



USC University of Southern California

RESEARCH AND INNOVATION

Request For Proposals Ming Hsieh Institute Research Award

FUNDING ORGANIZATION

Ming Hsieh Institute for Research on Engineering-Medicine for Cancer

APPLICATION DEADLINE

5 PM, January 29, Annually. Proposals submitted after this deadline will be rejected without review. When a due date falls on a weekend, federal holiday, or when USC offices are closed due to weather or other circumstances, the application deadline is automatically extended to the next business day.

SCIENTIFIC MERIT REVIEW

February - March

PROGRAMMATIC REVIEW

April

NOTIFICATION

May - June

EARLIEST AWARD DATE

July - August

AWARD PROJECT PERIOD

Maximum project period is one year

FUNDS AVAILABLE

\$1,200,000 (Estimated)

All awards are subject to the yearly availability of funds, terms and conditions, cost principles, and other considerations.

ANTICIPATED AWARDS

7-10

The number of awards is contingent upon the receipt of a sufficient number of meritorious applications.

BACKGROUND

The Ming Hsieh Institute for Research on Engineering-Medicine for Cancer (MHI) sponsors the Ming Hsieh Institute Research Award, which aims to make USC an international leader in translational research that bridges basic science, engineering, computing, and medicine. The MHI was established in 2010 through a generous gift from Ming Hsieh, a graduate of the USC Viterbi School of Engineering, founder of Cogent Systems and Fulgent Genetics, USC Trustee, and a member of the National Academy of Engineering and the National Academy of Inventors. The MHI's main goal is to support integrated interdisciplinary translational research that speeds discovery and creates pathways to rapidly improve the lives of cancer patients. Its commitment to supporting new and creative approaches and breakthrough interdisciplinary ideas drives advances in engineering, computing, and science into treatments and cures for cancer. The Ming Hsieh Institute Research Award (MHIRA) aims to promote the integration of engineering, scientific and medical

research that together generates novel thinking and the interdisciplinary and collaborative research needed to speed discovery and be translated into real improvements in human health.

OPPORTUNITY

MHI awards support impactful translational and pre-clinical research that drives innovation, bridging science, engineering, computing, pharmaceutical sciences, and medicine, and that expedite the bench-to-bedside development of new life-saving devices and therapeutics to detect and/or treat cancer. There is a strong interest in proposals that will initiate multi-disciplinary research teams employing or lead by engineering, computing, AI and machine learning, computational biology, physics, chemistry, genetics, pharmacology, and/or medicine and biological sciences. Successful applicants are strongly encouraged to develop novel devices, technologies, and other discoveries that can be commercialized and show great promise to improve human health.

FOCUS

The breakthroughs developed by Ming Hsieh Institute Research Award interdisciplinary projects are designed to be translated directly into advances in patient care and catalyzed into inventions that can be licensed and commercialized. The program supports new and creative approaches and breakthrough interdisciplinary projects that drives advances in engineering, computing, science and biomedical research into treatments and cures for cancer. The Ming Hsieh Institute Research Award supports two categories of projects:

- *Pre-Clinical Study*: Scientific work where a clinical perspective informs and guides research toward medical solutions (awards of up to \$150,000).
- *Translational Research Project*: Scientific work in which *already developed technologies or therapies* are married with clinical patient populations for human testing as a step toward a specific commercialization goal (awards of \$200,000 - \$300,000).

Previous awardees can be found at <https://mhicancer.usc.edu/research/>.

HEILMEIER CATECHISM: MANAGING INNOVATION

The selection process for determining what projects to fund under this program will operate on the principle that generating big rewards requires taking big risks. In order to determine what risks are worth taking, the Defense Advanced Research Projects Agency (DARPA) utilize questions developed by former DARPA director George Heilmeier. Known as the "[Heilmeier Catechism](#)," these questions help funding agencies think through and evaluate proposed research programs. Applicants to this program are required to address these questions in their proposal:

- What are you trying to do? Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares? If you are successful, what difference will it make?
- What are the risks?
- How much will it cost?
- How long will it take?
- What are the mid-term and final “exams” to check for success?

Applicants are also required to include a one-page synopsis of their proposal using the template provided in the Appendix included with this Request for Proposals.

FUNDING TARGETS

Applicants who apply to this program are required to develop a partnership with a small business or other company, with whom they can work to commercialize and license IP that is generated from the proposed effort. It is further required that applicants work with a small business partner to pursue federal funding

though Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, collectively the Small Business Programs, which are also known as America's Seed Fund. Applicants may also identify their own small business, if applicable, for which to submit the SBIR or STTR application.

SBIR/STTR: USC's Research and Innovation (R&I) has an open [Request for Proposals](#) (application deadline May 1, 2023) to support applicants to pursue SBIR/STTR funding. Awardees who receive funding under the MHIRA are strongly encouraged to apply to this R&I program, to work with a small business and plan and prepare an application for a Phase I, Phase II, or Fast-Track SBIR or STTR proposal. Applicants selected for funding are also strongly encouraged to contact Research Strategy and Development (RSD), an R&I suboffice dedicated to supporting faculty in the preparation of competitive applications to federal funding agencies. RSD has considerable experience in generating and submitting SBIR proposals (RSD services are detailed below, including provision of a list and contact information of potential small business partners). Qualifications of what is considered a "small business" can be found at on the government's Small Business Administration (SBA) [website](#) and in the [SBA Eligibility Guide](#).

By setting aside more than \$1.2 billion from its Research & Development Funding specifically for Small Business Programs, NIH provides support to early-stage small businesses throughout the nation. Many companies leverage NIH funding to attract the partners and investors needed to take an innovation to market. The focus is on a variety of high-impact technologies ranging from research tools, diagnostics, digital health, drugs, medical devices, and others. NIH SBIR and STTR programs provide the seed funding that facilitates bringing scientific innovations from bench to bedside. The goals of NIH SBIR and STTR programs are to: stimulate technological innovation, increase private sector commercialization of innovations developed through federal R&D funding, and foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons and women-owned small businesses. SBIR and STTR awards are always made to the small business; STTR applications require a partnership with a non-profit research institution. There are three types of awards: (1) Phase I: the focus is on the feasibility, technical merit, and commercial potential of your research project; (2) Phase II: research and development efforts initiated in Phase I are continued. Once Phase I milestones are reached, you can apply for a Phase II award; and (3) Fast-Track: both Phase I and Phase II components are included in one application for review.

High-Risk/High Reward: The MHIRA program plays a unique role in funding pre-clinical research that has great promise yet limited opportunity to compete for federal funding — which typically only supports longstanding work with proven data. Fostering such high-risk, high-reward research is essential to achieving meaningful advances in improving human health. A notable exception is the National Institutes of Health (NIH) High-Risk, High-Reward Research Program, which supports exceptionally creative scientists pursuing highly innovative research with the potential for broad impact in biomedical, behavioral, or social sciences within the NIH mission. Preliminary data are not required. Applicants are strongly encouraged to apply to these programs to obtain additional funding to support work that will lead to commercialization of research products. The program's four constituent NIH Director's awards provide a diverse set of funding opportunities. They are listed below and are described in detail at <https://commonfund.nih.gov/highrisk>. See the individual award websites for more information and application help:

- NIH Director's Pioneer Award (<https://commonfund.nih.gov/pioneer>)
- NIH Director's New Innovator Award (<https://commonfund.nih.gov/newinnovator>)
- NIH Director's Transformative Research Award (<https://commonfund.nih.gov/TRA>)
- NIH Director's Early Independence Award (<https://commonfund.nih.gov/earlyindependence>)

Funding targets may also include other external sponsors. Applications that specify federal funding targets like research programs of the National Cancer Institute or other NIH institutes are highly encouraged.

RETURN ON INVESTMENT

It is expected that projects funded under this program will yield a return on investment of at least 10 times the funding received for an application submitted to this Request for Proposals. This will be determined by

considering the magnitude of future funding awarded by federal agencies or other external sponsors that was enabled by inclusion of preliminary data and publications generated through this award. A return on investment also may be provided by future revenue from the commercial licensing of intellectual property (IP).

RESEARCH AND INNOVATION RESOURCES

Applicants selected for funding are strongly encouraged to contact RSD, a Research and Innovation suboffice dedicated to supporting faculty in the preparation of competitive applications to federal funding agencies. RSD has considerable experience in generating and submitting proposals to federal agencies. RSD services include science writing, budget preparation, and supporting documentation collection. RSD also can generate a list of relevant small businesses doing work on the products or technologies in which you are interested and who have been successful in achieving NIH SBIR/STTR funding. Contact RSD for assistance by sending an email to robbyngil@usc.edu.

ELIGIBILITY REQUIREMENTS

Each proposal *must have a team of two or more USC* faculty principal investigators. The team of PIs/co-PIs must hold *primary* faculty appointments in *at least two different USC schools*.

- ***Pre-Clinical Study:*** Teams must include *a lead PI* from engineering, computing, AI/machine learning, computational biology, physics, chemistry, biology, molecular biology, and/or other biological related sciences, partnered with biomedical researchers that may also include pharmacy and dentistry. Teams must include at least one physician (M.D.), as a co-PI or in an advisory/collaborator role, and *whose current clinical practice includes serving patients in the area of cancer for which the research is proposed*.
- ***Translational Research Project:*** Teams must include *a lead PI* physician (M.D. or MD, PhD) *whose current clinical practice includes serving patients in the area of the specific disease for which the research is proposed*. We seek *multi-disciplinary research teams* that partner researchers with engineering, computing, AI/machine learning, computational biology, physics, chemistry, biology, molecular biology, and/or other biological/biomedical related sciences.

Faculty Rank: Applicants must be full-time faculty at USC at the start of the award period. Tenure track, non-tenure track, and research faculty are all eligible. Adjunct or visiting faculty are not eligible to apply. Recipients must be faculty of USC during the entire award period.

A prior MHI grant recipient may apply for a second and final year of funding under this program but must demonstrate that promising results have been achieved and that an effort is underway to seek additional external funds. Requests for a second year of funding must be submitted as a full proposal and will be reviewed with other proposals received for the award cycle.

PROPOSAL REQUIREMENTS

Applicants must carefully follow instructions. Information uploaded beyond what is requested will not be included in the proposal package provided to reviewers; proposal documents must be converted to PDFs prior to uploading to the application portal.

- a) ***Award Program:*** Specify the type of Ming Hsieh Institute Research Award to which you are applying (*Pre-Clinical Study* or *Translational Research Project*).
- b) ***Brief Description*** (not to exceed 60 words): A succinct description of the proposed work.
- c) ***Abstract*** (not to exceed 20 lines of text): Provide a stand-alone succinct description.
- d) ***Program Plan*** (not to exceed 5 pages): Page limits are inclusive of figures and tables and include 1” margins of single-spaced text in 11-point Arial font. The following headers should be included:

- a. *Introduction*: Provide a brief background and the specific aims of the project. Explain the project's specific innovations and significance for improving the treatment and diagnosis of the targeted disease.
 - b. *Scientific Expertise*: Provide the qualifications of the research team for the proposed work and describe how the skills of the PI team complement each other to achieve the project aims. Describe how the project will be organized and the contributions of each participant. Proposals should include a discussion of the PD(s)/PI(s) past and current funding history. Discuss why the proposal team would be successful in pursuing this opportunity, and how the research expertise of the PD(s)/PI(s) will be integrated through the proposed project.
 - c. *Methodology*: Present the technical approach that will be followed in the project, including any aspects of experimental design.
 - d. *Patient Population*: Describe the types of patients that would benefit from the proposed approach, and the disease that would be targeted through the research. Also describe the pathway that the research will take toward human clinical translation.
 - e. *Outcomes*: Describe the anticipated outcomes of the project and how the project results will be disseminated. Provide a clear timeline table and specific milestones to be achieved. Describe future plans to extend the proposed research through external funding. Also, describe the timeline and approach for taking the proposed research into clinical translation.
 - f. *Prior Work*: Describe prior experience in the proposed area of research. Explain areas in which the prior work needs to be advanced towards clinical translation. If an applicant has previously received funding from the Ming Hsieh Institute, describe: (1) prior research aims and accomplishments; (2) proposals that have been submitted or will be submitted to external funders; (3) progress toward clinical translation; and (4) how the proposed new project builds from the prior outcomes.
- e) ***Heilmeier Catechism Questions*** (not to exceed 2 pages): Address the 8 questions described above under **HEILMEIER CATECHISM: MANAGING INNOVATION**.
 - f) ***DARPA-Style Synopsis*** (not to exceed 1 page): Utilize the template included in the Appendix to provide a technical description, technical advantages, anticipated benefits and applications, business model, and work to date. Click [here](#) to download PowerPoint template.
 - g) ***Budget and Budget Justification*** (not to exceed 2 pages): Specify a project start and end date. Utilize standard budget categories, only including the allowable budget cost categories as detailed in the **Grant Conditions** section below.
 - h) ***Return on Investment*** (not to exceed 1 page): Identify a federal agency Funding Target (including URL), e.g., Phase I, Phase II, or Fast-Track SBIR/STTR programs, of at least 10x the funds requested under this RFP. For example, proposals requesting \$60,000 in funding from this opportunity would need to identify an NIH grant that will generate a cumulative award of \$600,000 or more (this includes total costs summed over all award years).
 - i) ***Grant Submission Commitment*** (not to exceed 1 page): The proposal must include a statement in which the applicant commits to submit a proposal to the opportunity identified as the Funding Target, as well as the intended proposal submission date.
 - j) ***Innovation Ecosystem Commitment*** (not to exceed 1 page): USC R&I is committed to establishing a thriving innovation ecosystem at USC that will build collaborations between USC researchers and venture capital firms, accelerators, incubators, small and large businesses, and foundations. R&I is working closely with USC University Advancement to develop these partnerships. The proposal must include a statement in which the applicant commits to contacting USC University Advancement at hpourman@usc.edu to discuss the potential for obtaining funding for research from venture capital firms, accelerators, incubators, small and large businesses, and foundations that are part of USC's

developing innovation ecosystem that may arise from the research activities funded under this award. It is expected that such funding ultimately will lead to the commercial licensing of IP.

- k) **Commercialization Potential** (not to exceed 2 pages): Describe the current state of the market as well as the commercialization, licensing and IP potential of the proposed technology or method. For the small business with whom you plan to partner with now or in the future, include a description of the company, their success at achieving SBIR/STTR funding from a federal agency, and their success at commercializing products comparable to what is expected to be produced from the proposed program. Applicants may also identify their own small business, if applicable, for which to submit the SBIR or STTR application. Contact RSD for a list of relevant small businesses doing work on the products or technologies in which you are interested and who have been successful in achieving NIH SBIR/STTR funding by sending an email to robbyngil@usc.edu. Include a letter of support from the small business with this application. Please note that a company founded by the applicant is a suitable partner, as long as it meets the SBA definition of a small business as defined on the SBA [website](#) and in the [SBA Eligibility Guide](#).
- l) **Active Funding**: List all sources of active internal and external support awarded during the past five years, current or pending, for the PD(s)/PI(s) and key personnel. For each source, specify who on this proposal was involved, their role on the project, title of the award, period, award amount, and sponsor (including subagency).
- m) **Letter(s) of Support**: Provide letters of support from a USC school and department head, as well as a letter of support from a small business with whom you would partner with now or in the future.
- n) **Federal Agency Review Documents**: Provide a copy of an NIH summary statement or other review document from a previous proposal submission to support the proposed research (as applicable).
- o) **Patents & Licenses**: Provide a list of invention disclosures, patents, and licenses (per PI) as a single PDF.
- p) **Scientific References** (not to exceed 1 page): This includes citations listed in the narrative.
- q) **Curriculum Vitae** (not to exceed 5 pages per PD(s)/PI(s)/key mentor): Applicants may use any standardized CV format (e.g., NIH Biographical Sketch, NSF Biographical Sketch, etc.).

GRANT CONDITIONS

R&I's awards and grant programs are administered by the Research Initiatives and Infrastructure (RII) office.

- At the time of being notified by RII that an award will be made and as a condition of funding, awardees will provide to RII the name, title, and email address of a USC senior business official who will establish an internal funding account in which RII funds for the award will be transferred. The account must be unique to this award with no additional funds added.
- Within one month of being notified by RII that an award will be made and as a condition of funding, awardees will provide RII with an account number and enable view access for the account, such that RII staff will be able to view the account balance. If this information is not provided to RII within this timeframe, RII may elect to rescind the award and use the funds to make an award to another applicant.
- Awardees commit to submitting a future application or applications to a funding opportunity (Funding Target) sponsored by a federal agency.

- Awardees commit to working to develop collaborations with venture capital firms, accelerators, incubators, small and large businesses, and foundations, to obtain support that will advance the commercial licensing of IP that results from research supported under this program.
- Awardees commit to working to develop collaborations with a small business to develop innovative solutions for the work proposed, in an application for funding under the Ming Hsieh Institute Research Award, that in turn can then be commercialized as new products and services or as improvements to existing ones.
- Prior to release of funds, all awardees will attend an in-person ceremony with R&I leadership.
- Failure to spend at least half of the awarded funds within six months of the project start date may result in the suspension of the remaining funds.
- Awardees have 12 months from the date funds are received to complete projects. Funds not expended by that time are returned to R&I to support other MHI research awards.
- The MHIRA is not intended to duplicate currently funded efforts or to provide interim bridge funding.
- This award will not provide financial support beyond the duration of the award and does not carry the opportunity for renewal.
- Awards are not transferable to other researchers or institutions. Recipients must be faculty of USC during the award period.
- Awards include fringe benefits but are not assessed Facilities & Administration Costs (formerly known as Indirect Costs).
- Awardees have discretion in the budgeting and re-budgeting of funds to meet their research needs within the guidelines of the fund and the terms of the proposal. However, funds may not be transferred to another project or other researchers or institutions.
- All USC rules, concerning conflict of interest, human subject research, animal research, etc., apply to projects funded under this program. Funding only will be provided following confirmation that all pertinent reviews have been submitted for approval by relevant committees (e.g., IRB, IACUC).
- Allowable budget expenses:
 - Postdocs/graduate/undergraduate student RAs/administrative personnel salary & fringe, excluding funding student tuition and other student-related fees
 - Materials & Supplies
 - Other expenses (equipment purchases require pre-approval)
- Non-allowable budget expenses:
 - Faculty salary & fringe
 - Student tuition and other student fees (such as health insurance).
 - Travel
 - Consultants
 - Subcontracts

SCIENTIFIC REVIEW CRITERIA

Applications will be reviewed by a standing committee of researchers with expertise relevant to the areas of proposed research. The committee will be convened yearly to review applications submitted to this program. Review criteria will be based on the following:

1. *Research Focus*: The research focus is on new and creative approaches and breakthrough interdisciplinary ideas that turn advances in engineering, computing, and science into treatments and cures for cancer.
2. *Potential for Big Rewards*: The proposed research entails big risks but offers big rewards. [Heilmeyer Catechism](#) questions are convincingly addressed.
3. *Scientific Expertise*: The applicant describes their relevant and necessary experience in research and administrative duties in direct relevance to the research focus area and regarding potentially leading to future research support and to the development of commercialized products.
4. *Commercialization Potential*: The applicant describes the current state of the market, as well as the commercialization, licensing and IP potential of the proposed technology or method. The DARPA-style one-page synopsis provides a compelling technical description and a compelling overview of the technical advantages, anticipated benefits and applications, business model, and work to date for the proposed project. The applicant identifies a small business partner (as applicable) and documents their track record in achieving SBIR/STTR funding from a federal agency, and their success at commercializing products comparable to what is expected to be produced from the proposed program. A letter of support from the small business included with this application would be highly desirable.
5. *Funding Target and Potential for Future Funding*: The application identifies an appropriate federal agency Funding Target, e.g., SBIR/STTR program, for future research support. A Funding Target expecting to yield a return on investment of at least 10x the funding requested has been specified, and this is an appropriate and realistic Funding Target based on the PD(s)/PI(s)/key personnel's expertise and funding history with the specific subagency sponsoring the Funding Target.
6. *Budget*: Reviewers will consider whether the budget and the requested period of support are fully justified and reasonable in relation to the proposed activities.

PROGRAMMATIC REVIEW

The MHI and RII will incorporate aspects of existing policies and procedures regarding funding decisions that are utilized by major federal funding agencies like NIH, i.e., proposals will be subject to scientific peer review and programmatic review. Programmatic review assures maximum efficiency for funding awards, strategic alignment with this program's and the MHI's and university's strategic research priorities, and maximum potential of achieving a goal of commercializing and licensing IP generated by the project. Ultimate funding decisions will be made based on both scientific peer and programmatic reviews.

DIVERSITY, EQUITY, AND INCLUSION

The MHI, R&I and RII strongly support a culture of diversity, equity, and inclusion. Proposals should incorporate meaningful DEI practices across the project team and proposed activities. This will be a consideration during programmatic review.

REPORTING AND ACKNOWLEDGEMENT OF SUPPORT

Awardees will be required to submit a one-page progress report, which will be due six months into the project period and at the point of project period completion. This report must detail scientific, financial, and research performance over the preceding months. Any and all publications arising from the must acknowledge the support of the *Ming Hsieh Institute for Research on Engineering-Medicine for Cancer*.

PROPOSAL SUBMISSION

Submit your proposal application utilizing the RII application submission and reporting portal. Go to <https://rii.usc.edu/funding/oor-portal/> to log in or create an account using your USC email address.

FURTHER INFORMATION AND PROGRAM CONTACT INFORMATION

We encourage inquiries to RII concerning this funding opportunity and welcome the opportunity to answer questions from potential applicants. For additional information or inquiries, please send an email to rii@usc.edu with “MHI Research Award” in the subject line.

APPLICATION CHECKLIST

- Award Program
- Brief Description
- Abstract
- Program Plan
 - Introduction
 - Scientific Expertise
 - Methodology
 - Patient Population
 - Outcomes
 - Prior Work
- Heilmeier Catechism Questions
- DARPA-Style Synopsis
- Budget and Budget Justification
- Return on Investment
- Grant Submission Commitment
- Innovation Ecosystem Commitment
- Commercialization Potential
- Active Funding
- Letter(s) of Support
- Federal Agency Review Documents (as applicable)
- Patents and Licenses
- Scientific References
- Curriculum Vitae

FREQUENTLY ASKED QUESTIONS

Q1: Can I request all of the available funding, or should I ask for an averaged amount based upon the number of anticipated awards and the funding? Could you fund more or less than the anticipated awards?

A1: The budget you submit will be subject to both a scientific peer and programmatic review. You are expected to provide a scientific justification for whatever budget that you request. We have deliberately avoided giving more specific advice or guidelines on the budget, to promote maximum flexibility, creativity, and innovation in submitted proposals. For these reasons, the number of anticipated awards is meant to be a general estimate to give applicants some sense of the scope of work. It is certainly the case that we could receive more (or less) applications that are specified; in addition, anticipated funding may be increased (or decreased) depending on the availability of MHI funding and other factors.

Q2: If my proposal is selected for funding, will I automatically receive my requested amount?

A2: Not necessarily. The budget is subject to scientific peer and programmatic review, and a recommended award may be for less than what was requested.

Q3: I am dissatisfied with my review. Can I rebut the review and get a new one?

A3: RII goes to considerable effort to ensure that the scientific peer review is fair and impartial. Constituting review committees and organizing reviews takes considerable time and effort. Thus, RII does not have the resources or a mechanism to re-review proposals.

Replace with
Company Logo

Note that final quad is not dense to be as
text dense as this template
Title from Proposal

Distribution Statement "A" (Approved for Public Release, Distribution Unlimited)
XYZ Technologies, Inc
999 Main Street, Anytown, WT 99999
Point of Contact: Vannavar Bush
E-mail: vbush@xyztech.com
Tel: 555-555-5555

Topic No.: SBXXX-00X
Contract No.: XXXXXXXXXXXX
DARPA Tech Office: XXO
Program Manager: Dr. John Doe
E-mail: john.doe@darpa.mil

Replace with product image, technical graphic,
systems diagram, etc.

Image should convey (in order of importance):

- What the tech is (a thing, method, design, ecosystem)
- Why it is useful COMPARED TO OTHER APPROACHES
- A sense of size, how it works, and where it operates

Image should be simple, clear and crisp.

Use colors only to highlight.

Legends and labels should be legible.

Technical Advantages:

- What does the technical approach offer, compared with other approaches that are used for the same ultimate ends? For example: "This technology overcomes a technical limitation to using digital methods, which are more flexible than an analog way of doing the same basic thing."
- Use this bullet to describe *why* the technology achieves or enables its advantages. For example: "High bandwidth allows digital methods to downsample to arbitrary frequencies, which is really hard to do using analog circuits."

Technical Description:

- What is the thing, physically? How will it be instantiated into physical form, and integrated with other things? For example: "Circuit diagrams, including interface and support features, designed to be integrated into ASICs or System-on-Chips."
- Use this bullet to describe *how* the technology achieves its advantages. For example: "Advanced CMOS technology nodes (<32 nm) enable beneficial physical scaling for improved power and performance."

Anticipated Benefits and Applications:

Military: Connect your technology to a military or governmental mission or need. Most technologies enable a previously nonviable approach to a particular problem or method to address that mission or need, so explain that connection. How is this changing given the competitive technological landscape, or to evolving modern missions or needs?

Commercial: How might your technology be used in the commercial sector? Does it provide cost savings to a mature industry, or does it enable new industries that do not yet exist? This section is strongest when tightly tied to the technical innovation – for example, "This technology would be useful for anyone who uses X to do Y, but also could enable stronger, better, or faster Z."

Business Model:

- How do you envision making money from your technology? E.g.,: "Technology available as a basic IP Core for integration into chipsets and systems, or as standalone hardware for particular applications."
- Who do you want to sell to? E.g.,: "Interest in working with commercial and DoD primes to define requirements for tailored applications."
- Ask / call to action. Who do you want to interact with for other (non-revenue generating) business reasons? E.g., "Interest in helping to define technology standards and solutions in new developing application space X."

Work to Date:

SBIR Phase I (or "Demonstration of Feasibility" for Direct to Phase 2) – Give a sense for results, measurements, theory, simulation, or analysis that gives basis for claims and performance metrics. For example: "Demonstrated test chips meeting a majority of the desired metrics; investigation of tradespace shows all metrics are achievable with modifications of existing designs"

SBIR Phase II or Direct to Phase II (as of DATE) – Give a sense for technical goals (e.g., metrics demonstrated by a prototype), and timelines for meeting those goals.

- Goal: Demonstrate operation < 100 mW
- Preliminary Design Review – November 20XX
- Critical Design Review – February 20XX
- Delivery to Government – May 20XX