

## Genome Innovation Hub

# Guide for GIH External Project Applications

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### About Genome Innovation Hub

Genome Innovation Hub (GIH) is a University of Queensland initiative and part of UQ Research Infrastructure. GIH aims to develop innovative approaches to advance technologies in the structural and functional analysis of genomes. The Innovation Hub will act as a collaborative research centre, working with UQ clinicians and scientists to implement novel and promising methodologies in projects focussed on the key areas of health, agriculture and the environment. Once implemented by GIH, these innovations (methods, protocols, software, expertise, etc.) will be made available through UQ Research Infrastructure Services, other UQ Service Providers, or through research groups willing to collaborate and/or train research staff in the newly developed approaches. A list of collaborative projects being undertaken at GIH is provided at the end of this document.

### GIH Call for External Collaborative Projects

Following yet another year of successful engagement of collaborative research projects across UQ, GIH is now inviting applications from UQ researchers for collaborative projects to start in 2021. An anticipated 3-5 projects will be supported in 2021. For successful applications, GIH staff and potential funding towards GIH consumables will support each project to develop cutting-edge technology breakthroughs (methods and pipelines). 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.

Collaborating research groups will 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 will be prioritized on the basis of novelty and transformative impact in advancing genomic applications and/or those that significantly drive down the costs of these applications. Proposals will also be evaluated on the basis of feasibility, broad impact, and clearly outlined paths for future access and uptake. The number of projects accepted will depend on feasibility, budget and timelines.

For selection criteria, timelines and submission process please refer to the application guidelines overleaf.

## Application guidelines

Project Selection Criteria and Ranking	
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%)	Has wide-ranging potential for uptake at UQ based on research interest and expertise in this space been illustrated? Has a clear path for future application of techniques been outlined?  <a href="https://research.uq.edu.au/research-infrastructure">https://research.uq.edu.au/research-infrastructure</a>
3. Team Quality & Feasibility (20%)	Does the collaborating team have track record/capability in the proposed area?  Does rationale/preliminary experiments convincingly demonstrate feasibility of project and fit with GIH wet-lab and bioinformatic expertise in the areas of CRISPR gene editing, single cell and long read (Nanopore, PacBio Sequel) sequencing?
4. Co-contribution (10%)	Does the proposal contain inclusion of leveraged support or in-kind contribution (from UQ researchers, Industry)?
5. Outcome (10%)	Is there a clear plan for the research outcomes (publications, funding applications, collaborations) and what is the contribution to current research goals?

## Timelines for evaluation

Applications for 2021 External Projects will open on Friday, 16<sup>th</sup> October 2020 and will close on Friday, 11<sup>th</sup> December 2020.

Following the closing date, projects for possible funding will be ranked and shortlisted by the GIH Management Group, with interviews for shortlisted applicants conducted in January 2021.

The final list of recommended projects will be forwarded to the GIH Steering Committee and the PVC Research Infrastructure for final approval.

We anticipate being able to inform applicants of their success (or otherwise) by the end of January 2021.

## Submission

Email completed GIH External Project Applications to [GIHapplications@uq.edu.au](mailto:GIHapplications@uq.edu.au)

## GIH collaborative projects

GIH's collaborative projects represent genomic innovation in a wide range of techniques including transcriptomics, long read sequencing, genome editing, proteomics and genomic data visualisation.

The projects are actively undertaken by the GIH team and the collaborating research groups working both together in project design and methods. GIH is looking forward to sharing all the innovations and developments these projects will bring with other UQ researchers. For updates on project outcomes, subscribe to the GIH email list and/or follow the @GIH\_UQ twitter feed.

Below is a list of GIH collaborative projects.

### 2020 GIH Collaborative projects

#### Platform for single-cell chromatin interaction analysis

Dr. Seth Cheetham, Prof. Geoffrey Faulkner and Dr. Adam Ewing

UQ Mater Research Institute, Queensland Brain Institute

*"Simultaneous identification of RNA-chromatin interactions and transcriptomes in single cells"*

#### Metaorganism genomic sequencing

Dr Cheong Xin Chan, A/Prof. Peter Erskine, Dr Lauren Messer, Dr Antony van der Ent

School of Chemistry and Molecular Biosciences, Sustainable Mines Institute

*"A genomic dissection of metaorganisms: molecular approaches for teasing apart the hologenome"*

#### Co-transcriptomic single-cell sequencing

Dr. Ronan Kapetanovic and Prof. Matt Sweet

Institute for Molecular Biosciences

*"Understanding host-pathogen interactions through development of new co-transcriptomic single-cell RNA sequencing technologies"*

#### Transcriptome profiling in plants

Dr. Milos Tanurdzic

School of Biological Sciences

*"Single-cell transcriptome and chromatin profiling in plant cells"*

#### PCR-free sequencing

Dr Sanjaya Kc

Institute for Molecular Biosciences

*"Targeted capture and detection of 16s rRNA gene applying PCR-free long read sequencing"*

### **HTS, customisable gene-editing**

Dr. Dmitry Ovchinnikov

Australian Institute for Bioengineering and Nanotechnology

*"OmniCRISPR: a simultaneous and combinatorial approach to the generation of multiple precise genomic alterations in a human stem cell model"*

### **Searchable genome browser**

Prof Ian Hendserson, Dr. Dom Gorse

QFAB Bioinformatics, Institute for Molecular Biosciences

*"TraDIS-Vault: an interactive searchable genome browser and repository for TraDIS data"*

### **Temporal RNA transcription dynamics**

Dr. Denuja Karunakaran

Institute for Molecular Biosciences

*"Combining novel scSLAM-seq technology with 10x Genomics Chromium to track microchanges in newly synthesised RNA at the single-cell level during macrophage efferocytosis"*

### **2019 GIH Collaborative projects**

#### **Spatial transcriptomics of whole tissues**

Dr Quan Nguyen, A/Prof Andrew Mallett

Institute for Molecular Biosciences

*"Spatial genomics technologies to study cancer and genetic diseases in tissue contexts".*

#### **High-throughput spatial transcriptomic screen**

Prof Ernst Wolvetang, A/Prof Jessica Mar, Dr Shyuan Ngo

Australian Institute for Bioengineering and Nanotechnology

*"Automated single cell quantitative in situ gene expression in cells and tissues (AutoMerFISH)".*

#### **Telomere sequencing and DNA replication**

Dr Mathew Jones, Prof Paul Clarke

UQ Diamantina Institute

*"Applying long-read sequencing technology to understand telomere repair and DNA replication".*

#### **Microbe transcriptomics**

A/Prof Scott Beatson, Prof Mark Schembri, Prof Mark Walker

School of Chemistry and Molecular Biosciences

*"Discovery of new regulatory networks with long-read transcriptomics".*

**Genome-wide CRISPR screening system**

Dr Rebecca San Gil, Dr Adam Walker

Queensland Brain Institute

*“Genome-wide CRISPR screening for modifiers of diverse cellular phenotypes”.*

**Whole genome protein interaction screen**

Dr Emily Goodall, Prof Ian Henderson

Institute for Molecular Biosciences

*“Using transposon-sequencing to probe whole cell protein-protein interactions”.*