging in data-driven research projects relating to -omics techniques.

Addressing skills in genomics and bioinformatics, our programme of events engages with researchers in this fast-paced research space through a multitude of formats: project-based courses with an underpinning biological question; resource-based courses and workshops including best practice; networking and discovery events.

Interested in connecting with:

Academic researchers and companies interested in developing skills or using El's in-house developed tools and resources for their research or commercial projects.

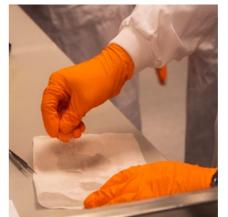


Roanne Ephithite Events Manager













Conservation and Biodiversity



Agriculture and food security

food security



Genomics for

precision medicine

ĨŸ



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training





Jose A. Carrasco Lopez

Earlham Biofoundry

Manager

BIO FOUNDRY

Earlham Biofoundry



The Biofoundry hosts a suite of automated platforms for molecular and microbiological workflows. It specialises in the rapid design, construction,

experimental throughput, while reducing reaction volumes and human error. Access to the Biofoundry can be provided as a service or in collaborative

and testing of genetically reprogrammed organisms. Our automated workflows include DNA assembly, genome engineering, cell-free protein synthesis, library screening and micro fermentation. The expertise can also be applied to automate numerous laboratory workflows, increasing

Academic researchers and companies interested in using laboratory

automation for their bespoke research or commercial projects.

projects, including hosting and training research staff.

Interested in connecting with:



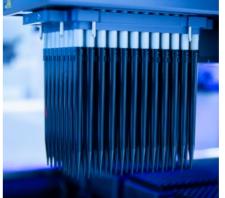
Lesley lves

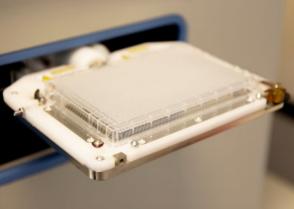
SU

Automation Senior

Research Assistant

















Agriculture and food security





Genomics for precision medicine

Sequencing tools,

techniques and









Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



ممم

Scientific training



GENOMICS PIPELINES

Genomics services

The Genomics Pipelines group provides a high-throughput genomics and single-cell analysis facility to support UK research communities. EI hosts a number of sequencing platforms and liquid handling automation. The group's expertise includes sample processing and preparation, laboratory automation pipelines, data generation, software, algorithms and bioinformatics pipelines for data analysis. This group specialises in testing new technologies and matching them to applications, as well as translating new protocols developed within EI into high throughput pipelines that can then be offered as a service.

Interested in connecting with:

External academic researchers, who would benefit from the expertise of this group; businesses, government departments and NGOs wishing to develop bespoke sequencing and bioinformatics platforms; companies developing new sequencing and automation technologies, equipment, and consumables.



Karim Gharbi **Head of Genomics Pipelines**

× ×



Specific expertise



Chris Watkins **Project management team**



Leah Catchpole Bespoke sample preparation and laboratory automation



lain Macaulay Single cell sequencing





Conservation and Biodiversity



Agriculture and

Genomes and evolution

food security





Sequencing tools,

Genomics for precision medicine



techniques and platforms



software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



Core bioinformatic services

The Core Bioinformatics group provides bioinformatic services, as well as developing software/pipelines to enable large scale data analysis for both industrial and academic projects. Our expertise can be applied across plant, microbial and animal genomes, with analyses including genome assembly and annotation, metagenomics, single cell multi-omics analysis to assess genetic, epigenetic and transcriptomic heterogeneity. We also support consortia in large scale genomics projects, for example International Wheat Genome Sequencing Consortium. Access to the core bioinformatics group can be provided as a service or through collaborative contracts and we welcome enquiries to tailor the bioinformatic analysis to your aims and needs.

Interested in connecting with:

Academic and industrial researchers interested in bioinformatics services or requiring large scale data analysis to develop applications and tools in agritech, biotech and pharma sectors.



Head of Core Bioinformatics

0







Specific expertise



Gareth Linsmith **Genome assembly**



27

Gemy Kaithakottil **Eukaryotic transcriptomics**





Conservation and Biodiversity



Agriculture and food security



Genomes and evolution



Genomics for precision medicine



Sequencing tools, techniques and platforms



Bioinformatic software and tools



Data storage, visualisation and sharing



Automation platforms for molecular and synthetic biology



Scientific training



Robert Davey



Head of Research e-Infrastructure

RESEARCH

desktop computing resources.

E-INFRASTRUCTURE

High performance computing

Interested in connecting with:

high performance computing resources.

Our high performance computing provides state-of-the-art computing

widely applicable to genomics and bioscience. Users can store huge amounts of data and complete complex computational tasks in

matter of hours that would have otherwise taken months on standard

Scientific community who are interested in enquiring or accessing

and storage technology to accelerate computational tasks for

the processing of large and complex data. This enables research



Specific expertise



Nicola Soranzo **Bioinformatic analysis platforms (Galaxy)**



Krister-Jazz Urog Cloud computing infrastructure (CyVerse)



Decoding Living Systems

Contact:

Earlham Institute Norwich Research Park Norwich NR4 7UZ

Email: business.development@earlham.ac.uk Telephone: +44 1603 450 001 Website: earlham.ac.uk