UNIVERSITY OF DUNDEE

Life Sciences at the University of Dundee

Introduction to Life Sciences at the University of Dundee

The University of Dundee is one of the leading universities in Europe for research in LifeSciences. The 2016 QS World University Rankings in Biological Sciences place Dundee 5th in the UK and 40th in the world as judged by 'citations per paper', one of the most widely recognized metrics of scientific excellence. The School of Life Sciences has one of the highest densities of Fellows of the Royal Society of London anywhere - 1 in 8 of our School of Life Sciences group leaders are FRS.

The University aims to maintain its position as a leading Life Sciences research institution by recruitment of the strongest individuals and by providing them with the infrastructure and support they need to reach their full potential, individually and collectively.

The University also believes there is an imperative to facilitate the translation of discoveries into patient and environmental benefit by providing an appropriate culture and the necessary infrastructure. Our research portfolio includes collaborations with many companies.

The School of Life Sciences

With 900 staff from over 60 countries, The School of Life Sciences is internationally recognised as one of the fastest growing and most productive research institutes in Europe. With molecular cell biology as the common theme, expertise ranges from developmental biology to medicinal chemistry.

'Lateral' and 'vertical' interactions within and between research groups are actively encouraged and 13% of publications in the past 5 years have been collaborations between two or more groups.

At the School of Life Sciences, our academic work is an international enterprise. We collaborate every day with colleagues at universities around the world - working on joint research, reviewing academic papers, and organising conferences. These institutional links are created and maintained by the connections between individual academics and universities.

Our view is that collaborations work best bottom-up, driven by the shared interests and then supported at institutional level by academics. Some of the world-class technologies and distinguishing features of Life Sciences include:

- Advanced Quantitative Proteomics
- Advanced Light Microscopy
- Early Stage Drug Discovery
- Enterprise-level High-Performance Computing
- Extensive interactions with industry
- Active and independent (but financially and administratively supported) Post-Graduate and Post-Doctoral Associations

Training the next generation of scientists

Besides performing research at the highest international standards, the University considers training and nurturing of the next generation of researchers a top priority. Our PhD Programmes therefore represent a major activity in the School of Life Sciences and are aimed at making this period an exciting and rewarding experience.

The aims of the PhD Programmes are:

- To train students in research methods and practice by performing well-supervised, high-quality research projects at the forefront of international science in well equipped laboratories.
- To make students aware of the theory, practice, capabilities and limitations of modern techniques in life science research.
3. To train students in the generic skills of scientific research i.e. experimental design, data analysis, literature survey, communication skills, teamwork and computer skills.
4. To assist students to obtain appropriate employment upon completion of their studies.
5. To provide an intellectually exciting and supportive work environment.

Our PhD programmes offer studentships and scholarships to UK, EU and overseas applicants through a variety of funding mechanisms from Medical Research Council, Biotechnology and Biological Sciences Research Council, Cancer Research UK, Wellcome Trust, A*STAR (Singapore), CAPES (Brazil), China Scholarship Council (CSC), Science without Borders (Brazil), Scottish Food Security Alliance and from the University itself.

Economic and Social Impact

Enterprise is a strong theme at the University and we strive to translate research into useful societal outcomes and the creation, incubation and support of companies in the Biomedical and Biotech sectors. This has played a key role in developing local Biotech, and Life Sciences represents 16% of the local Tayside economy. Further, our reputation for research excellence has enabled us to forge important strategic partnerships with major industrial collaborators.

We are proud to have nurtured a culture of communication and engagement with the public; our staff, principal investigators, post-docs, PhD students and support staff, are committed to a range of public engagement and outreach activities. The School regularly contributes to the Dundee Science Festival, the Dundee Women in Science Festival, Dundee Science Centre public engagement, hosts its own Open Doors Days, develops bespoke projects such as the highly acclaimed Magnificent Microbes, and Postdoc Pathways – a staff development project conceived by postdoctoral scientists on lives and careers for women (and men) in science.

We have also opened our own art-science research gallery **Life**Space (http//lifespace.dundee.ac.uk). The mission of **Life**Space is to engage artists and scientists in exciting new collaborations and to foster long-term cross-disciplinary activity that will provide these communities and the public with greater insight into the broad spectrum of life sciences research. We also have a very strong outreach programme for schools including school visits, school science days and science clubs as well as running master-classes and offering students the opportunity of work-experience.


life
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Highlights of Major Initiatives

The University is committed to nurturing scientific talent and maximising its research impact.

In the School of Life Sciences, the flagship of our forward plan is the recently opened Discovery Centre for Translational and Interdisciplinary Research.

The Centre enables the translation of our research into solutions for unmet medical need, fosters collaboration across research disciplines and maximises the impact of our world-class technology platforms.

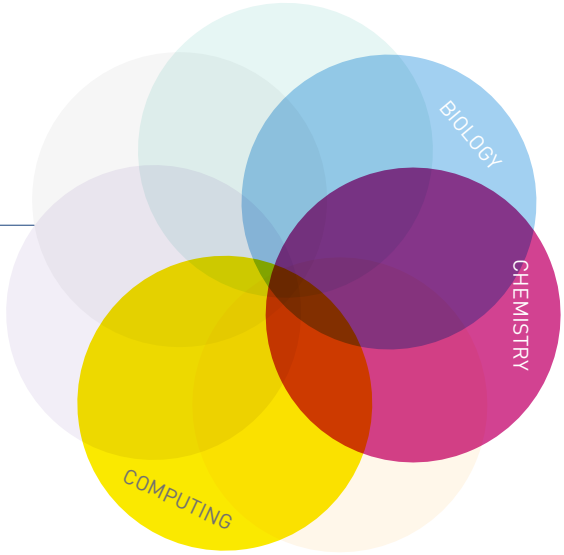
It houses:

- An expanded **Drug Discovery Unit**, more than doubling its capacity to develop new candidate drugs for neglected diseases and unmet medical needs.
- The **Division of Computational Biology,** taking computational, mathematical and biophysical approaches to biomedical problems.
- A **Laboratory for Quantitative Proteomics**, formed around the expertise of Prof Angus Lamond FRS plus corporate mass spectrometry and data analytics partners.

The School is also building more collaborative activity between physics, engineering and biology, particularly in **Laser Physics, Photonics and Imaging**. We have also created a new **Centre for Antimicrobial Resistance**, which is delivering innovation in antimicrobial research, translation and clinical practice.

In addition, the School of Life Sciences houses a long-standing and continually evolving multi-company collaboration on signal transduction called the **Division of Signal Transduction Therapy (DSTT)**. The DSTT is widely seen as a paradigm for how industry and academia can collaborate. The School also is delighted to host the new **UK National Phenotypic Screening Centre**, headed by Prof Andrew Hopkins. The following sections contain highlights of these major initiatives

The Drug Discovery Unit



The translation of basic research into local, national and global therapeutic benefits is central to the School of Life Sciences strategic vision and the University's mission. The Drug Discovery Unit has created a successful paradigm for translating basic, innovative life sciences research into therapeutic opportunities and yields pipeline of validated partnering and licensing opportunities. The Unit, which currently has 90 dedicated staff (mostly from industry) and is the only fully operational and integrated drug discovery team in the UK university system working across multiple therapeutic areas. It contains all the disciplines (compound screening, medicinal and computational chemistry, structural biology, pharmacokinetics and in vivo efficacy) required to produce drug leads and pre-clinical drug candidates.

Neglected Diseases

Drug discovery for neglected diseases (African sleeping sickness, leishmaniasis, Chagas' disease, malaria and tuberculosis) benefits our charitable product development partners and involves intensely interactive collaboration with major Pharma partners (particularly GlaxoSmithKline). This work is generously supported by the Wellcome Trust, with substantial international co-investment from the National Institutes of Health, the Bill & Melinda Gates Foundation, Medicines for Malaria Venture (MMV), Drugs for Neglected Diseases initiative and the TB Alliance.

In 2010, the Unit initiated a programme in partnership with Medicines for Malaria Venture to identify compounds that kill the malaria parasite. A significant milestone was reached in late 2013 when cycles of design, synthesis and testing by expert teams of chemists and biologists yielded a highly efficacious oral antimalarial agent that was curative in a mouse model of malaria.

This extraordinary achievement over a very short time period has resulted in Medicines for Malaria Venture including this agent in their clinical development portfolio and it is expected to enter clinical trials in 2016. The work gives real hope that safe, affordable, new medicines to fight malaria will be ready to replace current drugs that are failing due to antimicrobial resistance. Importantly, this compound is predicted not only to be curative of human malaria but also effective in malaria prophylaxis and in blocking transmission of the disease, both of which are key requirements for the elimination of malaria.

> "Identifying a compound like this is no small feat. It's a great achievement, particularly given the exciting properties of the compound, which give it potential for use in the treatment, prevention and transmission-blocking of malaria."
>
> Dr Paul Willis, Director, Drug Discovery, Medicines for Malaria Venture

The Medicines for Malaria Venture have declared the Unit's compound their "Project of the Year, 2014" and successfully partnered its pre-clinical development with European pharmaceutical giant Merck-Serono.

Details of the discovery, properties and mechanism of action of the novel compound were recently published in the journal Nature. (http://www.dundee.ac.uk/news/2015/discovery-of-a-novel-antimalarial-compound-published-in-nature.php). The story received global coverage and was reported by all of the major news channels and press in the UK.

Strategic collaborations with Pharma

The Drug Discovery Unit engages extensively with GlaxoSmithKline through its Wellcome Trust-funded programmes on kinetoplastid diseases, and the team expect to select shortly a new leishmaniasis drug candidate for pre-clinical development.

The Drug Discovery Unit also interacts with Pfizer, AbbVie and Bristol Myers Squibb (and the Broad Institute) as part of a Drugs for Neglected Diseases initiative leishmaniasis consortium and with Eli Lilly, AbbVie and GlaxoSmithKline and five other companies as an integral part of the Tuberculosis Drug Accelerator program. The Unit is also working with a team from Texas A&M University, USA on an exciting lead optimisation series with efficacy in animal models of TB. The team expect to develop a pre-clinical candidate within the next 12 months.

Other recent successes in this area include:

- repurposing a drug for leishmaniasis, now in phase-2 clinical trials;
- developing candidate veterinary drugs that are in field trials for African animal trypanosomiasis in partnership with the PDP GALVmed;

“Something very special is taking place in Dundee... (where) a drug discovery unit has torn down disciplinary walls to put chemists next to biologists, industry scientists beside academics. The result is a portfolio of promising new medicines for malaria, trypanosomiasis, and other diseases.”

The Lancet (Vol 379, May 12, 2012), Offline, Richard Horton

Innovative targets for unmet medical need

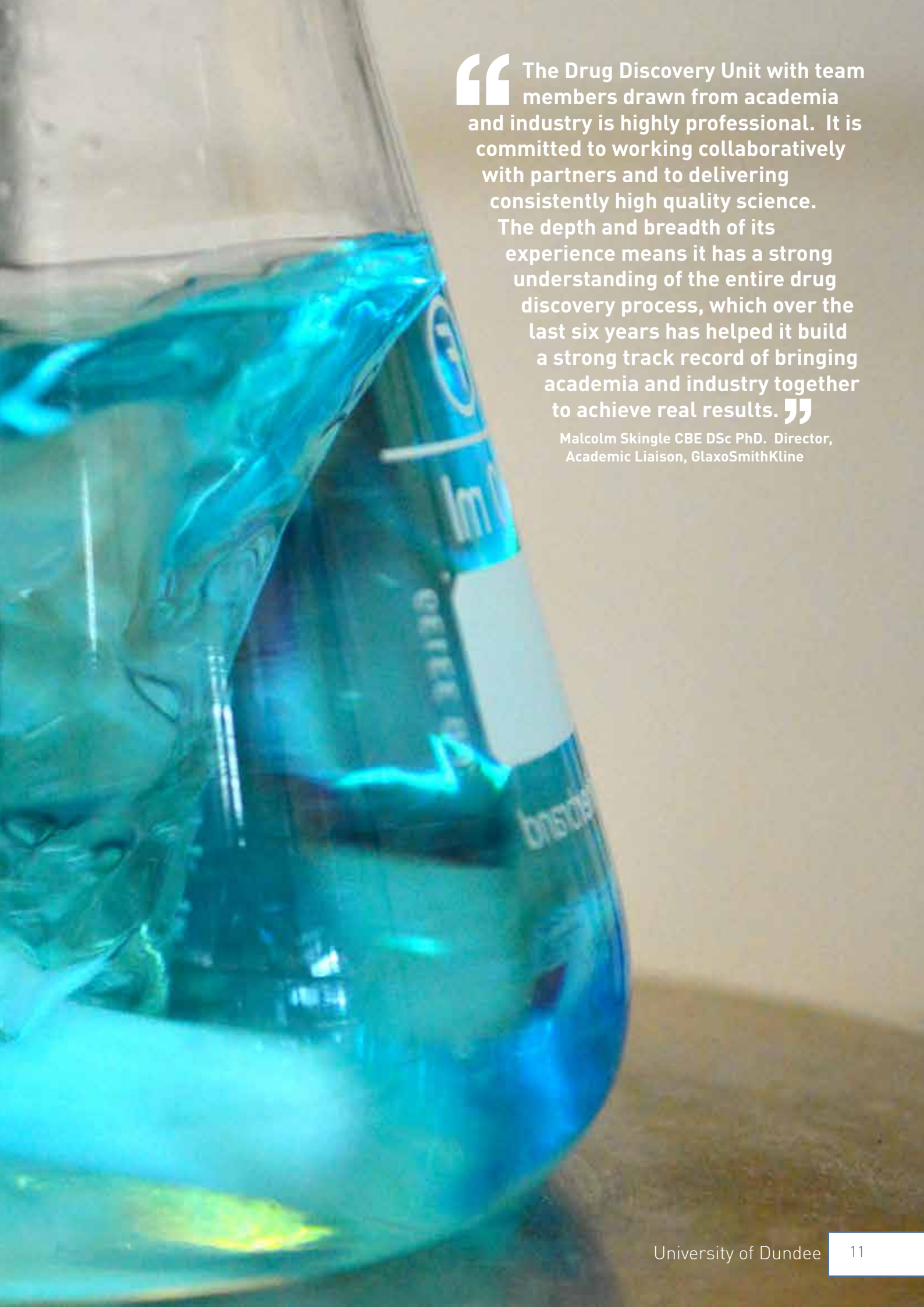
Since 2009, the Unit's work has expanded into other areas of unmet medical need, including cancer, diabetes, inflammatory (rheumatoid arthritis) and genetic skin diseases. Grants awarded by the UK Medical Research Council (MRC), and strategic funding from The Wellcome Trust and the University itself, has allowed the Unit to run its ***Innovative Targets Portfolio***. This integrates outstanding biological innovation with professional, small molecule, medicinal chemistry.

Independent market analysis (performed by Frontline Consultants, December 2011) described the Unit as unique within the UK University sector, with no other facilities providing its breadth and depth of expertise.

This approach enables 9 new innovative biological targets to benefit from first-rate medicinal chemistry each year. These projects provide data packages that stimulate significant partnerships with industry in about one in three cases, and provide useful probe compounds to advance the biology in all cases.

Taking innovation all the way

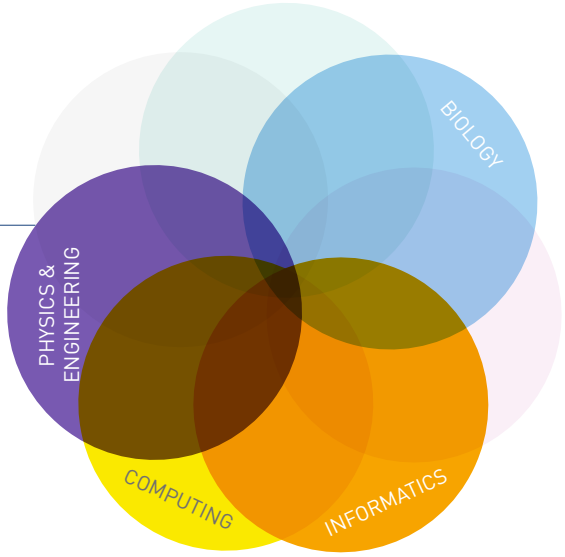
The Unit is currently embarking on a major project to further the translation of innovative targets and deliver a significant pipeline of pre-clinical candidates to the pharmaceutical industry. This innovative model - called the CURE Fund - is a limited partnership drawdown fund, structured in accordance with industry standard attrition rates and license deal values. The Fund model was developed in partnership with a commercial fund manager and will leverage the substantial public/charity funding already awarded to the Unit (circa. £1.3 million pa), to develop innovative targets into higher value assets suitable for spin-out or licensing. The fund will share risk and reward while delivering a new pipeline of pre-clinical candidates to the pharmaceutical industry. The University and their academic partners will receive a share of commercialisation returns as assets are licensed or sold, with the reminder retained by the CURE Fund and distributed back to investment partners. The model is unique in its ability to identify, translate and de-risk novel target biology from a range of leading universities via a model that delivers impact for both the originating institutes, the Unit and the pharma partners.



“The Drug Discovery Unit with team members drawn from academia and industry is highly professional. It is committed to working collaboratively with partners and to delivering consistently high quality science. The depth and breadth of its experience means it has a strong understanding of the entire drug discovery process, which over the last six years has helped it build a strong track record of bringing academia and industry together to achieve real results.”

Malcolm Skingle CBE DSc PhD. Director, Academic Liaison, GlaxoSmithKline

Computational Biology



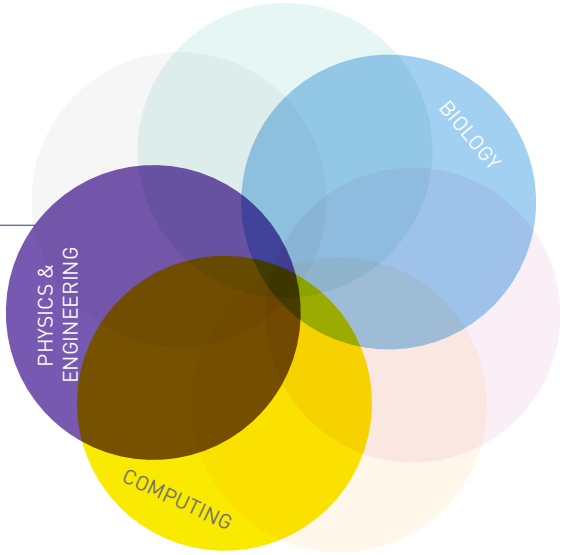
The Division of Computational Biology was created in 2013 to apply interdisciplinary approaches involving computational, mathematical and biophysical techniques, to biomedical problems. Coalesced together in the second floor of the Discovery Centre for Translational and Interdisciplinary Research, an open plan, high quality 'dry' laboratory has been created for an interdisciplinary group of biophysicists, bioinformaticians, software developers and data analysts to feed off each other's expertise and, at the same time, sit at the heart of a huge Life Science experimental centre. Our strategy is to remove artificial barriers between the physical and biological sciences to maximise scientific discovery. Members of the division either have their own "wet-lab" or collaborate closely with "wet-lab" experimentalists or clinicians to extract maximum value from experimental data that informs the development of predictive algorithms and models that may be tested experimentally. The support of our Data Analysis Group and opportunities for collaboration with informaticians and physicists is a powerful attractant for new faculty.

The Head of the Division is Prof Geoff Barton, who works on tackling the problem of 'Big Data' in biology. One of his projects Jalview (www.jalview.org), integrates large collections of biological sequences, such as DNA, RNA and protein with information about their function and role in disease. It helps scientists working on genetic disease make sense of their data and improve the prediction of the effect of mutations in the human genome on disease.

Computational Biology also contains the research group of Prof Timothy Newman, Professor of Biophysics along with Dr Andrei Pisliakov, Dr Ulrich Zachariae and Dr Rastko Sknepnek) all joint all joint appointments with the School of Science and Engineering, emphasising the strategic importance of this interdisciplinary area.

Jason Swedlow's Open Microscopy Environment team is also part of Computational Biology. This team of professional software engineers is responsible for the development of OMERO and for the spin-out company Glencoe Software Ltd. Jason was BBSRC 'Innovator of the Year' in 2011.

Laser Physics, Photonics and Imaging



The University of Dundee has an international reputation in high-resolution microscopy, particularly in advanced live imaging of cells and tissues. Originally founded in the School of Life Sciences, the Imaging Facility has steadily grown its links to all aspects of the University's scientific research programmes. Its growth is driven by scientific need— new technologies are added or expanded as required to support the research ambitions of our scientists.

The Dundee Imaging Facility has fostered links between photonics and biological and medical research— driving interdisciplinary collaborations by scientific need and demand. This bottom-up approach ensures the Imaging Facility's sustainability— it is constantly linked to competitive, cutting-edge research programmes and applications.

The facility has a central hub in the School of Life Sciences, incorporating Advanced Light Microscopy, Super Resolution Microscopy, Tissue Imaging, the Physics and Life Science (PaLS) lab, Image Analysis and Sample Preparation. We have an additional Light Microscopy facility at the Ninewells campus, School of Medicine and our Analytical Electron Microscopy facility is housed in the School of Science and Engineering. All of our technology is accessible by all staff in the University of Dundee on an equal basis.

"Microscopy is one of the most important tools scientists have for discovery-based research but the high costs associated with this technology are often a barrier to expansion. This funding is crucial to help the UK capitalise on the latest technologies and maintain its internationally leading position in biological and biomedical research.

This type of microscopy relies on scientists in very different disciplines coming together to solve very specific imaging problems. All seventeen projects were able to demonstrate extremely strong partnerships between biologists, physicists, chemists, mathematicians, engineers, technologists and equipment manufacturers."

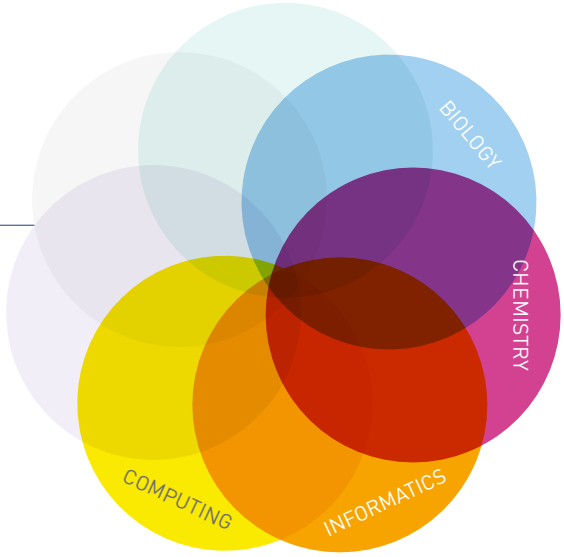
Professor Steve Hill, expert on Research Council assessment panel

"These substantial funding awards will bring together the UK's world-class research base and industry to keep our life sciences sector at the forefront of discovery. Through exploring innovative new uses for microscopy they will improve our understanding of disease and ultimately deliver benefits for patients."

David Willetts, Minister for Universities and Science

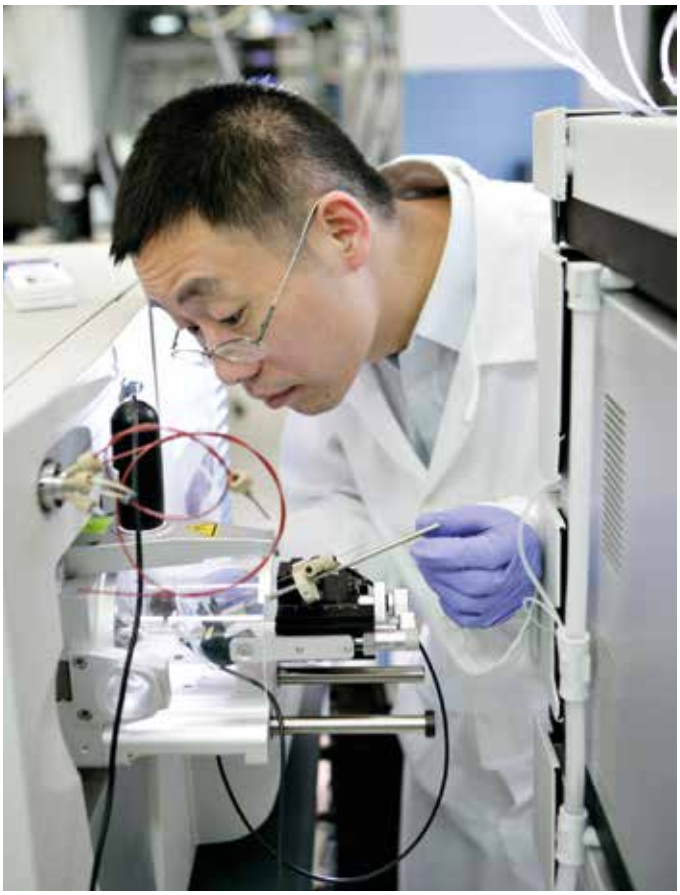
MRC News – "Biomedical research in the UK is to benefit from a £25.5m cash injection to boost the resolution revolution taking place in microscope technology" 20 February 2013

Quantitative Proteomics



As sophisticated proteomics methodologies are increasingly embraced by Life Sciences academics and industry, growth in this area is set to explode. Recent improvements in the sensitivity and resolution of mass spectrometry instrumentation, the design of effective experimental strategies and the development of new data analysis software and approaches, offer huge opportunities to transform our understanding of basic mechanisms in cell biology and genetics at a system-wide level.

Through the expertise of Prof Angus Lamond FRS, we have built a strong position for quantitative proteomics in the UK that incorporates mass spectrometry in a '3rd generation proteomics strategy', providing quantitative measurements of key protein properties, including post-translational modifications, protein isoforms, protein complexes and interaction partners, subcellular protein localisation, protein half-lives and abundance. Our approach has been to combine quantitative proteomics with industrial and in- house experience in business intelligence (BI) computing and data warehousing to move beyond compiling 'simple proteomes' that primarily identify static lists of proteins and to pioneer the application of new, multi-dimensional proteomics strategies for the analysis of fundamental problems in human genetics and cell biology. The Laboratory for Quantitative Proteomics combines cell biologists, mass spectrometrists, data scientists and software developers, working in an integrated project to develop new technology for high-throughput detection and analysis of proteins in human cells, model organisms and pathogens. A key component of the project includes developing software tools for the efficient management, visualisation and sharing of proteomics 'big data', including the integration of these data with other forms of genomics and biological data and resources (peptracker.com). Thanks to the scale of mass spectrometry instrumentation (9 Thermo Q-Exactive and 2 Fusion MS instruments) and associated chromatography, sample processing and computational equipment, together with the bespoke data management infrastructure, the laboratory can undertake large-scale proteomics projects that would not otherwise be possible. For example, pioneering the multidimensional analysis of proteomes, including the system-wide analysis of multi-protein complexes. These technologies have great power in both fundamental biology (understanding biological regulation and disease mechanisms) and in translational science (for example in improving the identification of drug mode(s) of action and toxicological prediction). Advances made in the experimental laboratory are rolled out to the academic community through the co-located Dundee 'Fingerprints Proteomics Facility' that, with a further 10 high-end mass spectrometry platforms, provides advanced turnkey proteomics solutions. Proximity and access to one of the largest and most advanced proteomics capabilities in the world is a major bonus for new faculty.

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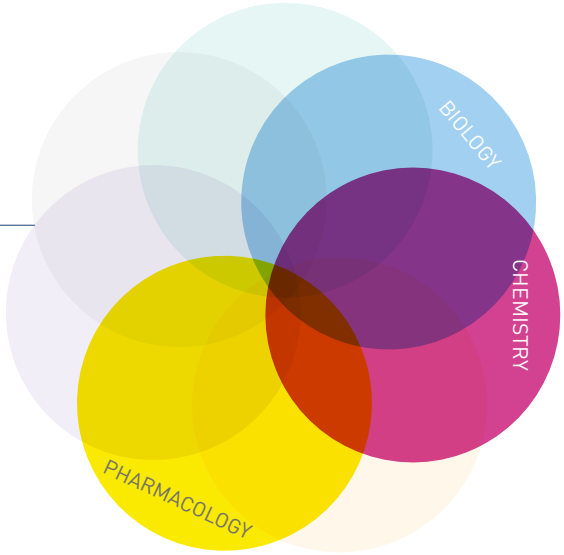
Division of Signal Transduction Therapy



Created in 1998 by Professor Sir Philip Cohen and Professor Sir Peter Downes, and now Directed by Professor Dario Alessi, the Division of Signal Transduction Therapy consortium is one of the largest and longest collaborations between the pharmaceutical industry and an academic research institute worldwide. It is widely regarded as a model for knowledge exchange and for how academia should interact with industry.[1] Allied to the MRC Protein Phosphorylation and Ubiquitylation Unit, it currently includes six of the world's leading pharmaceutical companies - AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Janssen Pharmaceutica NV, Merck-Serono and Pfizer – which have awarded core support of £14.4 million for the period 2012 to 2016. In return for their investment, the Pharma partners benefit from access to unpublished results, technology, know-how and reagents in the participating academic laboratories and have first rights to license intellectual property generated in the collaborative programme. Participating companies are provided with detailed information about the selectivity of thousands of their compounds via a kinase profiling service. The consortium scientists deliver ideas and expertise in drug target identification and validation in multiple areas, including cancer, arthritis, lupus, hypertension and Parkinson's disease. Three 3-day meetings each year are held between key scientists in the College and representatives in the Pharma companies to maintain this successful working relationship. The level of investment and commitment the pharmaceutical companies have made to this consortium through recurrent funding provides the evidence for the impact that this novel arrangement with industry delivers.

The model enables industrial researchers working in any of the worldwide outlets of six pharmaceutical companies to effectively work with the ~200 Dundee-based researchers that participate in the collaboration to understand the fundamentals of the molecular causes of disease that result from disruptions in protein phosphorylation and ubiquitylation networks.

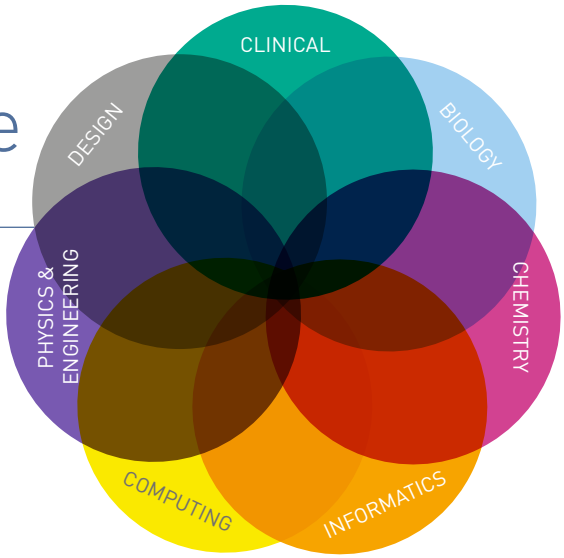
The collaboration is a good example of how cutting edge research can feed innovation to corporate partners. In addition, the exposure of post-docs and PhD students to consortium activities leads to many joining companies – providing further benefits to industry and effective knowledge exchange.

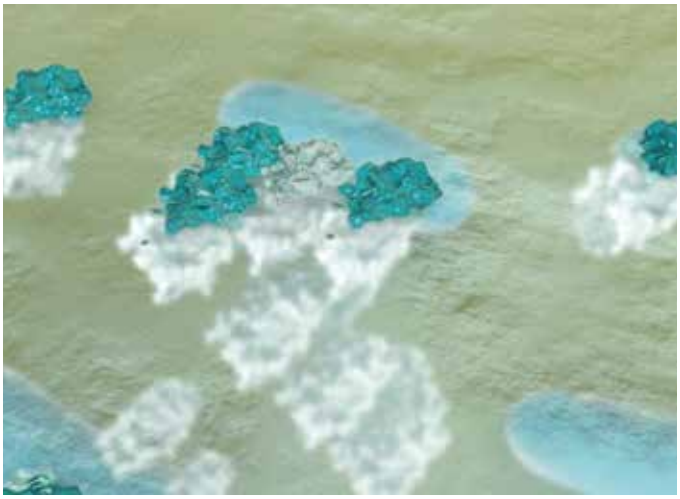
[1]Nat. Rev. Drug Discov. 10, 561-562 (2011) doi:10.1038/nrd3526; Research Councils UK Study on the economic impact of the Research Councils. Part II: Case studies (2007)

"The DSTT collaboration is a highly effective partnership that allows academic researchers to collaborate with pharmaceutical companies to maximise the translation of basic research towards clinical benefit. We are proud to continue our support of a project that is greatly accelerating pharmaceutical drug discovery programmes for major diseases."

Professor Sir John Savill, chief executive of the MRC

Centre for Antimicrobial Resistance



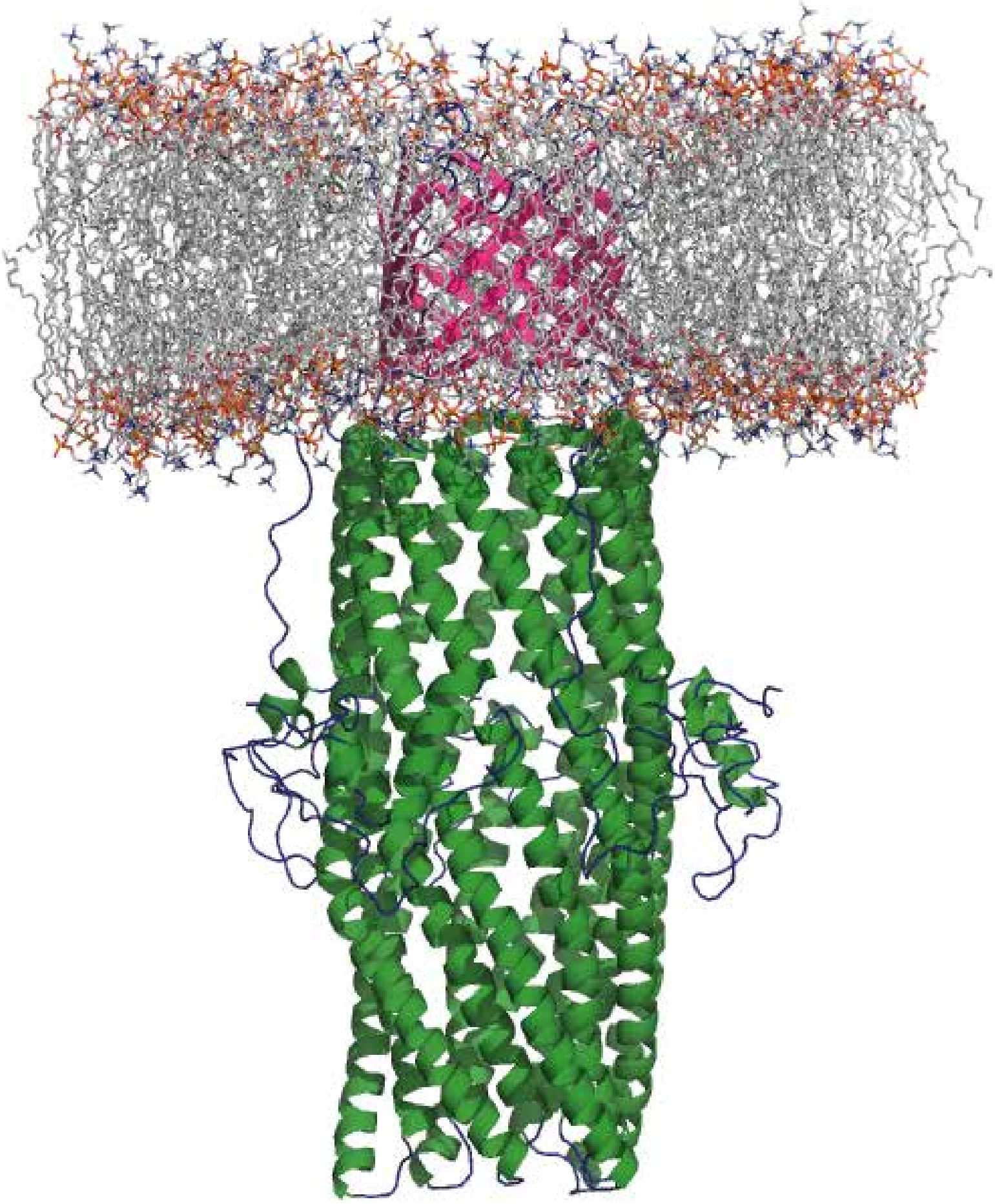


Antimicrobial resistance (AMR) is the ability of microbes like bacteria, viruses and parasites to evade treatment by antibiotics and other drugs. This is an increasing threat to global health as new resistance mechanisms emerge and spread across the world.

For bacterial infections, we are poised to enter a 'post-antibiotic' era. The World Health Organization estimates that antibiotics treatments add an average of 20 years to all of our lives. But in the 80 years since the discovery of penicillin, our overuse of antibiotics has put pressure on bacteria to evolve resistance, leading to the emergence of untreatable superbugs that threaten the basis of modern medicine. Some types of bacteria that cause hospital acquired infections have lost susceptibility to all available antibiotics. This could mean a return to the high incidence of routine lethal sepsis from injury, childbirth and surgery seen before the discovery of penicillin.

The Centre for Antimicrobial Resistance (http://amr.dundee.ac.uk) at the University of Dundee brings together biologists, chemists, physicists, clinicians, mathematicians, epidemiologists, engineers and designers to focus on innovation in tackling antimicrobial resistance. Members of the Centre are located across the institution in the School of Life Sciences, the School of Medicine, the School of Science and Engineering, Duncan of Jordanstone College of Art & Design and NHS Tayside. Researchers within the Centre work on a variety of areas such as identifying targets for new therapeutic agents through basic research; developing innovative technologies for application in AMR research, driving leadership in antibiotic stewardship and performing drug discovery programmes to develop new antimicrobial agents. Much of the work of the Centre is carried out in multidisciplinary collaborations between different groups within Dundee and beyond. The Centre also links into the Academic Health Science Partnership in Tayside (AHSP), which brings together University of Dundee and NHS Tayside to improve the health of the population in Tayside and beyond through advancement of health research, education of healthcare professionals and improved quality & safety of healthcare services.

> "Failure to tackle drug-resistant infections will lead to at least 10 million extra deaths a year and cost the global economy up to $100 trillion (£64 trillion) by 2050."
>
> Jim O'Neill, former Goldman Sachs chief economist and Chairman of the Review on AMR

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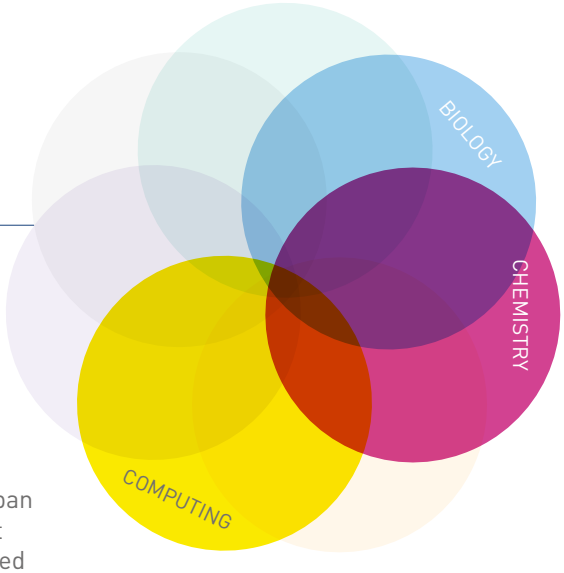
UK National Phenotypic Screening Centre



The UK National Phenotypic Screening Centre (UK-NPSC) is a new drug discovery venture, embedded within the academic sector, focusing on rebalancing the current emphasis on target-based screening in order to identify new pharmaceuticals to tackle complex human diseases.

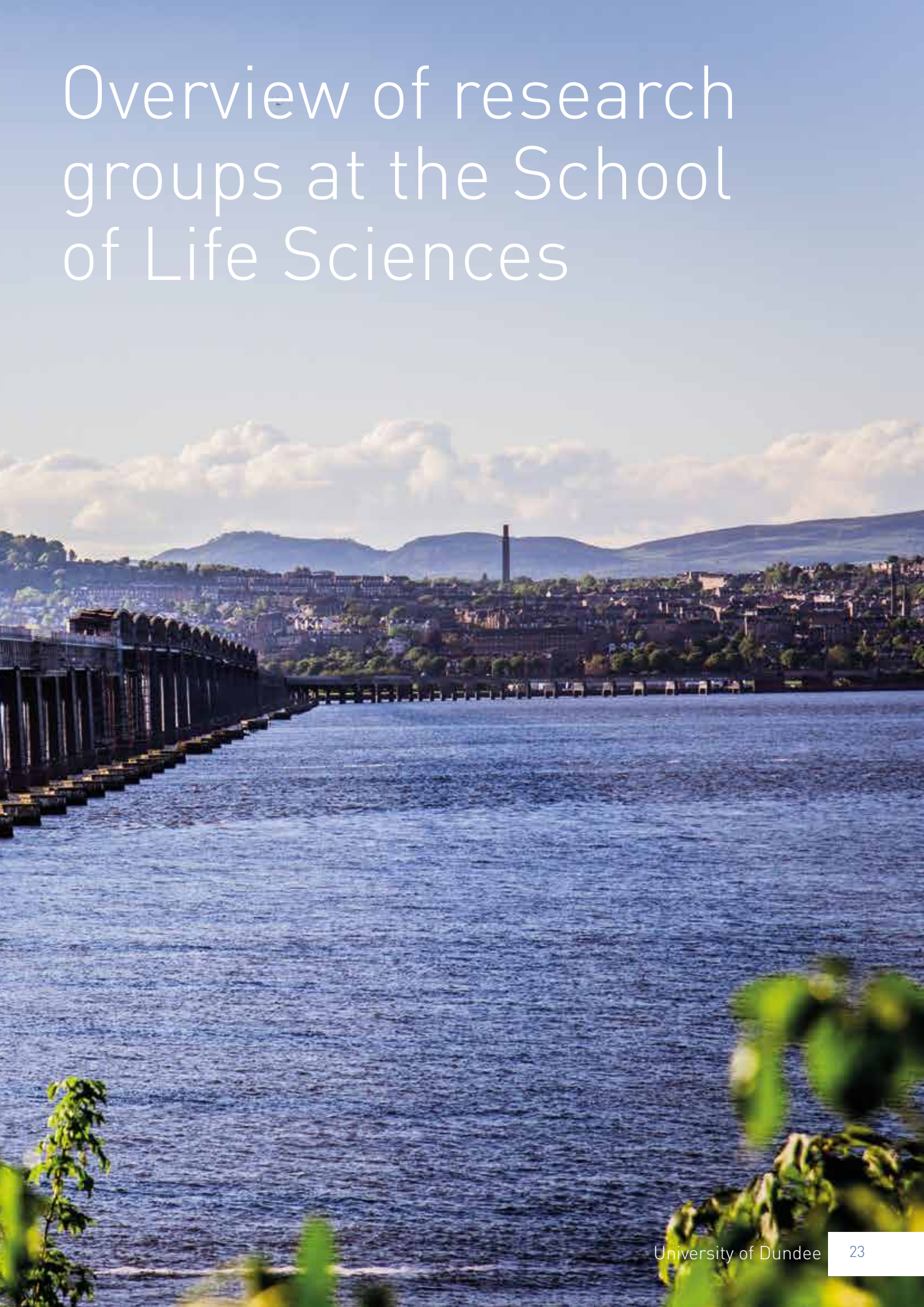
UK-NSPC's approaches capitalize on recent technological advances that span genetics, stem cell biology, tissue and organ culture systems, high-content imaging, high-throughput flow cytometry and label-free screening, advanced informatics and modeling, and small molecule chemical technologies. Its mission is to reduce the time and cost to translate basic research into a clinical setting by employing a greater proportion of complex human models along the drug discovery pipeline. Together the partnership will focus on operating a world-class phenotypic drug discovery facility that will collaborate with a wider network of centres from across the UK, Europe and beyond, to bridge between academia and industry and drive innovation in the sector.

UK-NPSC is built on a core partnership between the members of the Scottish Universities Life Science Alliance (SULSA) and the University of Oxford.

UK-NPSC comprises:

- A central compound bank.
- Two phenotypic screening centres in Oxford and Dundee
- An assay development centre in Edinburgh
- A unified management structure and network to organize and integrate platforms for chemo-informatics, high-content screening and assay development, cellular technology and repositories, data processing and storage.
- Chemistry support for validation of hit compounds.

Overview of research groups at the School of Life Sciences



Biological Chemistry and Drug Discovery

The overarching theme of the Division is "the discovery of chemical solutions to biological problems" through excellence in basic and applied multidisciplinary research.

Dr Alessio Ciulli is currently a Reader and BBSRC David Phillips Fellow in the Division of Biological Chemistry and Drug Discovery. Research in the Ciulli laboratory focuses on dissecting and targeting protein-protein interactions within the ubiquitin and chromatin systems. His expertise spans the fields of Chemical Biology and Structural Biology and he is specifically concerned with studies of druggability of protein- protein interactions to small molecule modulators.

www.lifesci.dundee.ac.uk/people/alessio-ciulli

Professor Alan Fairlamb is Wellcome Trust Principal Research Fellow and is a world-renowned specialist in the biochemistry of tropical diseases. His research has focused on the study of parasites causing three different diseases – sleeping sickness, Chagas disease and leishmaniasis. Since 2006, Alan Fairlamb has been co-director of the Drug Discovery Unit at the University of Dundee, which has facilities for high-throughput screening and medicinal chemistry.

www.lifesci.dundee.ac.uk/people/alan-fairlamb

Professor Mike Ferguson is a Wellcome Trust Senior Investigator and Regius Professor of Life Sciences. His research takes a mulitidisciplinary approach to understanding the biochemistry of protozoan parasites that cause tropical disease and is focused on understanding trypanosome protein glycosylation and exploiting parasite-specific variations for drug discovery.

www.lifesci.dundee.ac.uk/people/mike-ferguson

Professor Mark Field is Professor of Cell Biology and Parasitology and joined the Division of Biological Chemistry and Drug Discovery in 2014. His laboratory studies fundamental aspects of parasite biology to identify new therapeutic targets for clinical intervention, focusing on the African Trypanosome, Trypanosoma brucei (the causal agent of sleeping sickness in humans and livestock in sub-Saharan Africa), and specifically macromolecular transport, signaling, gene expression and evolution.

www.lifesci.dundee.ac.uk/people/mark-field

Professor Ian Gilbert is Head of Chemistry in the Drug Discovery Unit focussing on tackling unmet medical need through small molecule drug discovery. He is also Head of the Division of Biological Chemistry and Drug Discovery, which is a multi-disciplinary and highly collaborative research division, encompassing both fundamental research and translational research.

www.lifesci.dundee.ac.uk/people/ian-gilbert

Dr David Gray joined the Drug Discovery Unit in 2010 as Head of Biology. He has responsibility for the quality of output of the compound screening campaigns and underpinning biological characterisation of the hit molecules including the integrated compound and data management functions. His role encompasses the development of strategies for people, facilities, equipment and IT that are required to maintain the DDU at the leading edge in providing biological support to drug discovery programmes.

www.lifesci.dundee.ac.uk/people/david-gray

Professor Andrew Hopkins is Chair of Medicinal Informatics and SULSA Research Professor of Translational Biology. Research activities focus on developing novel informatics and experimental methods to enable new, more effective ways of conducting drug discovery. His laboratory consists of a Medicinal Informatics group, that uses chemoinformatics, structural bioinformatics, database and and machine learning techniques in its research and a Biosensor Screening Lab, that specializes in biosensor technologies.

www.lifesci.dundee.ac.uk/people/andrew-hopkins

Professor David Horn is a Wellcome Trust Senior Investigator and Professor of Parasite Molecular Biology in the Division of Biological Chemistry and Drug Discovery. He also acts as Deputy Head of this division. His research focuses on antigenic variation, drug action and resistance and the application of genetic screens to the African trypanosome, Trypanosoma brucei.

www.lifesci.dundee.ac.uk/people/david-horn

Professor Bill Hunter is Professor of Structural Biology in the Division of Biological Chemistry and Drug Discovery. His research involves elucidation of the relationships that link protein structure to biological function or chemical catalysis. The broad objectives are to determine the mechanisms whereby enzymes catalyze specific, sometimes unusual biosynthetic reactions or where protein architecture regulates the transport of materials or signals across a membrane.

www.lifesci.dundee.ac.uk/people/bill-hunter

Professor Irwin McLean is a Professor of Human Genetics and a Principal Investigator in the Division of Biological Chemistry and Drug Discovery. The central focus of his research group is the study of human inherited diseases that affect epithelial cells and epithelial tissues. More recently efforts have been targeted towards therapy development, and in particular the use of RNA-interference therapy systems and small drug molecules in treating genetic disease.

www.lifesci.dundee.ac.uk/people/irwin-mclean

Dr Kevin Read is Head of Drug Metabolism and Pharmacokinetics in the Drug Discovery Unit and has extensive experience of early phase drug discovery, lead optimisation project leadership and preclinical development gained from over 20 years in the pharmaceutical industry. His passion is to successfully drive lead optimisation forward, working closely with the medicinal chemists to deliver high quality candidate molecules for entry into formal preclinical development.

www.lifesci.dundee.ac.uk/people/kevin-read

Professor Maurice Van Steensel is a Clinical Professor of Genetic Dermatology and is an Associate Principal Investigator in the Division of Biological Chemistry and Drug Discovery. His research to date covers the full range of genetic dermatology, from the clinical identification of novel disorders to ciliary biology. Current interests focus on using rare skin disorders to understand the biology underlying common skin symptoms and applying that knowledge to drug development.

www.lifesci.dundee.ac.uk/people/maurice-van-steensel

Professor Paul Wyatt is Head of The Drug Discovery Unit. His role is to develop translational research at Dundee, by bringing together his and other's experience of drug discovery in the Pharma/Biotech sector with basic academic life sciences research to de- risk novel targets for drug discovery and develop new treatments for diseases including malaria and cancer.

www.lifesci.dundee.ac.uk/people/paul-wyatt

Cell & Developmental Biology

Researchers in this Division investigate the mechanisms of differentiation in developing organisms, stem cells and adult tissues and how these are corrupted in disease states.

Dr Kim Dale is a Royal Society University Research Fellow and the broad interest of her laboratory is to further understanding of how several genetic interactions come into play at the earliest stages of development to build the developing embryo. More specifically her research analyses primitive streak stem cells and the role of Notch in regulating cell fate choice within these multipotent progenitor pools.

www.lifesci.dundee.ac.uk/people/kim-dale

Dr Jens Januschke is a Sir Henry Dale Fellow and Principal Investigator in the Division of Cell and Developmental Biology. He leads a research group to examine the mechanisms controlling stem cell polarity in consecutive divisions in the developing Drosophila central nervous system. In particular, he is using life-cell imaging approaches to study the dynamics of cell polarisation in asymmetric division.

www.lifesci.dundee.ac.uk/people/jens-januschke

Professor Carol MacKintosh is Professor of Molecular Signalling and Head of Postgraduate studies in Life Sciences. Her laboratory is discovering how 14-3-3 proteins regulate a constellation of intracellular targets by docking onto specific pairs of phosphorylated serine/threonine residues, masking functional domains and inducing conformational changes. This data is then used to construct regulatory networks that explain phenotypes relevant to cancer, neurodevelopmental and metabolic disorders.

www.lifesci.dundee.ac.uk/people/carol-mackintosh

Professor Inke Nathke is Professor Epithelial Biology and Cancer and Deputy Head of the Division of Cell and Developmental Biology. The aim of work in her laboratory is to determine the molecular mechanisms that govern the role of the APC protein in cell migration, adhesion and division and includes investigating the relationship between different protein interactions of APC in vivo. The experimental approaches used include whole tissue, cultured cells, in vitro assays combined with cellular and molecular biology techniques as well as high-resolution fluorescence microscopy.

www.lifesci.dundee.ac.uk/people/inke-nathke

Professor Pauline Schaap is a Wellcome Trust Senior Investigator and Professor of Developmental Signalling in the Division of Cell and Developmental Biology. Her research interests lie in using a Dictyostelid model to investigate the signalling pathways of encystation and explore whether crucial regulatory proteins in these pathways might be suitable targets for the design of drugs to inhibit encystation.

www.lifesci.dundee.ac.uk/people/pauline-schaap

Professor Kate Storey is a Wellcome Trust Senior Investigator and Head of the Division of Cell and Developmental Biology. She investigates the cellular and molecular mechanisms that direct neurogenesis; and has recently discovered a new form of cell sub-division, apical abscission, which regulates neuronal differentiation.

www.lifesci.dundee.ac.uk/people/kate-storey

Dr Marios Stavridis is a lecturer and an Associate Principal Investigator in the Division of Cell and Developmental Biology. His research focuses on the biochemical properties of pluripotent cells such as embryonic stem cells (mouse and human) and cells of the early embryo. A better understanding of the properties of embryonic stem cells may lead to cell replacement therapies for degenerative conditions like Parkinsonism, Alzheimer's disease or macular degeneration as well as for injuries like those caused by stroke.

www.lifesci.dundee.ac.uk/people/marios-stavridis

Professor Kees Weijer is Professor of Developmental Physiology and Head of Systems Biology in the Division of Cell and Developmental Biology. His research is focused on Cell-cell signalling and chemotactic cell movement during development. In particular he uses a combination of advanced in-vivo imaging methods and computational data analysis and modelling techniques to study cell movement during gastrulation in the chick embryo.

www.lifesci.dundee.ac.uk/people/kees-weijer

Cell Signalling and Immunology

The Division of Cell Signalling and Immunology hosts research groups whose work is relevant to the pathologies associated with cancer, diabetes, infectious disease, autoimmunity and allergy.

Dr Simon Arthur is a Reader and Deputy Head of the Division of Cell Signalling and Immunology. His laboratory is primarily interested in the roles that cells of the innate immune system play in coordinating inflammation and how they contribute to activation of adaptive immunity via the production of cytokines. Understanding how these pathways act to control immunity and how their disregulation may contribute to disease is the major focus of research in the group.

www.lifesci.dundee.ac.uk/people/simon-arthur

Professor Doreen Cantrell is a Wellcome Trust Principal Research Fellow and Dean of the School of Life Sciences. Her research interests are focused on T lymphocyte development and activation, a key process to the comprehension and manipulation of mammalian immune responses.

www.lifesci.dundee.ac.uk/people/doreen-cantrell

Professor Paul Crocker is Professor of Glycobiology and Head of the Division of Cell Signalling and Immunology. His research is aimed at understanding how immune cells utilise host glycans to regulate immune and inflammatory responses and translating this to human disease. In particular his laboratory is focussed on the study of the siglec family of sialic acid binding Ig-like lectins, many of which were discovered in his laboratory.

www.lifesci.dundee.ac.uk/people/paul-crocker

Professor Grahame Hardie is a Wellcome Trust Senior Investigator and Professor of Cellular Signalling in the Division of Cell Signalling and Immunology. His current research is focussed on uncovering non-canonical pathways for regulation of AMP-activated protein kinase cascade.

www.lifesci.dundee.ac.uk/people/grahame-hardie

Professor Hari Hundal is Professor of Molecular Physiology in the Division of Cell Signalling and Immunology. The work in his lab focuses on the control of intracellular signalling processes that regulate uptake, storage and metabolism of fuels (e.g. glucose) in response to hormonal, stress and nutritional cues.

www.lifesci.dundee.ac.uk/people/hari-hundal

Professor Colin Watts is Professor of Immunobiology in the Division of Cell Signalling and Immunology. The focus of his research is the cell biology of the immune response and covers three areas i) the cell biology of dendritic cells at the early stages of the immune response ii) the events of antigen processing and presentation and iii) the function of endo/lysosomal proteases and their regulation in immune cells.

www.lifesci.dundee.ac.uk/people/colin-watts

Dr Jenny Woof is a Reader in Immunology and an Associate Principal Investigator in the Division of Cell Signalling and Immunology. Her work focuses on the structure and function of immunoglobulins and their receptors, together with developing novel antibody reagents for treating certain cancers and infections such as tuberculosis.

www.lifesci.dundee.ac.uk/people/jenny-woof

Computational Biology

The Division of Computational Biology brings together scientists with skills in developing and applying computational, mathematical and biophysical techniques to questions in biological and medical research.

Professor Geoff Barton is Head of the Division of Computational Biology. His research centres on the development and application of computational methods for the analysis of biological data. Several of his tools such as Jalview (www.jalview.org) and Jpred (www.compbio.dundee.ac.uk/www-jpred) are used by tens of thousands of scientists world-wide.

www.lifesci.dundee.ac.uk/people/geoff-barton

Professor Jason Swedlow is Professor of Quantitative Cell Biology in the Centre for Gene Regulation and Expression and the Division of Computational Biology. His lab focuses on studies of mitotic chromosome structure and dynamics and has published numerous leading papers in the field. He is co-founder of the Open Microscopy Environment (OME), a community-led open source software project that develops specifications and tools for biological imaging.

www.lifesci.dundee.ac.uk/people/jason-swedlow

Professor Timothy Newman is Professor of Biophysics & SULSA Research Professor of Systems Biology in the division of Computational Biology. His research employs analytic and computational tools to understand the emergent properties of biological systems at many different scales, from molecular interactions all the way to population biology. A common theme in the work is quantifying the central role of stochasticity in living systems.

www.lifesci.dundee.ac.uk/people/timothy-newman

Dr Andrei Pisliakov is a Senior Lecturer in Physics and the Division of Computational Biology. He conducts computational research to explain and predict the functioning of protein complexes that are important in key biological processes, such as cellular energy conversion, molecular transport, and enzyme catalysis. To tackle these challenging problems, he employs a range of computational methods, extensively using supercomputers, and work in close collaboration with experimental groups.

www.lifesci.dundee.ac.uk/people/andrei-pisliakov

Dr Ulrich Zacharie is a Reader in Computational Biophysics and Drug Discovery. His laboratory is focussed on developing Atomistic and Coarse-Grained Simulations of Proteins and Membranes. A particular interest is the investigation of ion channels through computational electrophysiology, which allows the prediction of channel ion conductance and selectivity based on electrochemical gradients.

www.lifesci.dundee.ac.uk/people/ulrich-zachariae

Dr Rastko Sknepnek is a Lecturer and Dundee Fellow in the Division of Computational Biology. His main research efforts focus on understanding physical processes in biological and soft condense matter systems. In particular, he is interested in pattern and shape formation in multi-component biological and artificial membranes, cell and tissue mechanics and active, self-propelled systems.

www.lifesci.dundee.ac.uk/people/rastko-sknepnek

Gene Regulation and Expression

The Centre for Gene Regulation and Expression was created within the University of Dundee School of Life Sciences in January 2008. The aim is to build and enhance the Division as a world leading research centre studying the cell biology of gene expression and chromosome biology.

Professor Julian Blow is a Wellcome Trust Senior Investigator and Head of Research for the School of Life Sciences. His personal research aims to understand at a molecular level the way that chromosome replication is regulated, how precise duplication of DNA is ensured and how cells deal with errors in the replication process.

www.lifesci.dundee.ac.uk/people/julian-blow

Dr Victoria Cowling is a Lister Institute Fellow and MRC Senior Fellow in the MRC Protein Phosphorylation and Ubiquitylation Unit. Her research focuses on investigating the synthesis, function and therapeutic potential of the mRNA methyl cap. Her research has shown that the mRNA methyl cap operates as a master integrator of cellular signals, which drives protein production in the cell. This research has revealed a new fundamental biological process relevant to understanding how all cells regulate cell growth.

http://www.lifesci.dundee.ac.uk/people/victoria-cowling

Professor Anton Gartner is a Wellcome Trust Senior Research Fellow and Professor of Genetics in the Centre for Gene Expression and Regulation in the School of Life Sciences. His research explores the use of *C. elegans* genetics as a model for studying basic biological problems including uncovering DNA damage and stress response pathways.

www.lifesci.dundee.ac.uk/people/anton-gartner

Professor Ron Hay is a Wellcome Trust Senior Investigator and Professor of Molecular Biology. His research interest has focused on the role of ubiquitin and ubiquitin-like proteins in transcriptional regulation. He is currently employing quantitative high-resolution mass spectrometry to carry out quantitative temporal analysis of the Small Ubiquitin-like Modifier (SUMO) proteome as cells respond to various challenges.

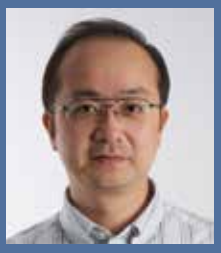
www.lifesci.dundee.ac.uk/people/ron-hay

Professor Angus Lamond is a Professor of Biochemistry in the Centre for Gene Expression and Regulation, and Director of the laboratory for Quantitative Proteomics. He has pioneered seminal work on the structure and functional organisation of the nucleus of mammalian cells and leads an interdisciplinary team to develop data analysis and warehousing software for proteomics.

www.lifesci.dundee.ac.uk/people/angus-lamond

Professor Tom Owen-Hughes is a Wellcome Trust Senior Investigator and Director of the Centre for Gene Expression and Regulation. He leads a research group investigating how chromatin structure contributes to gene regulation. He is best known for his contributions to the understanding of how ATP-dependent molecular motors remodel nucleosomes.

www.lifesci.dundee.ac.uk/people/tom-owen-hughes



Professor Tomo Tanaka is a Wellcome Trust Principal Research Fellow and Professor of Cell and Molecular in the Centre for Gene Expression and Regulation. His research is focused on dissecting the mechanism involved in regulating the kinetochore-microtubule interaction in mitosis.

www.lifesci.dundee.ac.uk/people/tomo-tanaka

Dr Joost Zomerdijk is a Reader in the Centre for Gene Regulation and Expression. The central objective of his laboratory is to achieve an understanding of the molecular mechanisms involved in transcription of the ribosomal RNA genes, mediated by RNA polymerase I, and the cellular control of this process. Deregulation of this process can lead to cell death, hyperproliferation or hypertrophy and has been linked to specific cancers and heart disease.

www.lifesci.dundee.ac.uk/people/joost-zomerdijk

Geomicrobiology

The Geomicrobiology Group carries out research on the geoactive properties of microorganisms in order to understand their importance in key biosphere processes and their applied potential.

Professor Geoffrey Gadd is Professor of Biology in the Geomicrobiology group in the School of Life Sciences. His research interest is in the geoactive properties of microorganisms and their importance in key biosphere processes. The prime focus is on metal-mineral transformations and understanding physiological and morphological responses to toxic metals and mineral substrates, mechanisms of mineral dissolution, and the formation of novel mycogenic biominerals.

www.lifesci.dundee.ac.uk/people/geoff-gadd

Medical Research Council Protein Phosphorylation and Ubiquitylation Unit

The MRC Protein Phosphorylation and Ubiquitylation Unit is a major research centre that focuses on the understanding of the biological roles of phosphorylation and ubiquitylation and how disruption of these processes cause human diseases such as neurodegeneration, cancer, hypertension and immune disorders.

Professor Dario Alessi is Professor of Signal Transduction and Director of the MRC Protein Phosphorylation and Ubiquitylation Unit and the Division of Signal Transduction Therapy Unit. His laboratory has carried out landmark work in cell signalling, in which he has pioneered research on kinases and their role in inherited diseases providing exciting new insights into conditions such as diabetes, cancer and hypertension.

www.lifesci.dundee.ac.uk/people/dario-alessi

Professor Sir Philip Cohen is a Wellcome Trust Senior Investigator and Professor of Enzymology and Co-Director of the Division of Signal Transduction Therapy at the School of Life Sciences. His current research is focused on dissecting signal transduction networks that regulate the innate immune system activated during infection by bacteria and viruses. A particular focus is to understand the interplay between protein phosphorylation and protein ubiquitylation in regulating the innate immune system, and to validate drug targets for the treatment of inflammatory and autoimmune diseases.

www.lifesci.dundee.ac.uk/people/philip-cohen

Dr Greg Findlay is a Programme Leader in the MRC Protein Phosphorylation and Ubiquitylation Unit. His laboratory is interested in the role of phosphorylation and ubiquitylation networks in embryonic stem cell fate determination, with the aim of understanding how stem cells can be manipulated or applied to treat human disease.

www.lifesci.dundee.ac.uk/people/greg-findlay

Dr Ian Ganley is a Programme Leader in the MRC Protein Phosphorylation and Ubiquitylation Unit. Research activities focus on deciphering the phosphorylation and ubiquitylation events that switch on autophagy. A large part of his work is concentrated on two autophagy-essential kinase complexes containing either the protein kinase ULK1 or the lipid kinase VPS34.

www.lifesci.dundee.ac.uk/people/ian-ganley

Dr Yogesh Kulathu is a Programme Leader in the MRC Protein Phosphorylation and Ubiquitylation Unit. The research goal of his lab is to understand how cellular signal transduction is regulated by the combined influences of ubiquitylation and phosphorylation. His research aims to characterize the structural and mechanistic principles underlying allosteric regulation of enzymes by ubiquitylation.

www.lifesci.dundee.ac.uk/people/yogesh-kulathu

Professor Karim Labib is a Wellcome Trust Senior Investigator and Professor of Genome Integrity at the College of Life Sciences" to "Professor Karim Labib is a Wellcome Trust Senior Investigator and Professor of Genome Integrity at the School of Life Sciences.

www.lifesci.dundee.ac.uk/people/karim-labib

Dr Miratul Muqit is a Wellcome Senior Research Fellow in Clinical Science and Programme Leader in the MRC Protein Phosphorylation and Ubiquitylation Unit. He is also a Honorary Consultant Neurologist at Ninewells Hospital. His lab is focused on decoding the signal transduction mechanisms underlying Parkinson's disease and in particular deciphering the roles of the PINK1 kinase and Parkin ubiquitin ligase whose genes are mutated in rare familial forms of Parkinson's.

www.lifesci.dundee.ac.uk/people/miratul-muqit

Professor John Rouse is Professor of Chromosome Biology in the MRC Protein Phosphorylation and Ubiquitylation Unit. His research centres on how cells detect, signal and repair DNA damage and how they deal with blocks to DNA replication. His laboratory has discovered a range of factors in mammalian cells that are instrumental for repair of DNA damage and broken replication forks. Furthermore he is involved in identifying new anti-cancer drug targets in the DNA repair arena.

www.lifesci.dundee.ac.uk/people/john-rouse

Dr Gopal Sapkota is a Programme Leader in the MRC Protein Phosphorylation and Ubiquitylation Unit. His research is focused on understanding the molecular mechanisms and consequences of TGFß/BMP signal transduction pathways in cells and human diseases. In particular he is interested in the mechanism by which reversible phosphorylation and ubiquitylation regulate these signal transduction pathways.

www.lifesci.dundee.ac.uk/people/gopal-sapkota

Dr Satpal Virdee is a Programme Leader in the MRC Protein Phosphorylation and Ubiquitylation Unit. Using a multidisciplinary approach composed of synthetic, biochemical, structural and chemical genetic methods, his laboratory studies the various polyubiquitin topologies and how they are decoded. He also has an interest in the mechanism of the ubiquitin conjugation machinery.

www.lifesci.dundee.ac.uk/people/satpal-virdee

Nucleic Acid Structure Research Group

The work of the group centres on the structural, dynamic and chemical properties of nucleic acids, and their recognition by and interactions with proteins.

Professor David Lilley is Professor of Molecular Biology and Director of the Cancer Research UK Nucleic Acid Structure Research Group. His research interested is in the structure of helical junctions in DNA and the folding of RNA, and the origins of catalysis in RNA molecules.

www.lifesci.dundee.ac.uk/people/david-lilley

Dr David Norman is a Reader in Structural Biology in the Cancer Research UK Nucleic Acid Structure Research Group. His research uses a variety of biophysical methods to investigate the structure and function of proteins and nucleic acids. Recent efforts have focused on using pulsed Electron Paramagnetic Resonance (pEPR) in conjunction with site-specific spin labeling for long distance and orientation measurements in protein complexes.

www.lifesci.dundee.ac.uk/people/david-norman

Molecular Microbiology

The Division of Molecular Microbiology encompasses a spectrum of research that flows from fundamental science using model organisms to translational research on medically- and economically-significant pathogens. The overarching purpose of the Division is to further the science of Molecular Microbiology through excellent, innovative and internationally-recognised research on a broad platform of topics.

Dr Sarah Coulthurst is a Royal Society of Edinburgh Research Fellow in the Division of Molecular Microbiology. Her research aim is to elucidate how bacterial pathogens are able to interact and interfere with other bacterial cells and with host organisms, particularly through the use of protein secretion systems. Her laboratory utilise a variety of approaches from genetics, molecular biology and classical microbiology, through to biochemistry, proteomics and cell biology.

www.lifesci.dundee.ac.uk/people/sarah-coulthurst

Professor Tracy Palmer is Professor of Molecular Microbiology and Head of the Division of Molecular Microbiology. The major research focus of her group is the transport of proteins by the twin arginine protein transport pathway and the contribution that it makes to the physiology of bacteria. In collaboration with the Drug Discovery Unit in the School of Life Sciences, her laboratory is working towards identifying small molecules that interfere with the activity of the Tat machinery that might be useful precursors to novel antimicrobial drugs.

www.lifesci.dundee.ac.uk/people/tracy-palmer

Professor Frank Sargent is Professor of Bacterial Physiology in the Division of Molecular Microbiology. His research focuses on the methods employed by bacteria to fuel their growth, and their application in the extraction of biofuels. Moreover his group also are examining novel molecular, biochemical, and applied aspects of Tat-targeted bacterial respiratory enzymes.

www.lifesci.dundee.ac.uk/people/frank-sargent

Dr Nicola Stanley-Wall is a Reader in the Division of Molecular Microbiology. Her research interests are centred on using molecular biology to understand the signalling processes that control multicellular behaviours exhibited by bacteria. In particular her lab is interested in the genetic components that control biofilm formation by the Gram-positive bacterium Bacillus subtilis.

www.lifesci.dundee.ac.uk/people/nicola-stanley-wall

Professor Daan van Aalten is a Professor of Biological Chemistry in the division of Molecular Microbiology and in the MRC PPU unit. He is author of over 130 scientific papers and his current interests are the molecular basis of biogenesis of the fungal cell wall in the human pathogen Aspergillus fumigatus, and the role of O-GlcNAc in modulating phosphor-dependent signal transduction in higher eukaryotes..

www.lifesci.dundee.ac.uk/people/daan-van-aalten

Plant Sciences

The Division of Plant Sciences was established in 2007, creating an internationally recognised centre for molecular plant science, addressing the global challenges of food security, renewable energy, conservation and climate change by increasing understanding of genes and processes underpinning important plant traits (yield, disease resistance, stress tolerance, developmental characteristics, end-use quality).

Professor Paul Birch is Professor of Plant Pathology and Deputy Head of the Division of Plant Sciences. His group studies effector proteins from the potato late blight pathogen, Phytophthora infestans. This eukaryotic pathogen develops haustoria - finger-like cell structures that form an intimate interaction with the host plasma membrane during the early stages of disease. His laboratory has shown that haustoria are a major site of delivery of a class of proteins called RXLR effectors.

www.lifesci.dundee.ac.uk/people/paul-birch

Dr Jorunn Bos is a Royal Society of Edinburgh Research Fellow in the Division of Plant Sciences. Her group aims to elucidate how aphids and plants interact with each other at the molecular level during both compatible and incompatible interactions. Research is focused on identifying and characterizing biochemical, metabolic and signaling pathways that aphids target and how this impacts aphid host range.

www.lifesci.dundee.ac.uk/people/jorunn-bos

Professor John Brown is Chair of Molecular Plant Sciences in the Division of Plant Sciences. The main objective of his research is to address the mechanisms and functions of alternative splicing using Arabidopsis and barley as model systems. His laboratory has developed a sensitive, high resolution system which has allowed the analysis of dynamic changes in alterative splicing genes and address many questions of splicing regulation including the function of various plant splicing factors.

www.lifesci.dundee.ac.uk/people/john-brown

Professor Claire Halpin is Professor of Plant Biology and Biotechnology and Head of the Division of Plant Sciences. Her group is using association genetics in barley with barley and Arabidopsis mutants and transgenics where lignin has been manipulated, to discover new genes related to lignin biosynthesis and to determine how lignin properties affect different bioenergy applications.

www.lifesci.dundee.ac.uk/people/claire-halpin

Dr Edgar Huitema is a Senior Lecturer in the Division of Plant Sciences. His research is focused on examining the mechanisms of virulence acquisition during Phytophthora-host associations. His laboratory aims to harness both new understanding about the role of effector proteins during disease, and the availability of P. capsici genome sequences, to study and perturb the pathways that control effector delivery and their activities.

www.lifesci.dundee.ac.uk/people/edgar-huitema

Dr Davide Bulgarelli is a Royal Society of Edinburgh Research Fellow in the Division of Plant Sciences. His research deploys a combinaton of metagenomics, cellular biology, molecular microbiology and computational biology tools to further understand the structure, function and host control of the microbiota thriving at the root-soil interface.

www.lifesci.dundee.ac.uk/people/davide-bulgarelli

Dr Piers Hemsley is a Principal Investigator in the Division of Plant Sciences. His group aims to understand how protein S-acylation (palmitoylation) acts to control protein function, with particular emphasis on its role in stress responses and development in plants.

www.lifesci.dundee.ac.uk/people/piers-hemsley

Dr Sarah McKim is a Royal Society of Edinburgh Research Fellow in the Division of Plant Sciences. Her research is focused on the developmental biology of plant architecture. Her laboratory is examining the transcription factors controlling stage-specific morphologies and architectures in barley and Arabidopsis and the role of miRNA regulation in this process.

www.lifesci.dundee.ac.uk/people/sarah-mckim

Professor Gordon Simpson is a Professor of Molecular Genetics in the Division of Plant Sciences and an Associate Principal Investigator in the Centre for Gene Regulation and Expression. His research focuses on the role of RNA and RNA processing in controlling development using Arabidopsis thaliana as a model system. His research is anchored in unbiased approaches involving molecular genetics and genome-wide analyses of gene expression using third generation true single molecule sequencing.

www.lifesci.dundee.ac.uk/people/gordon-simpson

Professor Robbie Waugh is Professor of Crop Genomics in the Division of Plant Sciences. His work has concentrated on three major research elements (i) assembling and utilising germplasm suited to high resolution genetic analysis (ii) developing molecular tools and approaches that facilitate gene identification and validation and (iii) contributing to international efforts to derive a reference barley genome sequence.

www.lifesci.dundee.ac.uk/people/robbie-waugh

Our Location

Being at the heart of Scotland's road and rail network puts spectacular scenery, skiing, championship golf, mountain climbing and sailing within easy reach as well as the major cities of Edinburgh and Glasgow.

Dundee has direct flights to London and Scotland's four main international airports operate major airlines such as British Airways, Air France/KLM, United, Delta, Alitalia, Lufthansa, Qatar and Turkish Airlines and low cost airlines like EasyJet, Ryanair, German Wings, Flybe and Jet2.com. This makes it easy to get to all the major centres of the UK, Europe, the USA, the Middle East and beyond.

www.dundee.ac.uk/general/travel

Dundee to...

- **London Stansted 1 hour 30 mins**
- **Edinburgh Airport 1 hour 15 mins**
- **Glasgow Airport 1 hour 30 mins**
- **Manchester Airport 5 hours**
- **Birmingham 5 hours 20 mins**
- **London 6 hours**

Scottish airport flights to:

- **Amsterdam Schiphol Airport 1 hour 25 minutes**
- **Paris CDG Airport 1 hour 45 minutes**
- **London Airports 1 hour**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Images credit: Lewis Houghton, Ben Kirkpatrick and Keith Hunter

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