

Research Themes YEAR IN



R E V I E W

Following extensive consultation, spring 2021 saw the establishment of six new cross-cutting Research Themes in the School of Biological Sciences, designed to provide research integration across the School, encourage new conversations and enhance interdisciplinary networking critical for major innovation.

This report provides updates and progress on Research Theme activities over the course of their first year.

Research Themes in Numbers

March 2021 - February 2022



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Message from Jon Simons

Deputy Head of School for Research Strategy

The ambition to develop Research Themes in the School of Biological Sciences sprung from an appreciation that within the outstanding research programmes across the School, there are undoubtedly undiscovered synergies that could enhance our research and propel scientific progress.

This sentiment was echoed in the results of the Research Theme Members Survey, conducted in May 2021, where one of the biggest barriers to research was identified as difficulties in cross-departmental collaboration. We are tremendously grateful to everyone who completed the survey, which has been very important in determining the direction of Research Theme priority areas during their first year. In response to the findings of the survey, the Research Themes have established a range of activities and events designed to bring researchers together across departmental boundaries to share research ideas, discuss techniques and identify common areas for future collaboration. An overview of these activities can be found in the following pages. It has been rewarding to see the enthusiastic engagement in Theme events of so many across the School, despite the ongoing pandemic-related challenges people have faced.

As the Research Themes move into their second year, they are tasked with working with Theme members to identify coherent challenge areas and research topics that are both scientifically important and inherently interdisciplinary. Once identified, these 'Grand Challenge' topics can drive opportunities for innovation, whether that be funding bids, philanthropic asks, industry engagement or influencing policy. The Themes are working to model a positive research culture, increasing the diversity of those in leadership roles, encouraging participation across career stages and supporting the Research Culture Academic Leads on areas of strategic interest.

An impressive amount of progress has already been made against the everchanging backdrop of the pandemic, and I thank you all for your continued support and engagement with the School's Research Themes.

Jon Simons
Deputy Head of School, Research Strategy

Fresh Perspectives:

Research Theme Leadership Teams

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Following a call for expressions of interest across PIs in the School, we were delighted to receive a wide range of applications to the Theme leadership positions. This enabled the selection of six diverse leadership teams in terms of career stage, gender, and ethnicity, bringing people together from a variety of perspectives to drive the Themes in ambitious and positive directions.

“

Through engagement with PIs across the School, Theme Leads have delivered enormous progress in establishing the new Research Themes, and I'm really excited to see how Theme activities will develop in the coming months.

”

Anna Philpott, Head of School

Theme Leads were appointed in March 2021 and have since worked to represent the interests of all Theme members and Departments across the School, with a focus on four overarching aims:

- Promote **collaboration** and **interaction** across traditional Departmental boundaries.
- Increase opportunities for involvement in **major funding bids**.
- Contribute to a **research culture** that is inclusive and supportive.
- Enhance targeted **philanthropy** and **industrial engagement**.

Theme Leads meet fortnightly with the Research Strategy Team to deliver progress towards these aims and to ensure that all Theme activities are founded in the principles of openness, inclusion and mutual respect.

In addition to steering Theme activities, Theme Leads also take a proactive role in welcoming new PIs to the School, setting up introductory meetings to explain the Theme concept, suggesting key people they may want to meet based on complementary research interests, and signposting further initiatives such as the School's Early PI Network and relevant University Strategic Research Initiatives / Interdisciplinary Research Centres. From May 2021– February 2022, 17 new PIs have joined the School, signed up to Themes, shared their research interests and have had profile pages created on the new School website to increase visibility and engagement.



Molecules and Cells: The Building Blocks of Life

Catherine Lindon, Pharmacology
Ewa Paluch, PDN
Luca Pellegrini, Biochemistry
Ritwick Sawarkar, MRC Toxicology Unit

Infection and Immunity

Louise Boyle, Pathology
Stephen Graham, Pathology
Olivier Restif, Veterinary Medicine
Rahul Roychoudhuri, Pathology



Neuroscience, Psychology and Behaviour

Elisa Galliano, PDN
Rebecca Lawson, Psychology
Amy Milton, Psychology
Jasper Poort, PDN
Ewan St. John Smith, Pharmacology
Marta Zlatic, Zoology

Functional and Evolutionary Genomics

Michael Boemo, Pathology
Ian Henderson, Plant Sciences
Anna Protasio, Pathology
Aylwyn Scally, Genetics



Reproduction, Development and Lifelong Health

Dino Giussani, PDN
Walid Khaled, Pharmacology / Stem Cells
Emma Rawlins, PDN / Gurdon
Ben Steventon, Genetics

Organisms, Evolution and Ecology

Beverley Glover, Plant Sciences / Botanic Garden
Jason Head, Zoology / Museum of Zoology
Kiran Patil, MRC Toxicology Unit
Adam Pellegrini, Plant Sciences
Emília Santos, Zoology



Theme Members Survey:

building from the ground up



It was imperative from the outset that the Research Themes should provide activities, events and support that are both relevant and responsive to researchers in the School.

“ We knew for the Themes to be successful we needed to tailor Theme activities to the needs and priorities of the Theme membership. The Research Themes Survey has been invaluable in guiding the planning and delivery of Theme activities. ”

Emma Rawlins,
Theme Lead, Reproduction, Development and Lifelong Health

A survey for Research Themes members (all PIs across the School) was conducted in May 2021 to establish the types of activities members would like Themes to prioritise and to understand the current barriers to research which could be supported via the Themes.

212 PIs in the School answered the survey, and these responses have been used to shape the early direction and activities of the Research Themes. The top 5 priorities for Theme activities are represented in the figure below.



Symposia and Seminars:

laying the groundwork for collaboration



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A priority for 58% of the Research Themes Survey respondents

A core aim of the Research Themes is to 'Promote collaboration and interaction across traditional departmental boundaries' and in response to the survey data, Theme Leads have developed meetings, symposia and seminars in pursuit of this aim.

Chalk Talk Series

Not wanting to add to the already crowded traditional seminar landscape, and in an effort to encourage new kinds of engagement and interaction, a number of Themes have adopted a 'Chalk Talk' seminar style, where presenters have been encouraged to share the headlines of their research programmes and identify areas where new collaborations could drive progress.

“*The 'Chalk Talk' series was conceived as an informal format where PIs from across Departments and career stages could share their ideas and make new connections that might not have been immediately obvious from the outset.*”

Ian Henderson, Theme Lead, Functional and Evolutionary Genomics

In July 2021, the Functional and Evolutionary Genomics Theme were the first to run these informal chalk talk style events, which were initially held outside to mitigate COVID-19 transmission risks, and subsequently moving inside into large, well-ventilated spaces. The '[Genomics Chalk Talk Series](#)' has welcomed speakers from across departmental boundaries, disciplines and career stages and continues to be popular among members of the Functional and Evolutionary Genomics Theme.



Functional and Evolutionary Genomics Chalk Talk, Downing site, July 2021

The Reproduction, Development and Lifelong Health Theme, the Neuroscience, Psychology and Behaviour Theme and the Infection and Immunity Theme have also adopted this informal 'Chalk Talk' format to successfully meet with members, encourage new interactions and support collaboration opportunities.

Hot Topics @Cambridge meetings

A different approach to bringing researchers together has been pioneered by the Molecules and Cells Theme. Several research 'Hot Topics @ Cambridge' have been identified that are scientifically exciting and interdisciplinary in nature. Theme member meetings have then been organised to share research insights, establish new research networks and plan for collaborative grant applications.

“*Hot Topics @ Cambridge meetings are designed to be relevant to the broad range of researchers and research programmes, with the aim of catalysing bottom-up collaborations, identifying synergies for ambitious grant applications and offering opportunities for industry engagement.*”

Ritwick Sawarkar, Theme Lead, Molecules and Cells

Biomolecular Condensates @Cambridge

The first of these meetings, held in July 2021, focussed on '[Biomolecular Condensates @Cambridge](#)', an area of biology that spans disciplines and research scales, with the potential to advance understanding of the biological basis of complex diseases such as neurodegeneration and cancer.

Speakers and attendees were deliberately mixed to include people well established in the condensates field, people who have interesting data which are either unpublished or in preparation/review, and others who are generally interested in the area and would like to be involved at a later stage, when projects mature in their labs. This format and range of speakers maximised opportunities for collaboration across different fields and areas of expertise.

Proteostasis @Cambridge

A second of these collaboration meetings was held in December 2021 on '[Proteostasis @Cambridge](#)'. The Molecules and Cells Theme identified colleagues within the School and beyond who are interested in the broad area of proteostasis. Speakers and delegates came together to share research projects and to build a collaborative network covering a spectrum of spatial and temporal scales, from basic mechanisms to biomedical relevance and translation.

Computation @Cambridge

The Neuroscience, Psychology and Behaviour Theme are also organising a Hot Topic meeting with a focus on 'Computation @Cambridge'. Conceived and coordinated by Paul Bays (Psychology), this in-person event will bring together PIs from across the University who use computational approaches to study brain and behaviour - stretching from electrophysiology to social psychology.

The goal of these 'Hot Topic' events is to stimulate discussions and possible collaborations between researchers who have a shared scientific outlook, but who might otherwise interact rarely because they work on different models, use different techniques, or are based in different parts of the University.

Flash Talk Collaboration Events

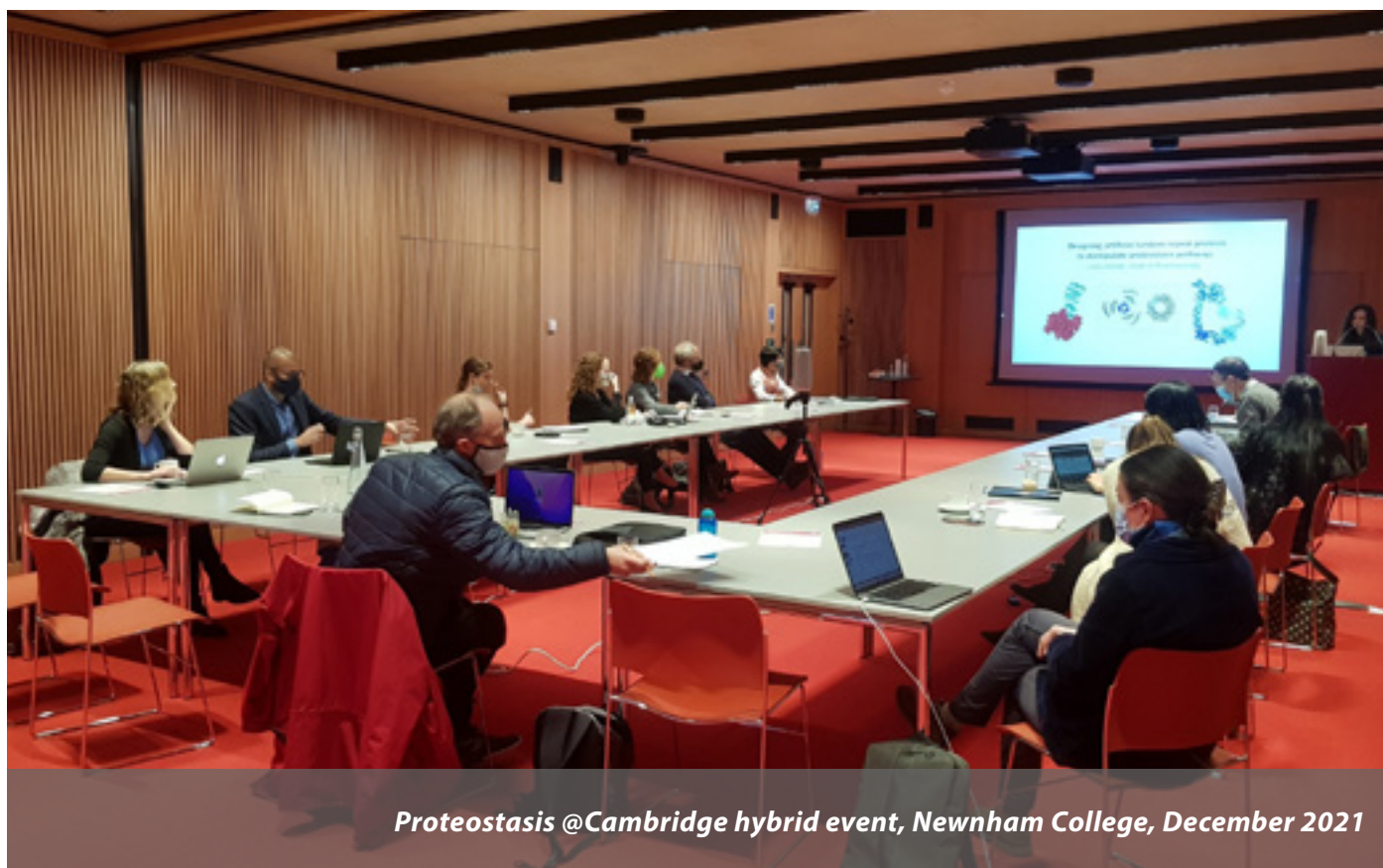
In February 2022, whilst still constrained by COVID restrictions, the Organisms, Evolution and Ecology Theme held an [online collaboration event](#) to bring researchers together to present 5 minute 'Flash Talks' designed to share an overview of the varied yet potentially complementary research ongoing across the Theme.

“*It was wonderful for me to be part of yesterday's Collaboration event. It was fantastic to hear and be heard. I could immediately see connections between my work and many other Pls.*”

Gita Yadav, Theme Member and Group Leader, Plant Sciences

34 attendees joined from across 9 Departments in the School to hear the talks and see where innovative areas of synergy and future collaboration might be established. After each session there were questions and discussion across a range of topics, from biological clocks in plants and animals, to the application of behavioural assays across model systems.

Theme Members then joined brainstorming sessions to identify cross-disciplinary topics that could form the basis of ambitious future collaborative grant applications and philanthropic asks. Helen Driver, Research Development Manager for the School of Biological Sciences (Research Operations Office), also presented a range of funding possibilities that Theme members could consider when planning collaborative research.



Proteostasis @Cambridge hybrid event, Newnham College, December 2021

Grant Writing Support:

assisting researchers across the School



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A priority for 44% of the Research Themes Survey respondents

Grant writing support was one of the areas identified as a priority by many respondents to the recent Theme Members survey. The Themes are developing several initiatives to help meet this need, and there is a dedicated page on the [School's Information Hub](#) to signpost our researchers to relevant grant support initiatives.

The Hub also features a live feed of funding opportunities from [Research Professional](#), an online funding service that the University of Cambridge subscribes to, allowing our researchers access to 1000s of grant opportunities which can be searched based on each researchers' personal interests.

Research Grant Advisory Database

“

The idea of the Research Grants Advisory Database was to provide PIs in the School with a list of colleagues willing to discuss and share tips on their recent successful grant applications. Over 150 grants are now listed in the database, evidence of the collaborative and supportive ethos in the School.

”

Catherine Lindon, Theme Lead, Molecules and Cells

Originally developed by the Molecules and Cells Theme and subsequently supported by all Themes, the [Research Grant Advisory Database](#) was launched in July 2021 and now contains details of a wide variety of researchers in the School of Biological Sciences who are happy to be approached to discuss successful grants and the application process to specific funders.

The database is accessible to PIs across the School and contains headline details of different grant types from a range of funders and across research areas, along with the contact details of the PIs who can offer support and advice for future applicants.

Details of grants are entered voluntarily by PIs in the School, and the database currently features over 150 different grants about which PIs are happy to be approached. This is a new resource in the School and is a tangible reflection of the willingness of our researchers to openly support their colleagues in achieving funding success.

Grant Funding Panel Discussions

Leads of the Neuroscience, Psychology and Behaviour Theme organised a [Grant Workshop Panel Discussion](#) in July 2021. The aim of the workshop was to give Theme Members the chance to ask questions to those people sitting on a range of funding panels, covering all aspects of grant applications, including commonly made mistakes, balancing 'blue skies' vs. incremental steps and how to effectively cost a grant.

“*Sometimes the best way to gain insight into what funders are looking for in grant applications is to speak directly to the people on the review boards. Hosting a grant funding panel discussion with speakers from a range of funders provided invaluable insight into the 'dos' and 'don'ts' of grant writing.*”

Ewan St. John Smith,
Theme Lead, Neuroscience, Psychology and Behaviour

The discussion panel consisted of **Jeff Dalley**, MRC Neurosciences and Mental Health Board; **Fiona Gribble**, Wellcome Trust Science Interview Panel; **Gordon Harold**, ESRC Expert Advisory Group; and **Becky Kilner**, Royal Society Dorothy Hodgkin Fellowship Committee and ERC LS8 Panel.



A [follow up grant meeting](#) was held in February 2022 with **Dr Clara Fons**, MRC Programme Manager for Neurodegeneration, who introduced the MRC strategy and ambitions for Neurosciences and Mental Health in a Zoom discussion. This was followed by 45 minutes of questions which ranged from advice about what to include in an application, to timelines of when to be preparing an application and approaching funders.

The Organisms, Evolution and Ecology Theme organised a similar grant support panel event with the focussed title of “**How to get NERC funding: practical tips and advice**”. The aim was to give specific advice and answer questions on NERC funding calls, with panel members on hand to share their own experiences and insights. The advice panel were **Emily Mitchell**, NERC Independent Research Fellow; **Beverley Glover**, former NERC panel member; **Jason Head**, NERC Standard Grant holder; **David Coomes**, University NERC Panel Member; and **Helen Driver**, Research Development Manager for the School of Biological Sciences (Research Operations Office).

Theme Member Meetings:

devising ambitious topics for future collaboration and funding

MAR
2021

The Infection and Immunity Research Theme held its first in person [Members' Meeting](#) in September 2021, with around half of the 83 Theme Members in attendance from across Biochemistry, Genetics, Pathology, Pharmacology, Veterinary Medicine and Zoology.

MAY

Theme Leads gave an overview of Theme activities from the past six months and introduced the concept of 'Grand Challenges' – ambitious research topics that naturally span disciplines and can be developed towards collaborative grant calls and philanthropic engagement.

JUL

As a follow up to the meeting, Theme Members were asked to suggest research topics for 'Grand Challenges', and the current areas of focus include **'Fighting cancer with the immune system'**, led by Klaus Okkenhaug (Pathology) and **'Seeing infection through a new lens: visualising host-pathogen interactions from the atomic to cellular state'**, led by Colin Crump (Pathology). The Reproduction, Development and Lifelong Health Theme held a similar in person [Theme Members' Event](#) in September.

AUG

“

I am looking forward to developing the 'Fighting cancer with the immune system' Grand Challenge with the Infection and Immunity Theme Leads. This topic has the potential not only to bring people together across the School and wider Cambridge community, but there is also real scope for industrial engagement, scientific advances and tangible patient benefit.

”

SEPT

Klaus Okkenhaug, Theme Member and Group Leader, Pathology

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Infection and Immunity Theme Members meeting, Downing College, September 2021

As a result of the meeting, the first 'Grand Challenge' for the Reproduction, Development and Lifelong Health Theme emerged: '**Complex tissue regeneration across scales and systems**', which is being led by Mekayla Storer (Wellcome – MRC Cambridge Stem Cell Institute). A second Grand Challenge topic being developed is '**Extending healthy lifespan by 10 years**', led by Walid Khaled (Pharmacology).

“*I am excited to work with PIs from different Departments that I don't usually get the opportunity to interact with, to learn from each other and to share our knowledge of complex tissue regeneration across tissues and species. I am hopeful that with the support of the Themes these interactions will lead to some new ambitious research projects.*”

Mekayla Storer,
Theme Member and Group Leader, Cambridge Stem Cell Institute

The Organisms, Evolution and Ecology Theme are planning to develop their 'Grand Challenges' using a series of flash talks and breakout discussions. An early area of focus in this Theme is '**Molecular Biology for Climate Change**' which has already captured the attention of the Cambridge Centre for Science and Policy and formed the basis of a successful small meeting grant from Cambridge Zero / NERC. The meeting, held in March 2022, brought together speakers and delegates from across 7 Departments and Institutes, many of whom have not interacted before. Helen Driver, Research Development Manager for the School of Biological Sciences (Research Operations Office), presented a range of grant opportunities that could be relevant to the 'Molecular Biology for Climate Change' topic, and delegates used these to facilitate discussions on new interactions and future opportunities.

“*The potential of molecular biology to deliver new solutions to climate change challenges remains untapped. We hope to use the diverse research expertise across the School of Biological Sciences and beyond to look for new synergies and innovations in molecular biology and climate change.*”

Kiran Patil, Theme Lead, Organisms, Evolution and Ecology



*Reproduction, Development and Lifelong Health Theme Members meeting,
Wyng Gardens, September 2021*

Master's Courses:

re-imagining postgraduate education



A priority for 33% of the Research Themes Survey respondents

Through the summer of 2021, Heads of Departments and PIs across the School worked with Matthias Landgraf (Deputy Head of School for Postgraduate Strategy), Research Theme Leads, and Leads of existing Master's courses, to support the development of a new Master's course structure.

“*This Master's course will provide a breadth of research topics and interdisciplinary opportunities to MPhil students. The course is structured along “pathways” that represent the new Research Themes. The course will provide a supportive cohort structure for students, which has proved highly successful in other MPhil courses.*”

Matthias Landgraf, Deputy Head of School, Postgraduate Strategy

Each cohort will receive a training programme of core and transferable skills, coupled with bespoke discipline-specific elements offered through the Themes. There is also the potential to include other Schools in this new structure, creating timely opportunities for interdisciplinary post-graduate education.

Each Master's course will be heavily research based (a 32-week research project) and will also include weekly taught sessions in the format of seminar-type group teaching. It is proposed that examined work will include a research skills aspect (e.g. bio-statistics; 5% of mark), an extended essay (25% of mark) and a research project write-up (70% of mark), including a viva focused on the research project, conducted by two specialist assessors who previously read and marked the research project report. This will help spread marking and examining load while maintaining due scrutiny during the assessment process.

A high level of engagement for the proposals has already been obtained from Heads of Departments, Theme Leads and PIs across the School. We anticipate that the School will be able to advertise these new multi-pathway courses as of September 2022, for admission of students by Michaelmas Term 2023.

It is envisaged that most students on these courses will be self-funded (as is currently the case for c. 80% of MPhil students), but bursaries and scholarships, particularly on a means-testing and widening participation basis, will be put in place as part of the Surplus Improvement Fund model that underpins activities on this course.



Philanthropy:

understanding alternative research funding routes



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A priority for 33% of the Research Themes Survey respondents

In addition to facilitating new opportunities for cross-departmental collaboration for scientists, the Research Themes also provide coherent and recognisable identities to capture the diversity and excellence of the research ongoing in the School of Biological Sciences.

“*The Research Theme structure provides a new lens for my team and me to showcase the scientific excellence in the School of Biological Sciences. Pioneering research and the potential for real world impacts are what interest and excite donors, and I am confident that working with the Themes and PIs across Departments will enhance future philanthropic opportunities and donations for the School.*”

Linda Hindmarsh, Senior Associate Director
Cambridge University Development and Alumni Relations

The ambition is that this presentation of our research will facilitate more engagement with stakeholders outside the School, whether that be external academics, industrial partners or philanthropic supporters.

In autumn 2021, Research Theme Leads began to explore the potential for philanthropic engagement through a series of meetings with Linda Hindmarsh and Caroline Campbell, the School representatives within the Cambridge University Development and Alumni Relations office (CUDAR).

Through consultation with School, Department, Institute, IRC and Theme leadership and Theme members, CUDAR will develop strategies to enhance targeted philanthropic income to the School, using the 'Grand Challenges' as one method to showcase our scientific strengths and outstanding research.



Postdoc Engagement:

inspiring interdisciplinarity in early career researchers



A priority for 34% of the Research Themes Survey respondents

The first year of the Research Themes have focussed on exploring how Themes can work effectively to bring people together across disciplines in the School, and to build momentum and engagement at the PI level. Now moving into year two, plans are being developed to bring postdoctoral researchers across the School onboard with Theme activities.

“*The Themes are a great opportunity to develop new links, strategies, and cultures between Departments, and provide a forum to learn new science and collaborate more effectively. Engaging postdocs in workshops and events via the Themes will provide a further layer of effective and valuable research interactions across departmental boundaries.*”

Anne Ferguson Smith, Theme Member, Group Leader, Genetics
Pro-Vice-Chancellor for Research, University of Cambridge

During December 2021 and January 2022, Abi Herrmann (Research Strategy Facilitator, School of Biological Sciences) met with the Postdoc Academy to learn what is currently available to postdocs and consulted with postdoc representatives from across Departments to understand what activities the Themes could offer to add value to their research and career progression. Feedback and comments included:

Chalk talks and networking events to meet people from other departments would be great.

Please don't add more lecture-style seminars to the already packed seminar series schedule.

A techniques and research resources list of what is available across the School would be useful.

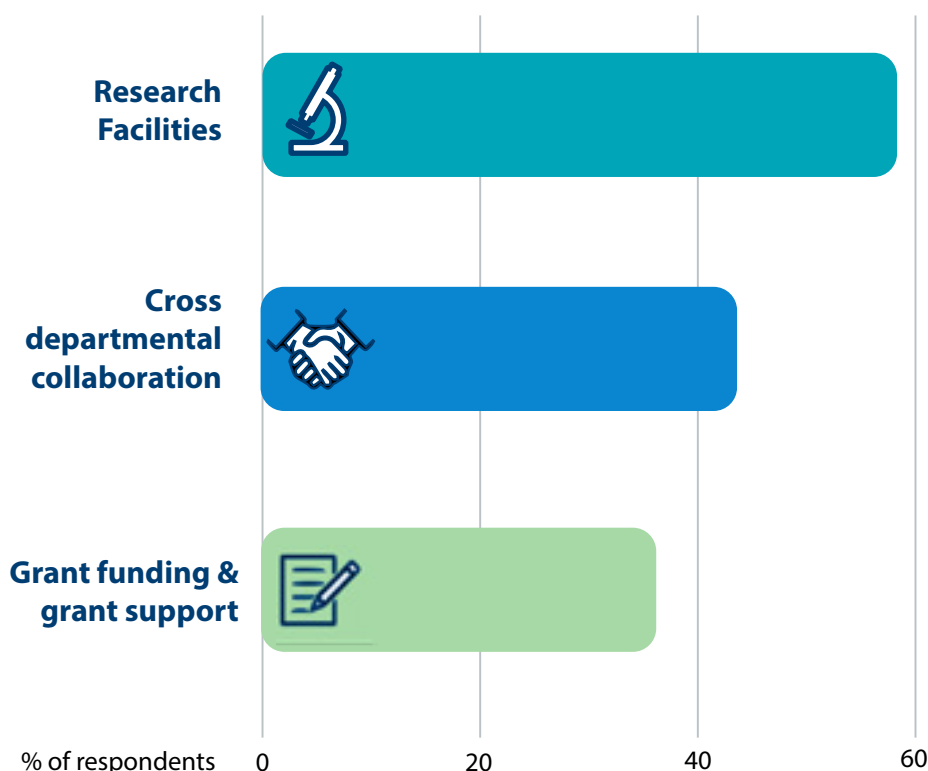
There are over 500 postdocs in the School of Biological Sciences so careful operational planning needs to be undertaken to ensure postdoc onboarding to Themes can be done in an organised and effective manner. Theme Leads and the School Research Strategy Team are now assimilating postdoc feedback from the consultations and designing a coherent plan of how to effectively engage postdocs in Theme activities whilst ensuring continued utility and engagement for and from PIs.



Overcoming Barriers and Next Steps:

research facilities, cross disciplinary working & grant support

An important question asked in the Research Themes Survey (May 2021) was **“What are the current barriers to your research that could be addressed at the Theme / School level?”** The top three barriers to research across the School are represented in the figure below.



Research Facilities

174 PIs in the School responded to the question about barriers to research, providing free text descriptions of the issues they had identified, which were then grouped into topic areas. **‘Research Facilities’** were identified as the dominant barrier to research, with **53% of respondents** identifying problems on this topic. Issues around equipment and facilities access, imaging and genomic capabilities, visibility of what facilities are available and bioinformatics support were all raised as issues. The School have listened to this feedback and are developing and implementing strategies to deliver improvements in this area.

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Core Scientific Facilities Development Project

To address the strategic direction of the research facilities in the School, a Core Scientific Facilities Development Project is being initiated and led by a Project Board containing representatives from different areas of research, facilities management and administration in the School. The initial discovery phase of the project will be kicking off in spring / summer 2022, with consultants visiting Departments to compile a landscape report establishing what the current scientific facilities environment is like across the School. Research Themes will feed in to the Project Board to ensure Theme member feedback from across the School is included in discussions and planning.

Facility Managers joining Research Themes

Research Facilities provide a hub for scientific interactions across the traditional research boundaries. Bringing Facility Managers on board with the Themes is a small but important step not only to integrate and share knowledge, but also to value the important contributions managers can make to scientific discussions and collaborative research.

Facility Fridays: new School-wide seminar series

In February the School launched 'Facility Fridays', a new series of 30-minute lunchtime talks designed to improve visibility of the facilities and technical support available to researchers in the School of Biological Sciences. The sessions feature paired talks from Facility Managers and School Researchers where the managers can provide updates on the range of opportunities available within their facilities, and a paired researcher can detail a short research vignette made possible through collaboration with the facility.

Facility Webpages

Working with Facility Managers, Susana Camacho (School Communications Manager) is beginning to update the facility pages on the School website to include headline information such as the key equipment and services offered; facility location; a named contact person; access and training requirements; and a link to more information and how to book. These pages are a work in progress and will be revised and updated on an ongoing basis in line with Theme members' needs and feedback.



Cross-departmental collaboration

Along with 'Facilities', the second largest barrier to research identified by Pls across the School was 'Cross-departmental collaboration', with 28% of respondents identifying challenges in this area. A core aim of the Research Themes is to "promote collaboration and interaction across traditional departmental boundaries" and this has been, and will continue to be, the major focus of Theme activities. Through feedback from Pls who have attended Theme events we are already discovering new synergies that will enhance research and drive innovation.

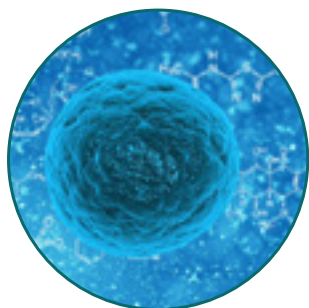
The School now also has a re-developed [external facing website](#) which features descriptions of each Theme, impact case studies, and searchable profile pages for Theme members to showcase their research interests, techniques used, and importantly, areas where collaborations are sought. [Searchable member databases](#) are also available on the Theme pages on the School Information Hub to facilitate information sharing and networking.

As an outcome of the Theme member meetings described above, Themes are now identifying 'Grand Challenges', designed to be more focussed research topics that are scientifically ambitious, naturally span disciplines, and can be developed towards collaborative grant proposals and philanthropic engagement. A summary of the current and emerging 'Grand Challenges' across the Themes are highlighted below.



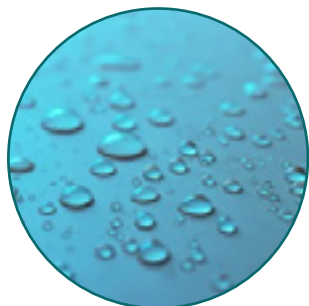
Mental health across scales and disciplines Neuroscience, Psychology and Behaviour

Mental health issues are projected to be one of the world's biggest causes of ill health by 2030. In response, the Neuroscience, Psychology and Behaviour Theme is building a network of researchers to develop opportunities that cut across multiple disciplines and improve the linkage of biological mechanisms with social and environmental drivers of mental health and illness.



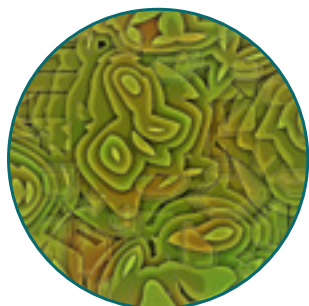
Fighting cancer with the immune system Infection and Immunity

The human body has the power to prevent, control, and eliminate cancer, however some cancers are invisible to our immune systems and as such can be left unchecked and become fatal. Biologists, chemists and physicists in Cambridge are pooling their expertise to understand how we can help the body recognise cancer cells early and harness natural immune responses to beat cancer and improve outcomes.



Biomolecular condensates – the key to health and disease Molecules and Cells

Inside human cells, dynamic droplets known as 'condensates' are constantly emerging, dividing and dissolving. This fascinating dance has captured the attention of the brightest minds in Cambridge who are working across biology, chemistry, physics and engineering to understand whether these condensates could hold the key to health and disease.



Complex tissue regeneration across scales and systems Reproduction, Development & Lifelong Health

Embryos and plants show us that multi-tissue regeneration is possible, however complex animals and humans have mostly lost this capability. Researchers in Cambridge are working together to learn lessons across tissues, systems and scales to make human limb and organ regeneration possible.



Molecular Biology for Climate Change Organisms, Evolution and Ecology

Molecular biology allows scientists to study biological phenomenon at the level of atoms, molecules and cells. Commonly used in health and disease research, scientists in Cambridge are harnessing modern molecular biology techniques to transform our understanding of climate change and accelerate much needed solutions in this area.



Seeing infection through a new lens Infection and Immunity

The ability to visualise host-pathogen interactions across multiple scales, from individual molecules to whole organisms, unlocks unprecedented opportunities for breakthroughs in our basic understanding of infectious disease biology. However, working with live human or animal pathogens also brings unique challenges. By sharing experiences, skills and resources, researchers in Cambridge are redefining what is possible in infectious disease imaging and illuminating novel biological processes that can be targeted for the development of next-generation therapies.



AI and Machine Learning: building breakthroughs in biology Functional and Evolutionary Genomics

Artificial Intelligence and Machine Learning are set to revolutionise biological research in the 21st century. New technologies will allow scientists to collect and analyse data at unprecedented speed and scales, making discoveries and breakthroughs ever more achievable. The Functional and Evolutionary Genomics Theme aim to facilitate understanding of Artificial Intelligence systems in relation to biological sciences. This will be achieved by bringing computational and wet-lab scientists together, catalysing collaboration and delivering tangible benefits to researchers across the School.



Extending healthy lifespan by 10 years Reproduction, Development & Lifelong Health

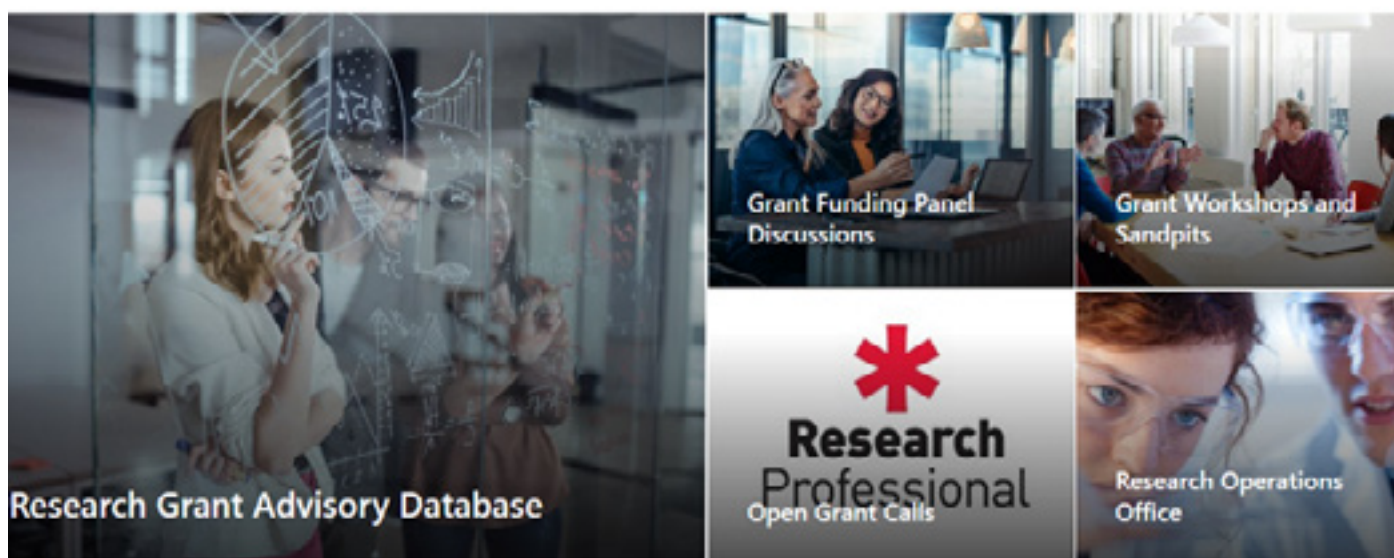
Over the last 60 years the global average life expectancy increased by more than 20 years, partly as a result of countless medical breakthroughs. However, most of these medical interventions address the symptoms rather than the causes of age associated diseases. Scientists in Cambridge from a range of backgrounds are combining their world leading expertise to tackle some of the biggest questions in human biology: What if we could identify those at risk of developing chronic age-related conditions before they present in the clinic? What if we could intervene before any symptoms arise and prevent disease onset? These changes would revolutionise healthcare and transform our twilight years into a healthy period of our lives.

Grant funding and grant support

The third biggest barrier to research in the School was identified as '**Grant funding and grant support**', with **19% of respondents** reporting difficulties in this area. This aligns with the previous findings where 44% of Theme members identified 'Grant support' as a priority area for Theme activities.

As described above, the Themes are developing several initiatives to help meet the Grant Support need, including: a dedicated page on the [School's Information Hub](#) to signpost our researchers to relevant grant support initiatives; live feeds of funding opportunities from Research Professional; and a new Research Grant Advisory Database which contains the details of Researchers in the School of Biological Sciences who are happy to be approached to discuss successful grants and the application process to specific funders.

Several Themes are now also developing ideas as to how more focussed grant writing support can be introduced, including writing groups and mock interview panels. Abi Herrmann (Research Strategy Facilitator, School of Biological Sciences) is also working closely with Helen Driver (Research Development Manager for the School of Biological Sciences, Research Operations Office) to horizon scan funding opportunities and share these with relevant researchers across the School to support new collaborations and interactions.



Future of the Research Themes:

strategic planning and deliverables

As we move into year two of the Themes, the principal objective remains to provide integration across the School, encourage new conversations and enhance interdisciplinary networking critical for major innovation. It is important the Themes continue to establish themselves in the life of the School, but in addition, Theme Leads are tasked with starting to think about tangible outcomes of their activities, such as ambitious grant proposals, coordinated bids for philanthropic support and industry engagement.

Theme Leads will work towards these goals by continuing to develop activities and initiatives that align with the four overarching aims of the Themes (below), with more directed facilitation towards increased opportunities for collaborative funding bids.

- Promote **collaboration** and **interaction** across traditional departmental boundaries.
- Increase opportunities for involvement in **major funding bids**.
- Contribute to a **research culture** that is inclusive and supportive.
- Enhance targeted **philanthropy** and **industrial engagement**.

Specifically, Research Themes will:

➡ **Continue** to run engaging events to bring Theme members together across departmental boundaries. Abi Herrmann (Research Strategy Facilitator, School of Biological Sciences) and Helen Driver (Research Development Manager for the School, Research Operations Office) will continue to work with Theme Leads to build pro-active facilitation of future funding applications into Theme events.

This model has worked well at recent events and as a result there are two grant applications currently in development:

1 x NERC Molecules to Landscapes: building interdisciplinary capabilities grant. This is a new collaboration between PIs in Zoology and Pathology resulting via facilitated introductions at an Organisms, Evolution and Ecology event.



1 x MRC Partnership Grant on biomolecular condensates developed via the Molecules and Cells Theme. This is an invited resubmission after initial rejection.



- ➡ **Leverage** the 'Grand Challenge' topics outlined above for more focussed interactions to plan ambitious research pipelines, collaborative funding bids and enhance philanthropic engagement.
- ➡ **Collaborate** with the Research Culture leads and new Research Culture post holders to provide joined up thinking across the School in this area.
- ➡ **Broaden** the Theme network to include the School of Biological Sciences Postdoc community to contribute to a culture that is inclusive and supportive.
- ➡ **Build** impact planning into Theme activities on an ongoing basis, working closely with the Research Strategy Office, Impact Teams, Industry partners and Departmental Research Strategy Coordinators.

The Research Themes are directed and supported by the Research Strategy Team in the School of Biological Sciences:

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