Chan Zuckerberg Initiative

Request for Applications
Seed Networks for the Human Cell Atlas

The Chan Zuckerberg Initiative invites applications for three year projects to form Seed Networks for the Human Cell Atlas (HCA).

OPPORTUNITY

Overview

The Human Cell Atlas (HCA) is a global effort to create a reference map of all cell types in the human body. It is an ambitious goal to generate a fundamental reference for biomedical research. The HCA was born out of advances in single cell biology that made it conceivable to collect extensive measurements that inform our understanding of cellular heterogeneity in health and disease. Due to the growth of the community, pace of technology, and interest from the international community, the project has gone from conceivable to feasible. The Chan Zuckerberg Initiative and the Helmsley Charitable Trust are pleased to announce continued support for the Human Cell Atlas by collaborating on two new funding mechanisms that the community can access through a single application portal. The Chan Zuckerberg Initiative seeks to continue the work of the HCA community with a focus on interdisciplinary work and collaboration through the formation of 3 year Seed Networks. The Helmsley Charitable Trust welcomes applications that will construct a detailed atlas of the human gut. CZI Seed Networks aim to solidify growth of the community and result in a first draft of several organs - there is no requirement for a gut component in CZI applications. Additionally, newly formed Networks are designed to catalyze partnership among the scientific community and the funding community so that we can work together toward a first draft of the HCA.

Project Specifications

Many diverse collaborations have been initiated in the HCA while many additional groups are looking for ways to contribute and engage further. This Request for Applications (RFA) seeks to support continued growth of nascent projects and to incubate new networks. The Seed Networks should generate new tools, open source analysis methods, and significant contributions of diverse data types to the Human Cell Atlas Data Coordination Platform. Applications should have a primary focus on the healthy tissues that will contribute to a

reference atlas. These projects should establish the HCA as a resource for applications such as clarifying genetic variants associated with disease, cell type-specific drug toxicity, or therapeutic applications. In addition to the Data Coordination Platform, community resources arising from the Seed Networks will be rapidly shared via open source repositories such as Protocols.io, Addgene, GitHub, and bioRxiv.

Seed Networks

Seed Networks should consist of at least three principal investigators, including at least one computational biologist or software engineer, together with additional computational biologists, engineers, experimental biologists, and/or physicians. CZI Seed Networks aim to support foundational tools and resources for the HCA and will not require a gut component in the application.

CZI Seed Network Grants have four overarching scientific goals:

- Build and support networks of collaborating scientists and engineers;
- Contribution of high-quality data to v1.0 of the HCA;
- Development of new technologies and benchmark data sets, particularly those anchored in spatial as well as molecular information;
- Support of computational biology within the Human Cell Atlas community.

Specific examples may include, but are not limited to:

- Systematic analysis, both experimental and computational, of single tissues or organs
- Studies across individuals and across lifespan to assess inter-individual variability of healthy human tissue with single cell resolution
- Analysis of multiple organs derived from single donors to understand individual correlations across tissues
- Integration of single cell measurements of RNA, protein, and metabolites with tissue-based information that retains the spatial relationship of analyzed cells
- Collaborative solutions for cross-cutting computational challenges (segmentation, registration, normalization, etc.) that combine experimental and analytical approaches
- Projects that identify and address challenges in making the Human Cell Atlas a useful resource for clinicians, including cell type resolution of clinically informative markers, metadata, ontologies, mapping to common coordinates and other challenges
- Development of experimental and/or computational methods that extract temporal, functional, or other cellular recordings along with single cell transcriptomics

Collaboration and Open Science

All projects will be evaluated based on their potential for Scientific output (productivity), Tool and resource dissemination (reach), and Collaboration. We will be looking for investigators and groups who will enthusiastically contribute to and benefit from a collaborative, dynamic and interdisciplinary approach. For examples of evidence of productivity, reach and collaboration, please see the CZI statement of principles.

- CZI will work with investigators to help build the HCA. Investigators in the HCA Seed Networks will have the opportunity to learn from, collaborate with, and interact with the community of investigators and groups across all Networks, as well as with the Chan Zuckerberg Initiative computational biologists and software engineers.
- CZI supports collaboration. All Principal Investigators listed on the application are expected to participate in meetings, reports and other events. Networks should be genuine collaborative projects with responsibility and participation distributed across participating labs. Members of Seed Network labs with key roles in the project (students, postdocs and staff) will also participate in scientific meetings, hackathons, and other activities.
- CZI's mission is at the interface of technology and science. Working in collaboration with, and guided by, other Seed Networks and the wider HCA community, we aim to develop technology-based tools and approaches to support and accelerate the scope and impact of the HCA.
- CZI supports open science values and principles. To accelerate scientific discovery, collaboration and rapid dissemination, CZI supports a consent, sharing, and publication policy for open and rapid dissemination of research results and a policy for software development that maximizes accessibility, reuse, and shared development.

ELIGIBILITY

- All Principal Investigators must hold a PhD, MD, or an equivalent Computer Science or Engineering degree.
- All Principal Investigators must have an independent faculty position or equivalent at an accredited college, university, medical school, or other research facility.
- Applications may be submitted by domestic and foreign non-profit organizations; public and private institutions, such as colleges, universities, research institutes, hospitals, laboratories, units of state and local government; and eligible agencies of the federal government.
- Principal Investigators may apply to join multiple Seed Network applications, but will only be funded in a single final Network.
- Principal Investigators may only serve as Coordinating Principal Investigator on one application.
- At least one Principal Investigator of the Seed Network must be a computational biologist/computer scientist or software engineer.
- One Principal Investigator should be designated as the Coordinating PI to take responsibility for managing the group collaboration and be the administrative contact for CZI and any grant partners, including Silicon Valley Community Foundation.
- Collaboration members may be from the same or different institutions. However, the Coordinating PI must be affiliated with the institution submitting the application and grant funds will be awarded to that institution, which will take responsibility for distributing funds to the institutions of the other members of the collaboration. Note that foreign institutions may not subcontract to US institutions, so please be mindful when selecting the Coordinating PI/institution.

- Early Career Investigators are strongly encouraged to apply, as Coordinating PIs as well as contributing PIs.
- Women and underrepresented minorities are strongly encouraged to apply.
- All grants will be made in compliance with the US Treasury Department's Office of Foreign Asset Control (OFAC) program. For additional information regarding OFAC sanctions, please refer to the US Treasury Department's resources located here: https://www.treasury.gov/resource-center/sanctions/Pages/default.aspx.
- Facebook employees, including employees of any subsidiary Facebook entities, are not permitted to apply for this grant.
- CZI reserves the sole right to decide if an applicant and applicant organization meet the eligibility requirements.

For questions about eligibility, please contact us in advance of the proposal deadline at sciencegrants@chanzuckerberg.com. Deadline extensions will not be granted.

APPLICATION PROCESS

Key Dates

9/18/18:	Application portal opens
11/13/18:	Applications due by 5:00 PM PT
3/18-3/27/19:	Video interview of finalists
4/15/19:	Earliest notification of decisions (subject to change)
6/1/19:	Earliest start date of project (subject to change)

Award period and start date: Proposed projects should be three years in duration with a projected start date no earlier than June 1, 2019. Actual start date may vary.

Application Requirements

All applications must be completed and submitted through the Chan Zuckerberg Initiative's online grants management portal at https://apply.chanzuckerberg.com. It is recommended that applicants familiarize themselves with this portal well in advance of any deadlines. Detailed application instructions (https://www.chanzuckerberg.com/science/rfa/seed-networks/instructions) are available on the Chan Zuckerberg Initiative website, as well as in the grants management portal at https://apply.chanzuckerberg.com/.

The application consists of the following sections:

- **Applicant Details** (Part 1 and Part 2): Information about the Coordinating Principal Investigator for the collaborative team
- **Organization Details** for Coordinating PI
- **Project Details**:
    - **Project Title**

    - **Full paper or preprint citations** (with PubMed or bioRxiv links), GitHub repository links, data repositories, protocols.io submissions and/or similar documentation for up to five of the most significant contributions members of the Seed Network have made that are relevant to the proposal.
    - **Abstract/Project Summary** (250 words maximum).
    - **List of Co-Principal Investigators** and individual statements from each co-PI describing their specific contributions (up to 750 words total).
- **Project Proposal** including:
    - **Abstract**: Succinct description of the Seed Network research project (250 words maximum; can be the same as above in project details).
    - **Proposal Body**: (2000 words maximum) Should include two parts:
        - Scientific goals of the project: Define the scientific goals of your research, as well as the contribution to the wider HCA community and how the project will benefit from being a part of the Seed Networks.
        - Tools and resources: We are particularly interested in the tools, resources, and/or specific expertise that your group would like to develop or bring to the collaborative Seed Network projects, and the tools/resources that could be generated by other Seed Networks or CZI that would benefit your work.
    - **Figures** (optional): limited to one page, inclusive of legends.
    - **References Cited** in your proposal (no word/page limit).
- **Brief preliminary budget** (one page per PI maximum): Description can be at a high-level and in narrative or tabular form, outlining costs for personnel, supplies, equipment, travel, subcontracts, other costs, and up to 15% indirect costs (excluding equipment and subcontracts). Budget should be requested in US dollars. Application budgets must reflect the actual needs of the proposed project within your group. The Chan Zuckerberg Initiative will work closely with successful applicants to arrive at a mutually acceptable budget after review.
- **Biosketches** for Coordinating PI and all co-PIs listed above (five pages maximum per biosketch, NIH format or similar).
- **Letters of Commitment** signed from each co-PI.

The proposal, biosketches, brief preliminary budget, and letters of commitment must be uploaded in PDF format. All text in these documents must be in Arial 11 point font or larger and no less than single spaced with minimum of half inch margins on all sides.

The formatting and component requirements, including word and page limits indicated above, will be enforced by the review team. Any submitted materials that exceed the word and page limits or do not follow the requirements will not be considered during the application review process.

Please note that this application is considered a pre-proposal. For successful applications, we will request additional materials, co-signed by your institutional officials, to determine final

budget and administrative details of the award. The Chan Zuckerberg Initiative does not require institutional sign-off at this stage of the application process, but we strongly suggest that you consult your home institution to determine your eligibility to apply for this grant and your institutional policy on indirect costs.

SELECTION PROCESS

The Chan Zuckerberg Initiative will evaluate all applications for scientific merit and will seek independent expert review. The application for the Seed Network Award is considered a pre-proposal and selected collaborations will be invited to submit a Full Application. Finalists from the review process may be invited for a video interview with CZI staff and/or scientific advisors. As the dates for interviews are firm, we request that all applicants, including Co-PIs, maintain availability for March 18th, 2019 through March 27th, 2019 for these calls. Final decisions will be made by CZI staff in consultation with our scientific advisors. There is no expectation of any specific number of awards, and the Chan Zuckerberg Initiative reserves the sole right to not recommend the funding of any applications. CZI does not provide feedback on decisions for unfunded proposals.

Reporting & Progress: Annual reports will be required to ensure that the Chan Zuckerberg HCA Seed Networks are progressing toward the project deliverables. Measures of progress will include project deliverables but also engagement with the community consistent with the selection criteria for Seed Networks. These include:

- Deposition of data to the HCA DCP
- Deposition of software code to an open repository such as Github
- Submission or modification of protocols on Protocols.io
- Publish results along with submission to open-access preprint servers (e.g. bioRxiv, aRxiv etc.)
- Interaction with the DCP development team to ensure that software development is informed of unique needs of scientists in the Seed Networks.
- Interaction with other Seed Networks and efforts to develop generalizable tools. All investigators will meet annually. Computational groups will have dedicated hackathon style meetings to identify common bottlenecks and work toward solutions that cut across Seed Networks.

POLICIES

- Funds from this award are intended to support research activities. Grants are made to institutions on behalf of the named award recipients and reasonable flexibility on how these funds are utilized is allowed, provided that the funds are used to support research activities related to the project. Funded investigators will be asked to provide summary budgets at the time of award and during annual reporting.
- For awarded projects, financial statements and progress reports will be due at the conclusion of each grant year. Specific deliverable requirements will be outlined in the award notification. Investigators of funded projects will be required to participate in regular investigator meetings, including annual investigator meetings in the Bay Area.

- Grantees may obtain funds for their research from other funding sources, provided that there is no conflict with meeting the terms of the CZI award.
- Unused research funds may be carried over to the following year and requests for no-cost extensions will be considered.
- **Ethical Conduct:** CZI advocates the highest ethical standards for the conduct of research and for the professional and personal conduct of investigators and grantees. Grantee organizations must adopt appropriate procedures for examination of cases of scientific and personal misconduct, including harassment. In addition to requirements of their own countries, grantees must have in place appropriate procedures for the ethical use of animals in research and for the ethical treatment of human subjects and tissue donors, including obtaining the appropriate written informed consent from human subjects. CZI regards the policies of the National Institute of Health as a strong model for such procedures.
- **Data, publication and dissemination policies:** To accelerate scientific discovery and collaboration, CZI supports a consent, sharing, and publication policy for open and rapid dissemination of research results, including methods, data and reagents, and a policy for software development that maximizes accessibility, reuse, and shared development. Exceptions will be considered where there are situations that make this impossible or counterproductive.
    - **Data Sharing:** CZI is committed to developing and using platforms that disseminate data openly and freely, and the HCA is intended to be fully open for all users, using human tissue fully consented for data sharing. That said, CZI recognizes the need for subsets of individual-level data to be protected or provided with controlled access. All datasets either curated or generated through the project should be made publicly available and easily accessible online, when feasible. This includes metadata, documentation, and intended computational use cases, as appropriate. CZI will work with Seed Network researchers to identify appropriate routes and best practices for data sharing from the Network.
    - **Publications:** To encourage rapid dissemination of results, any publications related to this funded work must be submitted to a preprint server, such as bioRxiv, at the first submission to a journal. Experimental protocols should be made publicly available through a protocol sharing service, such as Protocols.io. CZI requests that scientific publications, preprints, and presentations that result from this award be acknowledged as being supported by this funding.
    - **Software code:** CZI requires sharing of software code developed by its grantees, generally to be made publicly available on GitHub. All code must be released under a permissive open-source license (MIT, Simplified BSD, ISC, or Apache v2.0). All analysis packages must be released through the appropriate language-specific package manager (e.g. PyPi for Python, CRAN for R) with documentation, example data, and interactive demos (e.g. Jupyter notebooks), and the use of Docker or similar container technologies to ensure portability and reproducibility.

    - **Reagent sharing:** Resources and reagents developed with this funding support should be available for rapid dissemination to the community, where possible in an accessible community repository, such as Addgene (for plasmids/DNA reagents/viruses), Jackson Labs (for mouse lines), etc. This requirement applies to cell lines, transgenic organisms, plasmids/clones, antibodies, and other reagents.
    - **Consent:** All human tissues should be fully and properly consented to permit full sharing of the resulting data, and any resulting tools, in accordance with laws and regulatory requirements. Any desired exceptions to this policy must be identified at the time of application, and such requests may affect the application's chance of success. We are aware that there may be circumstances where broad consent may be challenging and in these cases, encourage investigators to discuss with CZI scientific staff.
- CZI does not retain any rights, other than a use right, to data, published results, or any other intellectual property that results from the research funded by these grants. CZI supports and promotes policies that enable research results and technologies to have the broadest reach and impact. To this end, all software should be made available through maximally permissive open source licenses. In some cases, commercialization of intellectual property rights in the form of patents provides for the best route for broadest availability and dissemination. In these cases, this intellectual property should be made freely available for all academic and non-commercial use and should generally be subject to non-exclusive commercial licensing.
- Indirect costs are limited to up to 15% of direct costs, and are included within the annual budget total. Indirect costs may not be assessed on capital equipment or subcontracts, but subcontractors may include up to 15% indirect costs of their direct costs.
- Applications selected through this process will either be funded by the Chan Zuckerberg Foundation or recommended for funding through the Chan Zuckerberg Initiative Donor-Advised Fund (DAF) at the Silicon Valley Community Foundation (SVCF).

CONFIDENTIALITY

All submitted applications will be kept confidential to the greatest extent possible, except as necessary for evaluation or to comply with any applicable laws. All applications submitted through the shared portal will be shared internally between the Chan Zuckerberg Initiative and the Helmsley Charitable Trust. After the grant award, funded proposals will be shared across the Seed Network, but unfunded proposals will remain confidential. Application materials will not be returned to applicants.

RFA CONTACT

For administrative and programmatic inquiries, or other questions pertaining to this RFA, please contact sciencegrants@chanzuckerberg.com.