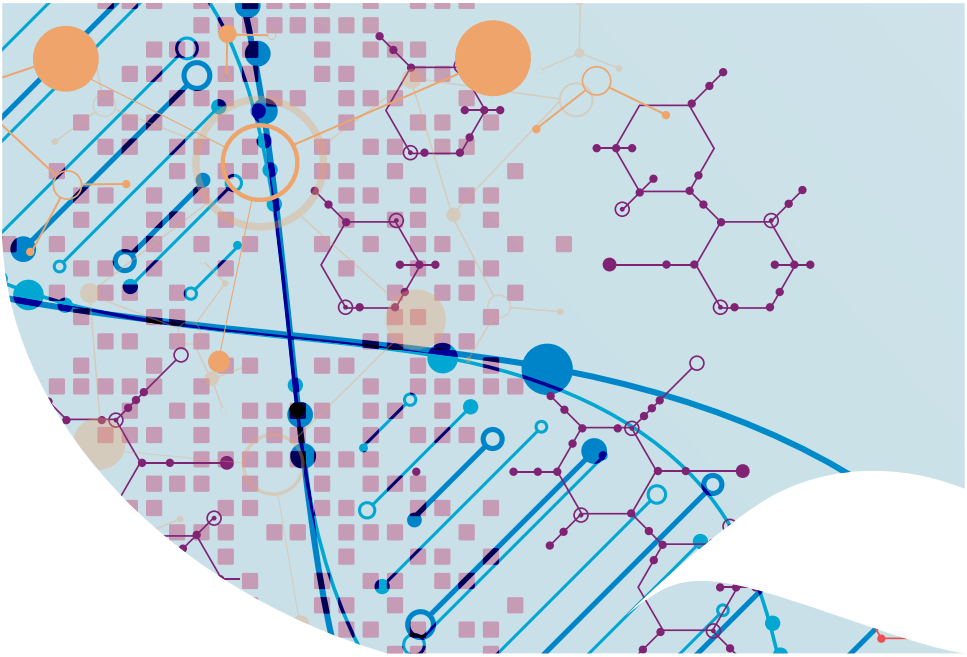
The University Of Queensland
AUSTRALIA

CREATE CHANGE

Genome Innovation Hub

Call for collaborative projects for 2023



The Genome Innovation Hub (GIH) is a unique initiative designed to develop and advance innovative genomic capabilities at The University of Queensland. As a collaborative research hub, it is uniquely positioned to develop and disseminate best practice genomic knowledge, methodologies and protocols.

GIH acts as a collaborative research centre, providing support for all UQ researchers to gain access to genomic expertise and enhancing UQ's core capabilities.

GIH works directly with UQ scientists and clinicians to develop novel and impactful methodologies to advance projects in the key areas of health, agriculture and the environment.

Once established, these innovations (methods, protocols, software, expertise) are made available through UQ Research Infrastructure Services, other facilities, or through research groups willing to collaborate and/or train research staff in the newly developed approaches.

Supporting genomics research at UQ

GIH operates from the portfolio of the Office of the Pro-Vice Chancellor (Research Infrastructure). As such, GIH is well placed to maximise cross-unit interaction with UQ facilities and access to advanced expertise and instrumentation. Collectively, the GIH management group, its collaborators and partners provide a wide-range of knowledge in genomic analysis and its related applications.

The in-house team of research scientists provide expertise in both traditional "wet" laboratory techniques and "dry" bioinformatics analysis methods for genomic research in a range of organisms. It is this collective experience that places GIH in an optimal position to develop innovative genomic capabilities at UQ.

Key areas of experience include:

- Single-cell and short read sequencing
- Long read sequencing
- Protein engineering and purification
- Genome editing and manipulation
- Spatial 'omics and advanced imaging
- Computational tool development for analysis of genomic and transcriptomic data

Collaborative Projects

GIH engages in collaborative projects in partnership with research groups across UQ to develop genomic-based cutting-edge technology breakthroughs.

Collaborating research groups work closely with GIH in the design and development of projects and actively contribute to projects, including co-investment in funding and personnel expertise.

Projects are prioritised on the basis of novelty and transformative impact in advancing genomic applications and/or those that significantly drive down the costs of these applications.

New developments for UQ researchers

The core aim of the Genome Innovation Hub is to develop new methods, techniques and tools which can be accessed by all UQ researchers, to enhance their research outcomes. In general, these will grow out of the collaborative projects, and can be any combination of the following:

1. Computational tools or pipelines

- Development of open-access tools or pipelines for data analysis compatible with UQ computing infrastructure, along with supporting documentation

2. Standard Operating Procedures

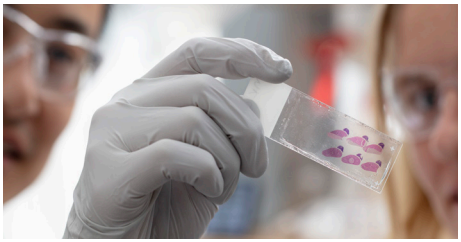
- Detailed documents outlining implementation of new wet-lab techniques

3. Availability through UQ Research Infrastructure

- Rollout of new techniques as a service available through specific UQ infrastructure platforms

4. Availability through collaboration with UQ research groups

- Commitment from collaborating researchers to collaborate with and/or train others



GIH project highlights

Read below a selection of developments from current and former projects that GIH is now working to make available to UQ researchers:

- SpaCell, stLearn, STRISH, HEMnet - computational tools for the analysis of spatial transcriptomics data
- RNAScope High Resolution Imaging - *in situ* RNA analysis at sub-cellular resolution
  Both from 2019 project "Spatial genomics technologies to study cancer and genetic diseases in tissue contexts" with Dr Quan Nguyen, A/Prof Andrew Mallett, and Arti Raghubar
- Precise genome editing - production and use of Cas9 variants for high efficiency gene editing
  Developed as a GIH internal core capability
- CAGE library prep - cost-efficient and robust in-house protocol for identification of transcription start sites
  Developed as a GIH internal core capability in collaboration with Dr Quan Nguyen

- High molecular weight DNA extraction from difficult plant species
  From 2019 project "Assembly of complex genome (Macadamia) using single molecule sequencing" with Professor Robert Henry and Dr Agnelo Furtado, and 2020 project "A genomic dissection of metaorganisms: molecular approaches for teasing apart the hologenome" with Dr Cheong Xin Chan, Dr Antony Van der Ent and team
- SLAM-seq - time-resolved measurement of new and existing RNA transcripts
  From 2020 project "Combining novel scSLAM-seq technology with 10x Genomics Chromium to track microchanges in newly synthesised RNA" with Dr Denuja Karunakaran
- TraDIS-Vault - a platform for storage, easy visualisation and comparison of hundreds of TraDIS bacterial data sets
  From 2020 project "TraDIS-Vault: an interactive searchable genome browser and repository for TraDIS data" with Professor Ian Henderson and Dr Dom Gorse
- Haplotagging - low-cost linked-read sequencing for phased haplotypes
  From 2021 project "Genome-Phaser: protocol for fully phasing whole genome variants using haplotagging" with Dr Melanie Wilkinson, Associate Professor Craig Hardner, Dr Elizabeth Ross and team
- Pore-C - combining multi-contact chromatin conformation capture (3C) with long nanopore sequencing reads for determination of higher order chromatin structure
  From 2022 project "Multi-contact Pore-C" with Dr Hyungtaek Jung, Dr Elizabeth Ross, Dr Loan Nguyen and team

Please see our website for more information about these developments and others, and get in touch if you are interested in trying them out in your own research!

2023 Collaborative Project Call

Collaborating research groups with proposals for innovative genomics projects will be again sought for 2023.

For successful applications, GIH staff and funding toward GIH consumables will support each project to develop cutting-edge technology breakthroughs.

Proposals can be entirely wet-lab-based, entirely bioinformatics-based or a combination of the two, and will vary in requirements for GIH budget and/or GIH staff support.

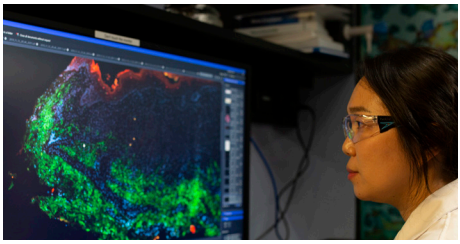
Project Application Guidelines

Project proposals must address all of the required sections in the application template (see overleaf). Note that innovation represents a major contribution to the project selection criteria and ranking, so proposals should have a strong emphasis on this aspect.

Future uptake of the project's outcome should be considered in the proposal. As such, for ease of future implementation of methodologies and/or techniques, projects may choose to utilise pre-existing infrastructure available within UQ facilities.

Project applications are preferred in PDF format and can include figures, tables and links to publications to support the project plan.

For wet-lab based projects, applicants must have required permits and ethics approvals to work with the source/s of the genomic material (e.g. human and human clinical samples, animal, plant, single-cell organisms, stem cells).



Project Selection Criteria and Weighting

1. Genomic Innovation (40%)

- Is this a major new capability that will help UQ to establish or maintain a competitive position nationally and internationally?

2. Broad Applicability/Uptake (20%)

- Is there wide-ranging potential for uptake at UQ based on research interest?
- Is there a clear path for future availability of techniques and is this outlined in the proposal?

3. Feasibility (20%)

- Do rationale/preliminary experiments convincingly demonstrate feasibility of project and fit with GIH wet-lab and bioinformatic expertise?

4. Team Quality (10%)

- Does the collaborating team have track record/capability in the proposed area?

  (Please note: this criteria considers the team as a whole. Students and ECRs are strongly encouraged to apply as lead investigators with support from their supervisors.)

5. Co-contribution (10%)

- Does the proposal contain inclusion of leveraged support or in-kind contribution (from UQ researchers/from industry)?

Important Dates

Applications open Tuesday 4th Oct 2022
Applications close Monday 28th Nov 2022

Interviews with short-listed applicants will be conducted in Jan 2023

Successful projects will begin in Feb 2023

Submission

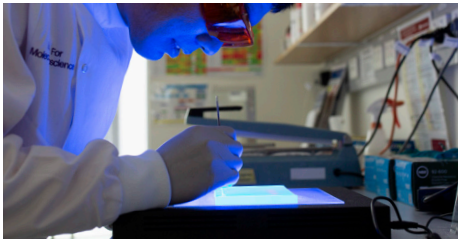
Project proposals must follow the 2023 GIH Collaborative Project Application template.

A digital version of the application template can be downloaded from the GIH website or requested via email from the 4th October 2022. Completed application files are submitted via email by the closing date and will not be accepted after.

Email completed GIH Collaborative Project Applications in PDF format to:

GIHapplications@uq.edu.au

For informative purposes and to aid with advance preparation of an application, the required content is provided in the following pages.



Join us for our collaborative project workshops

Come and discuss your proposal with the team!

Do you have a research question you think can be solved by genomics but you're not sure exactly how? Do you have a great idea and want to know how to make it a reality? Do you want to know more about the capabilities of our expert staff and how we can assist with your genomics project?

The Genome Innovation Hub will be running a series of workshops prior to the application close date to provide guidance on developing your project proposal and application for our upcoming collaborative project call. Join us for coffee and a chat at an informal session at Genies Café and get our team involved!

Upcoming workshops:

Genies Cafe, QBP Building, St Lucia campus

Monday 26th September, 10:30am - 12pm

Monday 17th October, 10:30am - 12pm

Monday 7th November, 10:30am - 12pm

Project Summary

Please provide a brief summary of your proposed project under the headings below – further detail can be included on subsequent pages. Please adhere to word limits outlined below.

Project Title:

GIH Requirements (computational, wet-lab or both):

Aim (max. 200 words):

Brief Project Outline (max. 300 words):

Overall Budget:

GIH Requested Funding:

Collaborating Group Contribution:

Time Frame (maximum is 12 months):

Expected Outcomes:
Research output:
New methods developed:
Publications/presentations:
Funding applications:
Collaborations:
Other:

Project Detail

Please provide detail of your proposed project under the following bold headings – a 500 word maximum per section.

Genomics-based innovative aspect of proposal:
Include how you would take advantage of existing GIH capabilities; whether any new capability would be required.

Experimental Design:
Include any preliminary studies that have informed the Experimental Design. Divide the Experimental Design into Specific Aims/Milestones.

Outcomes and Feasibility:
Include an outline of any risks that may impact the successful completion of this project. Include any specialised reagents required and the feasibility of acquiring these reagents in an ongoing manner.

Describe the broad applicability of the technique. Who will use it? How will it be made available?:
List other collaborators interested in utilising this technique. Briefly outline the projects for which the technique would be used and their anticipated time frame for adopting the technique. After implementation of the technique by GIH, how and where will this technique be made available to these future researchers?

Nominate an anticipated time frame for project completion:
Include anticipated time frame for completion of each of the Specific Aims outlined in the Experimental Design, in addition to overall anticipated timeframe.

Project Budget

Outline what you as an applicant will contribute to the success of the proposed project:
Including commercial/international/national/UQ partners, co-funding, availability of staff/students (specifying FTE).

Requirements for GIH Staff:
For each Specific Aim outlined in the Experimental Design, outline the requirements for wet and/or dry lab staff including specific tasks or skills and estimated FTE.

Consumables Budget:
For each Specific Aim outlined in the Experimental Design, outline the budget for the project including the GIH contribution requested and contributions from the collaborating group or groups.

Availability of Equipment/Infrastructure:
For each Specific Aim outlined in the Experimental Design, list the equipment needed for this project, its location, availability, any costs associated with the operation of this equipment and whether these costs have been covered. Additionally, list the overall equipment/infrastructure budget for the project.

Project Samples

Please supply details for any samples being supplied for this project:
You are required to disclose any quarantine requirements and/or potentially hazardous or infectious agent to which your samples have been exposed. Please also indicate any testing undertaken that indicates the non-hazardous/non-infectious nature of the samples. List the approvals that you have in place to conduct the work required (Human and or animal ethics, high risk biological, OGTR).

Conditions for Final Project Approval

Collaborating groups must agree to a continued investment in this project, including:

- **participation in regular meetings**
- **collaborative establishment of pathway for making new tools and techniques available to UQ researchers**
- **the production of a final report at the cessation of the project.**

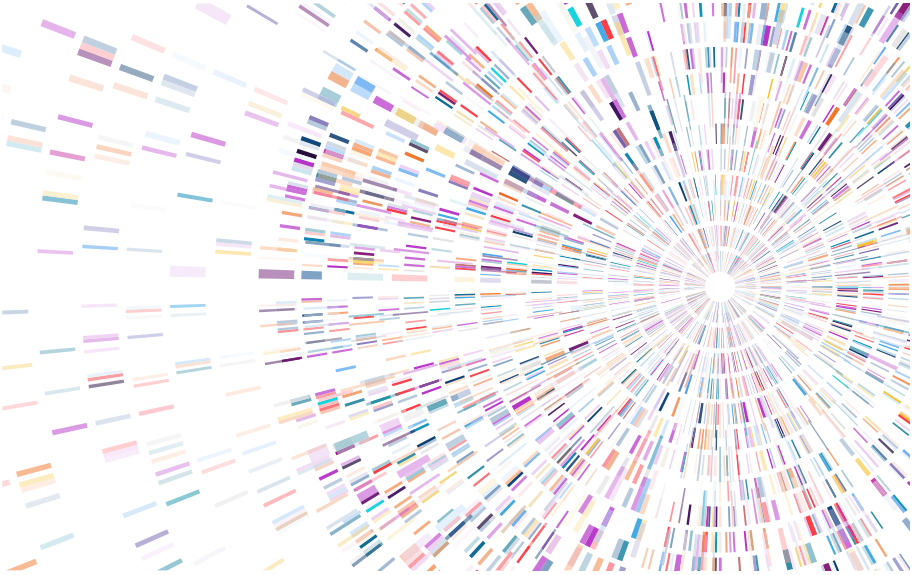
Once preliminary approval is granted for a given project, it is the responsibility of collaborating groups to ensure all necessary OGTR, High Risk Biological (HRB) and Ethics approvals are in place for the project and include the addition of all relevant GIH staff.

Final acceptance of projects will depend on receipt by GIH of completed research governance applications and approvals.

A data management plan for all bioinformatic data generated will be negotiated on a project by project basis.

All projects will be allocated a UQ Research Data Manager record and lab archives notebook for archival of project detail.

GIH will return all samples and sample products at project completion.



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