The Human BioMolecular Atlas Common Fund Program (HuBMAP) Pre-Application Webinar

October 1st, 2021, 12:00 - 1:00 PM EDT

To submit questions during the webinar please use the Q&A box. We will address questions at the end of the presentation. Following the webinar, questions can be sent to HuBMAP@mail.nih.gov

https://commonfund.nih.gov/HuBMAP
Agenda

• Common Fund & HuBMAP Program — 5 mins

• Tissue Mapping Center RFA— 15 mins

• Demonstration Projects RFA — 10 mins

• Q&A — 30 mins
What is the NIH Common Fund?

- Supports a set of **trans-NIH** scientific programs;

- **Spurs subsequent biomedical advances** that otherwise would not be possible without an initial strategic investment;

- Short-term (5-10 year), **goal-driven** programs focused on developing specific deliverables (data, tools, technologies, etc.) to **catalyze research**;

- Managed by the **Office of Strategic Coordination** within the NIH Office of the Director, in partnership with the NIH Institutes and Centers.

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**Common Fund programs are intended to benefit the entire biomedical research community**

[https://commonfund.nih.gov/HuBMAP](https://commonfund.nih.gov/HuBMAP)
The Human BioMolecular Atlas Program (HuBMAP)

Vision: Catalyze development of an open, global framework for comprehensively mapping the human body at a cellular resolution

https://commonfund.nih.gov/HuBMAP
1. Accelerate the development of the next generation of tools and techniques for constructing high resolution spatial tissue maps

2. Generate foundational 3D human tissue maps

3. Establish an open data platform

4. Coordinate and collaborate with other funding agencies, programs, and the biomedical research community

5. Support projects that demonstrate the value of the resources developed by the program

*Nature 2019: 574, 187–192*

https://www.nature.com/articles/s41586-019-1629-x

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**What makes HuBMAP unique?**

- **Focus:** comprehensive 3D single cell-level maps (multimodal, multi-scale, intra- and extra-cellular) of several normal human tissues; not a survey and not all tissues
- **Outcome:** relationship between tissue organization and function (functional measures, functional units, network analysis)
- **To understand:** inter-individual variability, changes across the lifespan (CCF to integrate data into common maps)
In FY18, 1x Infrastructure, 2x Tools & 2x Mapping OT2 awards. New FY22 announcement: OTA-21-012

In FY18, 5x U54 Centers funded for 4 years. In FY20, 6x U54 centers; In FY22: RFA-RM-21-026

In FY18, 4x UG3 / awards for 2+2 years. In FY20 +5x awards.

In FY19, 4 UH3 awards to accelerate technology implementation.

In FY22: RFA-RM-21-027

The HIVE (HuBMAP Integration Visualization & Engagement)

Tissue Mapping Centers (TMC)

Transformative Technology Development (TTD)

Rapid Technology Implementation (RTI)

Demonstration Projects

Research Community
Plan for Enhancing Diverse Perspectives (PEDP)

- PEDP is **required** for all applications
- Applicants are strongly encouraged to read the ROA instructions carefully and view the available PEDP guidance material: [https://commonfund.nih.gov/HuBMAP/generalfaqs](https://commonfund.nih.gov/HuBMAP/generalfaqs)

- Examples that **enhance inclusivity** include:
  - Inclusion of personnel (MPIs, PIs, Co-Is ...) from groups historically underrepresented.
  - Appropriate training at different career stages.
  - Outreach to community groups and other stakeholders.
  - Use research infrastructure for opportunities to undertake research
  - Suitable evaluation criteria for progress?
Administrative Details for All Awards

- **NIH Involvement**: There will be substantial NIH programmatic involvement in individual projects and HuBMAP Consortium activities.

- **Consortium**: Abide by Consortium policies for rapid sharing, collaborative projects, regular meetings, changing goals, and milestones [https://hubmapconsortium.org/policies/](https://hubmapconsortium.org/policies/).

- **Budgeting**: Applicants are strongly encouraged to set aside ~20% of their budget for Consortium activities, resource sharing, outreach, and meeting attendance as part of their proposed budget. NIH may modify budgets, specific aims and milestones before award.

- **RFA**: These are one-off announcements with no revisions or appeals.

- **Eligibility**: Includes traditional NIH applicants, foreign components, for-profit organizations, and NIH intramural program are eligible.

- **LOIs**: Not required, but strongly encouraged.

- **Review**: SEPs; Please pay attention to review criteria in the RFA.
RFA-RM-21-026
Tissue Mapping Centers for HuBMAP (U54)


Zorina Galis (NHLBI)
**Objective**: Generate high-resolution, multi-parameter, 3D biomolecular maps of non-diseased human organs and organ systems.

**Period**: Up to 4 years

**Budget**: 5-7 awards, $12M in FY22, $13.5M in FY23, $15M in FY24 and $3M in FY25.

**Responsiveness**: NIH will prioritize supporting Centers that will build an atlas for the following organs: kidney, colon, spleen, thymus, lungs, bladder, skin, heart, female reproductive organs, eyes, bone and bone marrow, pancreas, and liver. In addition, the NIH expects to support at least one Center focused on mapping the vasculature, lymphatic, and peripheral nervous system in multiple organs.

**Non-responsive projects**:
- Lacking plans to obtain spatial data information regarding the organization of cellular and non-cellular tissue components
- Not proposing a minimum core set of 3 assays (multiplexed immunoassay, single cell sequencing, at least one other high spatial resolution assay)
- Proposing to study bodily fluids, dissociated cells, diseased, non-human tissue

https://commonfund.nih.gov/HuBMAP
Multi-component cooperative agreements:

• **Overall Vision & Coordination** describe vision, general TMC admin duties and for coordinating activities and sharing expertise and resources [6 pages]

• **Data Analysis Core (DAC)** responsible for data annotation, curation, and analysis [6 pages]

• **Organ-Specific Projects (OSPs)** responsible for generating high quality tissue maps using multiple assays for one organ or component of an organ system. A Center should focus on a single organ [12 pages]

• **Other**: Plan for Enhancing Diverse Perspectives (PEDP)
Programmatic priorities:

- Approaches that maximize the volume of non-diseased human tissue that will be analyzed while maintaining cellular resolution and high biomolecular content
- A synergistic set of well-validated high-content, high-throughput assays for multiscale and multi-modal analysis of large volumes of tissue
- Studies that will complete building an atlas for the following organs: kidney, colon, spleen, thymus, lungs, bladder, skin, heart, female reproductive organs, eyes, bone and bone marrow, pancreas, and liver
- Centers with established informed consent from a diverse range of donors or their families with explicit consent for sharing of genomic data
- The NIH expects to support at least one Center focused on mapping the vasculature, lymphatic, and peripheral nervous system in multiple organs.
Important Dates and Information

- **Letter of Intent Due Date:**
  - October 19, 2021

- **Application Receipt Date:**
  - November 19, 2021

- **Peer Review Dates:**
  - February 2022

- **Advisory Council:**
  - May 2022

- **Earliest Start Date:**
  - July 2022

- We strongly encourage you to talk with us prior to submitting an application by emailing us at HuBMAP@mail.nih.gov

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Questions?

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RFA-RM-21-027
Demonstration Projects for the Human BioMolecular Atlas Program (U01)


Ajay Pillai (NHGRI)
HuBMAP Demonstration Projects

- **Objective**: Utilize HuBMAP data and resources in combination with other resources to address significant biomedical and biological questions
- **Period**: 4 years
- **Budget**: 5-9 awards, limited to $300,000 in direct costs (excluding subcontract F&A) per year

**Cooperative agreements**: Awardees are expected to become key members of the HuBMAP consortium

**Scope**:
- Software Engineering Focus
- Biomedical Focus

https://commonfund.nih.gov/HuBMAP
HuBMAP Demonstration Projects

Projects are expected to

• provide feedback to strengthen HuBMAP resources,
• Increase the relevance and benefit of the outputs of the program to the larger biomedical community.

Outputs from the project will significantly enhance the overall goals of HuBMAP.

The FOA provides some examples BUT these are not exhaustive
HuBMAP Demonstration Projects

Software Engineering:
- Systematic testing/enhancement of HuBMAP APIs
- Enabling facile access to small labs
- Methods to cross-query single cell resources

Biomedical:
- Effectively utilize unique datasets (data integration) available in HuBMAP
- Demonstrate utility as ‘normal’ human reference
- Demonstrate that HuBMAP data can answer important biological questions
- Focused experimental validation of HuBMAP datasets

Non-responsive projects:
- Projects where HuBMAP data/resources are incidental and not core
- Projects that do not propose well-defined outputs
- Projects whose focus is not the study of human organs, tissues, and cells
- Projects that do not include Resource Sharing Plan or PEDP

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**Additional Information**

**Connect with us:**
- General mailbox: [HUBMAP@mail.nih.gov](mailto:HUBMAP@mail.nih.gov)
- Website: [https://commonfund.nih.gov/HuBMAP](https://commonfund.nih.gov/HuBMAP)
- Existing Awards: [https://commonfund.nih.gov/hubmap/fundedresearch](https://commonfund.nih.gov/hubmap/fundedresearch)
- Consortium website: [https://hubmapconsortium.org/](https://hubmapconsortium.org/)
- Mailing list: [https://list.nih.gov/cgi-bin/wa.exe?SUBED1=hubmap_news_and_information&A=1](https://list.nih.gov/cgi-bin/wa.exe?SUBED1=hubmap_news_and_information&A=1)

**Frequently Asked Questions:**
[https://commonfund.nih.gov/HuBMAP/generalfaqs](https://commonfund.nih.gov/HuBMAP/generalfaqs)

**Interested in applying:**
We strongly recommend you discuss any application with us in advance and that you submit a LOI.
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HuBMAP Assays

**IMAGING**
- DNA/RNA
- DART-FISH
- seqFISH
- snFISH
- MERFISH
- Slide-seq
- SABER-FISH
- GeoMx

**Proteins**
- Multiplexed IF
- IHC
- Lightsheet
- CODEX
- Cell DIVE
- DART-FISH
- CyTOF Imaging
- MALDI Imaging MS
- nanoPOTS
- MIBI
- Immuno-SABER

**Lipids/Metabolites**
- MALDI Imaging MS
- SIMS Imaging
- DESI Imaging MS
- NanoDESI Imaging MS

**Other**
- MR Imaging
- CT Imaging
- Autofluorescence
- Stained Microscopy

**SEQUENCING**
- snDropseq
- scRNAseq
- snRNA-seq
- snATAC-seq
- sciRNAseq
- sciATACseq
- scTHSseq
- SNAREseq
- scATACseq

**BULK OMICS**
- **Lipids/Metabolites**
  - LC-MS/MS

- **Proteins**
  - Bottom-up LC-MS/MS
  - Top-down LC-MS/MS
  - TMT LC-MS/MS
### Data on HuBMAP Portal

- **Heart**
  - sciATAC-seq
  - sciATAC-seq
  - sciATAC-seq
  - sciATAC-seq
- **Liver**
  - sciATAC-seq
  - sciATAC-seq
  - sciATAC-seq
  - sciATAC-seq
- **Pancreas**
  - sciATAC-seq
  - sciATAC-seq
  - sciATAC-seq
  - sciATAC-seq
- **Kidney**
  - Autofluorescence Microscopy
  - CODEX
- **Spleen**
  - CODEX
  - CODEX
  - CODEX
  - Bulk ATAC-seq
- **Thymus**
  - CODEX
  - CODEX
  - CODEX
  - Bulk ATAC-seq
- **Lymph node**
  - CODEX
  - CODEX
  - CODEX
  - Bulk ATAC-seq
- **Large intestine**
  - Bulk ATAC-seq
  - Bulk ATAC-seq
- **Small intestine**
  - Bulk ATAC-seq
  - Bulk ATAC-seq

#### Technologies

- **seqFISH**
  - snRNA-seq
  - seqFISH [Lab Processed]
- **seqFISH [Lab Processed]**
  - snRNA-seq
  - snRNA-seq [Salmon]
- **scATAC-seq (SNARE-seq) [Lab Processed]**
  - SnARE-seq
  - snRNA-seq [Salmon]
- **snRNA-seq**
  - snRNA-seq
  - snRNA-seq [Lab Processed]
  - snRNA-seq [Salmon]
- **snRNA-seq (SNARE-seq) [Lab Processed]**
  - snRNA-seq
  - snRNA-seq [Salmon]
- **snRNA-seq**
  - snRNA-seq
  - seqFISH
- **Untargeted LC-MS**
  - Targeted Shotgun / Flow-Injection LC-MS
  - TMT LC-MS
  - Whole Genome Sequencing

#### Tissue Samples

- **Pending**
  - Vasculature
  - Bone & Bone Marrow
  - Tonsil
  - Skin
  - Uterus
  - Fallopian Tubes
  - Ovary
  - Placenta
  - Breast

[https://portal.hubmapconsortium.org/](https://portal.hubmapconsortium.org/)