# Application: Field experiment to reduce HIV spread among Chilean university students

David Rand - rand.dave@gmail.com MISTI Global Seed Funds

#### **Summary**

**ID:** 0000000107

**Last submitted:** Dec 12 2020 02:24 AM (CLST)

## **Fund Selection**

Completed - Nov 23 2020

## **Fund Selection**

#### **Project Title**

Please provide a descriptive name your project

Field experiment to reduce HIV spread among Chilean university students

#### MIT Administrative Officer (AO)

If you are the international applicant, and you do not have this information, you should ask your MIT collaborator. A <u>list of AOs can be found here for reference</u>. Do not put in the name of the MISTI Program Manager.

First name	Jason
Last name	Clinkscales
E-mail	jclinksc@mit.edu

#### MIT Fiscal Officer (FO) or Departmental Assistant/Support Staff

Please list the individual within your office/department that processes your travel reports and other financial processes. A list of FOs can be found here for reference.

If you are the international applicant, and you do not have this information, you should ask your MIT collaborator. Do not put in the name of the MISTI Program Manager.

First name	Benjamin
Last name	Egan
E-mail	<u>bennegan@mit.edu</u>

#### **MIT Fund Center Number**

This information may be obtained from the MIT collaborator's Administrative Officer or Fiscal Officer.

209609 (RAND /DAVID SLOAN P121009)

#### **MIT Profit Center Number**

This information may be obtained from the MIT collaborator's Administrative Officer or Fiscal Officer.

P121009 (Faculty Discr - MSA)

#### Please select which fund you are applying to:

MIT - Chile - Universidad de Santiago de Chile (USACH) Seed fund

#### University-specific funds

For university-specific funds, faculty members from that respective institution should direct their applications to those funds.

#### These include:

- MIT KU Leuven Seed Fund
- MIT-Belgium Universite catholique de Louvain Seed Fund
- MIT-Chile Universidad de Santiago de Chile (USACH) Seed fund
- MIT- IIT Ropar Seed Fund
- MIT-Imperial College London Seed Fund
- MIT-Germany FAU Seed Fund
- MIT-Germany University of Regensburg Seed Fund
- MIT-Germany University of Stuttgart Seed Fund
- MIT-Korea KAIST Seed Fund

If you are unsure which fund you should apply to, <u>please visit the Available Funds page</u> for further information.

To submit your response and move on to the application, click on the green "Mark as Complete" button below.

## Fill out MISTI Global Seed Funds Application

Completed - Dec 11 2020

## MISTI Global Seed Funds Application

## Page 1: MIT Applicant and Fund Information

Pro	ject	tit	le:
	100	LIL	ю.

Field experiment to reduce HIV spread among Chilean university students

To edit your project title, go back to the "Fund Selection" task in the task bar on the left-hand side of this screen.

## Proposal fields - your proposal will be reviewed by someone in these fields (please select 2)

Field 1	Brain and Cognitive Sciences
Field 2	Management

## Please list specific subfield (energy, environmental science, particle physics, robotics, etc.)

Public Health Studies

## **Number of MIT Applicants (Faculty)**

2

## MIT faculty or research scientist applicant:

GSF is open to all MIT faculty members and research staff with principal investigator privileges (principal research scientists and senior research scientists). If you have questions about your PI status, please consult your department.

First name	David
Last name	Rand
Status	Associate Professor
Title	Erwin H. Schell Professor
Department	Management (Course 15)
School	MIT Sloan School of Management
Lab or Center	(No response)
MIT E-mail	<u>drand@mit.edu</u>
Does this applicant have PI (Principal Investigator) Status?	Yes
Are they the main PI on this project?	Yes

GSF is open to all MIT faculty members and research staff with principal investigator privileges (principal research scientists and senior research scientists). If you have questions about your PI status, please consult your department.

## MIT faculty or research scientist applicant 2:

First name	Erez
Last name	Yoeli
Status	Principal Research Scientist
Title	Ph.D Economics
Department	Management (Course 15)
School	MIT Sloan School of Management
Lab or Center	MIT Applied Cooperation Team
MIT E-mail	eyoeli@mit.edu
Does this applicant have PI (Principal Investigator) Status?	Yes
Are they the main PI on this project?	No

GSF is open to all MIT faculty members and research staff with principal investigator privileges (principal research scientists and senior research scientists). If you have questions about your PI status, please consult your department.

## Number of International collaborators

4

First name	Denise
Last name	Laroze
Title	Ph.D Goverment
Institution	Universidad de Santiago de Chile
Department	Administración (Management)
Lab or Center	Centre for Experimental Social Sciences
Street address	Concha y Toro 32c
City and postal code	Santiago
Country	Chile
E-mail	denise.laroze@usach.cl
Research Group Website	cess.cl

First name	Giuliano
Last name	Duarte
Title	Master in Public Health (MPH)
Institution	Universidad de Santiago de Chile
Department	Escuela de Obstetricia
Lab or Center	(No response)
Street address	El Belloto 3530
City and postal code	Santiago
Country	Chile
E-mail	giuliano.duarte@usach.cl
Research Group Website	https://fcm.usach.cl/es/escuela-de-obstetricia-y- puericultura

First name	Eduardo
Last name	Leiva
Title	M.A. Political Philosophy
Institution	Universidad de Santiago de Chile
Department	Departamento de Filosofía
Lab or Center	(No response)
Street address	Las Sophoras, 135
City and postal code	Santiago
Country	Chile
E-mail	eduardo.leiva.p@usach.cl
Research Group Website	https://fahu.usach.cl/departamento-de-filosofia

First name	Francisco
Last name	Villarroel
Title	Master in Social Sciences Student
Institution	Universidad de Santiago de Chile
Department	Instituto de Estudios Avanzados
Lab or Center	(No response)
Street address	Román Díaz 89
City and postal code	Santiago
Country	Chile
E-mail	<u>francisco.villarroel.r@usach.cl</u>
Research Group Website	www.ideausach.cl

Please take note, your proposal will not be reviewed and moved forward in the evaluation process if you have any outstanding reports.

Please submit your <u>report via this form</u>. If you have any questions, please contact <u>misti-gsf@mit.edu</u>.

MIT faculty or research scientist applicant: Does at least one of your MIT applicants have PI (Principal Investigator) Status?

GSF is open to all MIT faculty members and research staff with principal investigator privileges (principal research scientists and senior research scientists). If you have questions about your PI status, please consult your department.

Yes			



## Page 2: International collaborators and grant questions

#### Confidentiality

Global Seed Fund (GSF) proposals are viewed by the evaluation committee, selection board, and the GSF administrative staff. We advise you not to provide details of patentable ideas, copyrightable software, or any confidential information, as this proposal could be considered a public disclosure and harm your patent and confidentiality rights.

By checking the box below, you are acknowledging you understand the above statement. If you choose to submit patentable ideas, copyrightable software or other confidential information, you do so at your own risk. Please contact the TLO for further advise if needed.

## Responses Selected:

I acknowledge I have read the above statement

#### Brief abstract

Provide a brief summary of the proposed project written for an audience of non-experts. This summary may be used in public promotional materials. (limited to 250 words)

The incidence of HIV and other sexually transmitted infections (STIs) in Chile increased 34% between 2010 and 2017, highlighting a key shortcoming in public health campaigns. In this project, we conduct a longitudinal social network experiment to test if a short video intervention designed using a combination of behavior change tools can reduce risk taking behavior among university students to a larger extent than an ordinary "Stay Active" health campaign. We use the natural organizational structure of the Universidad de Santiago de Chile as a defined social network on which to measure the direct and indirect impact of the intervention (i.e. the effect on both treated and untreated parts of the network), with a randomization design that makes it possible to separately measure these effects. The longitudinal design allows us to measure long and short-term effects.

The experiment consists of five waves of experimental surveys, the first is a baseline in which we collect data regarding student's risk taking and risk judgment behavior. Students that agree to participate in the longitudinal study are invited to a second wave in which they watch a video and repeat relevant baseline questions. Wave three repeats the video intervention and adds the possibility of sharing the video and signing a public commitment on avoiding risky behavior (e.g., using a condom). Waves four and five measure the impact of the combined treatments in the short and long-term.

#### Description of collaboration (if applicable)

Provide a brief history of the collaboration and describe how your work is complementary. (limited to 250 words)

This multi-disciplinary collaboration originates in an HIV/STI intervention designed by a male midwife and an anthropologist who understood that for an intervention to work, one has to use science to design it (Behavior Wheel Change); and for others to adopt it, one has to demonstrate it's effectiveness rigorously (experimental methods). Giuliano Duarte and Eduardo Leiva developed the intervention and, treatment in hand, contacted Denise Laroze to design an experimental impact evaluation. Denise works at the Centre for Experimental Social Sciences (CESS) at USACH and has experience running online experiments and spatial analysis of premature mortality. She incorporated Francisco Villarroel, an MSc student doing a thesis in social media experiments, to the team.

In 2018 CESS hosted a Latin American workshop on experimental and behavioural social sciences (LAWEBESS) conference where David Rand was a Keynote Speaker. During his stay, Dave got to know the CESS labs and online experiment infrastructure in Chile. His expertise in the field of social media was perfect fit for for collaborating on this project, filling in the social media and network aspect of the project. Given the type of intervention, Dave incorporated MIT research scientist Erez Yoeli, to assist in further developing the intervention because of his expertise in developing interventions to promote prosocial behaviors and health behaviors in particular, as well as MIT PhD students Zivvie Epstein and Jerry Zhang, to assist with several aspects of the experiment, including intervention design, experiment design, and empirical analysis.

#### Description of the proposed project

Describe in detail the proposed project. Funding may be used to cover travel and meeting costs to facilitate international projects and collaboration. Funds may not be used to cover salaries or materials and long-term stays. Please include any technical information that will help scientific reviewers in your field evaluate the proposal. Please review the guidelines and eligibility from our <u>website</u>. (limited to 1500 words)

#### Research Background

Sexually transmitted infections (STIs), including human immunodeficiency virus (HIV) infection, are a major public health problem. Every day, more than 1 million people worldwide contract an STI, and their

treatment is permanent, complex, and expensive (WHO 2020).

According to UNAIDS, in 2019, 38 million people in the world are living with HIV. In Chile, between 2010 and 2017, there was a 34% increase in new cases, totaling 71.000 people. This upward trend continues, as opposed to what is happening worldwide. The vast majority of people who were diagnosed with HIV in Chile are men between the ages of 15 and 29. Ninety-five percent of cases are acquired through sexual relations. Incidence of other STIs such as gonorrhea, syphilis and hepatitis A, B and C also grew in the same time period, especially among young people.

Our premise is that, for interventions to be effective they need to be based on multidisciplinary knowledge and evaluated with scientific rigor. This is consistent with the United Nations Economic and Social Council (2019) recommendation to expand evidence-based programs to end the AIDS epidemic as a threat to public health by 2030. Doing this in practice requires generating solutions based on sound theory and empirical evidence evidence, that are culturally contextualized (Michie S, Prestwich A. 2010). This requires collaboration between research groups, direct action health teams, and the general population in the definition and design of prevention strategies in STI / HIV. These requirements hold true for many health interventions, giving the results on this experimental research the potential to contribute to a broad area of intervention in health related areas. Speaking to this point, the Chilean Heath Ministry is openly looking to hire consultancies in this topics (2019).

#### Research Design

We propose an impact evaluation of the digital intervention for the prevention of STI/HIV in students at USACH that will be conducted through a five wave longitudinal online experiment that contrasts the Treatment video with a Placebo, a campaign to encourage physical activity at USACH. The behaviors that we are interested in analyzing (dependent variables) are:

- Baseline measurement of sexual behaviors during SARS-CoV-2, which allow us to collect descriptive measures of the current risk taking behavior of USACH students -- this data does not currently exist.
- A set of 5 experimental waves in which we collect self-reported measures of risk behaviors over time, using scales from the National Health Survey and others. This is based on the concepts coined by Susan Michie: Capacity, Opportunity, Motivation (Michie S., van Stralen M.M., West R. 2011).
- Self-reported changes in risk behaviors measured through List Experiments, Conjoint experiments or others, that allow us to collect measures that avoid introducing social desirability biases.
- Measuring the potential for organic diffusion through "like" and "sharing" of both campaigns.
- Measuring the impact of introducing social norm nudges and public commitment strategies on risk

taking and prescriptive norms.

- Measuring spatial spread, through a social network randomization design--an innovation recently used by Facebook and Amazon.

We have designed a recruitment campaign based on grassroots and university support for the study and estimate a turnout of 8% of the 25.000 USACH students for the baseline survey (approx 2,000 people). We expect attrition will leave us at nearly 600 participants in the final wave of the experiment. This is problematic for causal interpretation of results, if attrition is non-random. The design has taken that into consideration and includes four strategies to address the issue. The first is the selection of a neutral "Stay Active" video as a placebo, which has the same length and overall objective of inducing healthy behaviors, but has a standard top-down video design, therefore, we expect attrition to be balanced across treatment allocations. Second, we have incorporated socio-demographic measures into the baseline survey that enable us to test if unbalance has occurred, this will provide us with relevant information for balance tests and estimation of Complier Average Causal Effects. Third, we include economic incentives and provide a bonus for completing all waves of the survey. The fourth is to begin the intervention in earnest in the second meeting, since attrition tends to be highest between the first and second meeting. This strategy is increasingly employed in long-horizon psychology survey experiments to address attrition.

The randomization process is one of the fundamental steps for an experimental work, as it allows us to measure the spatial spread of the campaign (diffusion) using strategies similar to the ones used epidemiology (Walker D., Muchnik L. 2014). For this purpose, we have designed a three level randomization protocol where: first, 3/10 of Faculties of the University are assigned to the Placebo, and 7/10 of Faculties assigned to Treatment. Within each of the treated Faculties, Careers are randomized into treatment and placebo using proportions: 1/3 Placebo, and 2/3 Treated; and within the treated careers, the individuals are randomized to be part of the Treatment (T1, T2, T1xT2) or placebo group. All of these materials include self-reported gender and age group block randomization to measure treatment effect heterogeneity among sub-groups. A preliminary version of this impact evaluation has been approved by the IRB board.

#### Research contributions

This research contributes substantially in three ways. Our academic contribution is to put into practice the concepts of the Behavior Change Wheel (BCW) as well as behavioral principles related to norms and reputations, but as applied to sexual health. To the best of our knowledge, the BCW has not been implemented or evaluated as an experiment in STI/HIV prevention, and we will do so with a social

network experiment that incorporates a cutting edge design. Contributions in the area of preventive medicine, digital health, medical anthropology, health communication, data science and behavioral economics, have a high potential for publication in WOS-indexed journals.

Secondly, we contribute to evidence-based public policies. Innovation in the generation of digital interventions for behavioral change and in their evaluation methods, can serve as a scalable pilot to other areas of public health. This is especially relevant for behavioral interventions that have become the norm As an example, the Chilean Ministry of Science, Technology, Knowledge and Innovation is currently tendering studies of these characteristics, as the Contest for the Development of Institutional Capacities for Innovation based on Research and Development in Higher Education (See:

https://www.minciencia.gob.cl/ines), showing how public institutions are migrating towards the design of evidence-based public policies. The results of this study will be a contribution to the design of campaigns for behavior change, which will provide relevant background for both the USACH and the design of digital interventions in general.

Third, we contribute to the generation of academic networks within the USACH, and with other universities and institutions. In particular, the variety of perspectives among the authors of the proposal (FACIMED, Humanities/Obstetrics and FAE/CESS Santiago), allows for expanding the areas of research interaction, particularly with the MIT Sloan School of management through academic exchanges with David G. Rand and Erez Yoeli, both high-level and experienced researchers conducting experiments related to norm-change, health-behaviors, (mis)-information, etc. (see: <a href="http://erezyoeli.com/">http://erezyoeli.com/</a> and <a href="http://erezyoeli.com/">http://erezyoeli.com/</a> and <a href="http://erezyoeli.com/">http://erezyoeli.com/</a> and <a href="http://erezyoeli.com/">http://erezyoeli.com/</a> and

#### References

Arentoft, A. et.al. (2016). Comparing the unmatched count technique and direct self-report for sensitive health-risk behaviors in HIV+ adults. AIDS Care, 28(3), 370-375.

Hudgens, M. G., Halloran, M. E. (2008). Toward Causal Inference With Interference. Journal of the American Statistical Association, 103(482), 832-842.

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Perski O, Blandford A, Ubhi HK, West R, Michie S. Smokers' and drinkers' choice of smartphone applications and expectations of engagement: a think aloud and interview study. BMC Med Inform Decis Mak. 2017 Feb 28;17(1):25.

Perski, O., Blandford, A., West, R. et al. Conceptualising engagement with digital behaviour change interventions: a systematic review using principles from critical interpretive synthesis. Behav. Med. Pract. Policy Res. 7, 254-267 (2017).

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https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2019/july/20190726 ecosoc

Walker, D., Muchnik, L. Design of Randomized Experiments in Networks. Proceedings of the IEEE | Vol. 102, No. 12, December 2014.

World Health Organization (2020). Global Health Sector Strategy on Sexually Transmitted Infections, 2016–2021[Internet]. Available: <a href="https://www.who.int/reproductivehealth/publications/rtis/ghss-stis/en/">https://www.who.int/reproductivehealth/publications/rtis/ghss-stis/en/</a>

#### Exchanges and activities planned, including student participation

Describe in detail the exchanges and activities planned. (faculty and student exchanges, workshops, meetings) (limited to 250 words)

The USACH team consists of an Associate Professor, an Assistant Professor, a Teaching Fellow, and a graduate student; the MIT team consists of an Associate professor, a Research scientist, and two graduate students. The duration of the project is one year, divided into: 1) Design of the experiment and validation process 2) Execution of wave 1 and presentation of results 2) Execution waves 2-5, 4) Analysis of the information 5) Presentation of final results. Both teams will participate in each of the stages described above and communicating the results.

As part of the collaboration, the USACH team will attend MIT short program; in particular Francisco looks forward to attending the course "Design and Analysis of Experiments"

(<a href="https://professional.mit.edu/course-catalog/design-and-analysis-experiments">https://professional.mit.edu/course-catalog/design-and-analysis-experiments</a>), while Giuliano and Eduardo would like to attend the course: "Developing Health-Centered Communities: The Next Revolution in Real Estate" (<a href="https://professional.mit.edu/course-catalog/developing-health-centered-communities-next-revolution-real-estate">https://professional.mit.edu/course-catalog/developing-health-centered-communities-next-revolution-real-estate</a>) or similar, considering the availability of 18 months to execute our plan. The MIT team will travel to Chile to participate in a joint seminar on prosocial intervention designs, including a session led by members of Dave's team (likely Erez).

We expect the results of this collaboration to be published at high impact international journals and presented at conferences.

## In this current or proposed collaboration, what other additional activities are planned outside of the seed funding?

Describe additional activities and how they will be funded (NSF, etc.) (limited to 250 words)

In addition to the internationalization activities defined in sections "Exchanges and activities planned", this collaboration includes the implementation of a five-wave online experiment answered by USACH students, as well as organizing internal outreach campaigns with grass-roots organizations to reach as many students as possible.

The cost of the experiment is estimated in 25.000USD, for which USACH collaborators are in the process of applying to internal University of Santiago de Chile research funds allocated by the Vice-Chancellor for Research's Office.

#### Project sustainability

After MISTI seed funding, how will the project continue? (limited to 250 words)

This project is the continuation of a research funded by the USACH, entitled Effects of digital interventions for the prevention of STI/HIV in young people, led by Giuliano Duarte and Eduardo Leiva. The project had the support of UNAIDS, PAHO, the Chilean Ministry of Health and international researchers (UCL). Working with researchers from MIT would enhance the contributions of this research agenda, including cutting edge impact evaluations on the and effectiveness of interventions to change risk behavior in health.

In this way, the research has high possibilities of projection to other health related problems, especially those where attitudinal and behavior change is the main element to limit the transmission of pathogens – e.g. SARS-CoV-2-, or improve quality of life –e.g. obesity, incentive to exercise, addictions, smoking, alcoholism.

In addition, the multidisciplinary team in health and experimental design that we have formed could explore new lines of research, transfer knowledge through teaching, promote academic exchange and undergraduate and graduate students, increase the productivity and impact of research, and strengthen ties with civil society organizations and national and international health organizations. To do this, we have designed a financing strategy that considers application to institutional (USACH/MIT), national and international funds. We expect this first study to serve as a seed in the production of evidence-based research in health.

Finally, all of the above is aligned with the strategic objectives formulated by MIT and USACH, favoring development, innovation and knowledge transfer, in order to build a democratic, fair, equitable and sustainable society.

Are you applying for any other seed or research fu	ınas witnin MIII tor tnis project?
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No			

Are you applying for any other seed or research funds outside MIT for this project?

Yes

Which one(s)? List the name of the grant/fund/program that you are applying for/applied for and the name of the agency/fund providing the funds.

Currently we have the support of the administration faculty of the USACH, which supports us financially to supplement funding for travel, and we are in negotiations for other departments of the University to support us in the same way

On the other hand the USACH collaborators are in the process of applying to internal University of Santiago de Chile research funds allocated by the Vice-Chancellor for Research's Office and small research funds within the Faculty of Medical Sciences and the Faculty of Economics and Management.

## Page 3: Proposal Budget

#### **Budget**

Note: departmental allocations may apply; please refer to your MIT department.

## MIT applicant(s)

Faculty or research scientist travel

(For travel abroad)

## Scroll right to complete all required fields

	Team member	Status	Approximate travel dates and length	Activities planned and location	Funds requested in USD (do not use commas or decimal points)	Add row?
1	David Rand	Faculty	One week early September 2021	Co- organiser of seminar on prosocial interventio n designs	2200	•
2	Erez Yoeli	Research Scientist	One Week early September 2021	Co- organiser of seminar on prosocial interventio n designs	2200	×
6						×
Total amount requested:					4400.0	

Estimated total number of trips planned for all MIT faculty/researchers (going to parti	ner
location):	

## MIT student(s)

MIT student travel

(For travel abroad)

## Scroll right to complete all required fields

	Student	Year (U or G)	E-mail	Approxima te travel dates and length	Activities planned and location	Funds requested in USD (do not use commas or decimal points)	Add row?
1	Zivvy Epstein	grad	zive@mit. edu	2 weeks	Participat ion on seminar on prosocial interventi on and intership in CESS Santiago	2800	•
2	Jerry Zhang	grad	zyhjerry@ mit.edu	2weeks	Participat ion on seminar on prosocial interventi	2800	×

		on and intership in CESS Santiago		
Total			5600.0	
amount				
requested:				

Estimated total number of trips planned for all MIT students (going to partner location):

1

Estimated total number of all MIT students (undergraduate and graduate) who will participate in this project:

1

## International collaborator(s)

International faculty and research scientists travel

(For travel to MIT)

## Scroll right to complete all required fields

	Collaborator	Approximate travel dates and length	Activities planned	Funds requested (do not use commas or decimal points)	Add row?
1	Denise Laroze	one week early november 2021	Presentation in a anual meeting about experimental designs	2300	×
Total amount requested:				2300.0	

## Estimated total number of trips planned for all international Collaborators (going to MIT):

1

## International student(s)

International student(s) travel

(For travel to MIT)

## Scroll right to complete all required fields

	Collaborator	Approximate	Activities	Funds	Add row?
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		travel dates and length	planned	requested (do not use commas or decimal points)	
1	Eduardo leiva	2 weeks early november	Assistance to short program "Developing Health-Centered Communities: The Next Revolution in Real Estate" and work in data analysis with MIT team	3200	•
2	Giuliano Duarte	2 weeks early november	Assistance to short program "Developing Health-Centered Communities: The Next Revolution in Real Estate" and work in data analysis with MIT team	3200	•
3	Francisco Villarroel	2 Weeks early november	Asistance to short program " Design and Analysis of Experiments" and work in data analysis with MIT	3200	×

		team		
Total amount			9600.0	
requested:				

Estimated total number of trips planned for all international students (going to MIT):

1

Estimated total number of all International/non-MIT students (undergraduate and graduate) who will participate in this project:

3

## Non-travel related items (meeting and/or workshop)

Not travel related items

## Scroll right to complete all required fields

	Activities planned (and location)	Approximate dates and length	Funds requested (do not use commas or decimal points)	Add row?
1	Workshop in Experimental Designs, CESS Santiago	Early September, 2021	500	×
Total amount requested			500.0	

Total funds requested in USD:
22400.00
Overhead amount (10%)
2240.00
Total USD with Overhead:
24640.00
When you've completed the application, click the green "Mark as Complete" button below.

When you've completed the application, click the green "Mark as Complete" button below.

When you are ready to submit your proposal, click "Review & Submit" in the left-hand taskbar.

Please note only the owner of the application can submit it; collaborators will not see the "Review & Submit" button.