

Energy Technology Innovation

Classification Code:

A -- Research & Development

NAICS Code:

541 -- Professional, Scientific, and Technical Services/541712 – Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)

Background

Chain Reaction Innovations was created at Argonne National Laboratory to address the critical national need to accelerate the applied research, development and deployment of physical-science based technologies (e.g., materials and manufacturing) capable of transforming the nation's energy systems. Acceleration of these technologies from scientific laboratory to potentially commercialize-able opportunities requires the simultaneous performance of collaborative research and development of technologies and the entrepreneurial development of the innovators working on these technologies.

Chain Reaction Innovations is an energy materials and manufacturing innovation program that serves as a platform for supporting and mentoring entrepreneurial researchers whose early-stage innovations are too challenging or technically uncertain to pursue in a venture capital-financed startup. Chain Reaction Innovations embeds innovators within a National Laboratory technology eco-system for up to two-years, working with innovators as they advance their early stage scientific discoveries to potentially commercialize-able opportunities within a discrete time period, enabling the translation of high-impact materials and manufacturing technologies through entrepreneurial mentorship and cooperative research and development. Technology innovators are selected into the program through an annual competition, which is the purpose of this solicitation. The Chain Reaction Innovations program intends to provide selected technology innovators with scientific/technical mentorship and access to unique R&D assets and scientific expertise at Argonne, a Department of Energy (DOE) national laboratory, to incubate and translate innovations from proof-of-concept to proof-of-product.

Opportunity

Chain Reaction Innovations, in partnership with business mentors, will help selected innovators in the physical sciences and energy technologies to mature their early stage innovations. As part of Chain Reaction Innovations, the Department of Energy will directly fund Argonne to work with each selected innovator to develop their technology. Additionally, the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) will provide an Oak Ridge Institute for Science and Education (ORISE) fellowship to the selected innovators for the first year, with the possibility for support for a total of up to 2 years through this program. It is expected that the period of fellowship support of the innovator to be coincident with the period

of performance for the supported research at Argonne. Argonne is presently looking for up to four to five innovators for its second cohort of the Chain Reaction Innovation program.

Additional benefits to selected innovators may include:

- Up to 2 years of Chain Reaction Innovations resources (subject to performance & availability of funding) including the following:
 - Personal stipend, travel allowance, and health benefits through ORISE fellowship;
 - Lab space & technical collaboration support from Argonne National Laboratory; and
 - Chain Reaction Innovations programming and mentorship.
- Continued benefits after “graduating” for up to 5 years in total (innovators will graduate after the earlier of 2 years in the program or upon raising \$2M in cumulative private-sector funding, whichever is earlier) and may include the following:
 - Continued technical collaboration support from Argonne National Laboratory through Cooperative Research and Development Agreements (CRADA) on a pay-in basis;
 - On-site Chain Reaction Innovations lab occupancy on a pay-in basis; or
 - Access to Chain Reaction Innovations programming on a pay-in basis.

Each of the above is contingent upon availability of funds and personnel, negotiation of a mutually agreeable scope of work, as well as DOE approval.

Application Materials

Innovator applicants must submit the following materials:

- **You** (page 1): Provide the back story on you and your project. Where did the idea originate? What is the current status of your technology and team? Why do you want to pursue this effort and what makes you qualified to do so?
- **Your vision** (page 2-3): Describe the technology concept you want to pursue. Use the Heilmeyer catechism as a guide for what’s most relevant. Please also comment on the potential for impact on U.S. energy and manufacturing competitiveness.
- **Why Chain Reaction?** (page 4): What most attracts you to the Chain Reaction Innovations program? Why would this be the ideal home for you and your project (vs. alternative paths)? Which people or facilities at Argonne National Laboratory would be particularly valuable in supporting your work?
- **Your business idea** (page 5): Briefly describe how you envision making your technology a market reality. Please describe the market you intend to reach, its customers, potential suppliers/distributors/manufacturers, relevant intellectual property (and identification or

status of any licenses, per the Eligibility requirements below), barriers to entry, sophistication of market, market incumbents, etc.

- **Any Affiliation with Argonne National Laboratory:** Please identify whether you or your company have any affiliation with Argonne National Laboratory, its operator UChicago Argonne LLC, or the University of Chicago. If there is no affiliation, please indicate that as well.
- **What else?** (page 6) An extra page. Your call.
- **Resume:** Please append to the same PDF file a one-page resume for each innovator.
- **Innovation Partner:** Please identify the name of any other innovators who may be applying for participation in Chain Reaction Innovation that you wish to consider as an innovation partner.

Applicants should email an application as a pdf attachment to chainreaction@anl.gov.

Eligibility

In order to be considered, the applicant must meet each of the following criteria:

- Applicants apply as individuals, not as companies or organizations.
- Technical leads must:
 - Possess a minimum of 5 years technology R&D experience;
 - Be a first time technical founders; and
 - Be either a U.S. citizen or a permanent resident.
- Must be focused on an advanced materials- or manufacturing-based energy technology.
- Must have the potential for broad impact that aligns with EERE's mission to advance the national, economic, and energy security of the United States.
- Individuals may apply. Incorporated entities may not apply, though individuals that apply may have incorporated entities.
- Innovators who have raised more than \$1M in private-sector equity are not eligible to receive support under this program. Employees of Argonne National Laboratory are not eligible to (receive support under this program). (Employees of Argonne National Laboratory are not eligible to participate in Chain Reaction Innovations as innovators while they are directly employed by Argonne National Lab. Innovators may be Argonne employees at the time of application. However, in order to participate, Argonne

employees must take Entrepreneurial Leave or terminate their employment with the Laboratory.)

Selection Process and Criteria Selected applicants will be evaluated based on the following criteria:

- **Project Leader(s) (60%):** We are looking for the very best outcome-oriented, entrepreneurial technical innovators who have the drive and ability to build a foundational technology vision and lead a team in its development. The ideal candidate would exhibit exceptional:
 - Technical strength (detailed knowledge, conceptual depth and breadth)
 - Outcome orientation (problem-based and system level thinking, risk evaluation, and commercial awareness)
 - Personal excellence (passion and drive, resourcefulness, management & communication skills, personal integrity, team orientation, ability to rapidly learn and adapt)
- **Project Concept (40%):** While ideas may evolve, we want to ensure that the initial project concept is technically sound, reasonably differentiated, and addresses a well-framed problem with significant long-term impact potential. The ideal project would exhibit exceptional:
 - Impact on U.S. energy economy (potential for large-scale impact, techno-economic feasibility, credible path to impact with viable entry markets)
 - Technical merit (technical feasibility, differentiation, clear risk mitigation plan)
 - Business idea (market research, customer/supplier/distributor evaluation, establishment/identification of intellectual property, understanding of the market including: barriers to entry, sophistication of market, market incumbents, etc.)
 - Chain Reaction Innovation fit (basic materials science and/or manufacturing technology, Chain Reaction Innovation support would drastically change timeline/probability of success, alignment with lab resources and expertise, ability to work well with or in a national lab and/or research institution)
- Projects must have potential for long-term impact in enabling materials and manufacturing solutions that advance the Department of Energy's mission to create reliable, clean, and affordable energy solutions that advance the national, economic, and energy security of the United States.

CRI operates as an open science project, and all selected innovators' projects must be consistent with that requirement. Accordingly, CRI is unable to accommodate projects that will be or may

become subject to export control, ITAR or other restrictive classifications. During the selection process, each applicant's proposal may also be screened for export control or ITAR concerns. Applicants should remove any potentially export controlled information from their proposal.

All applicants will be reviewed by Argonne National Laboratory, and must be selected by a Federal Official from DOE's Office of Energy Efficiency and Renewable Energy.

Nature of the Partnership with Argonne

Selected innovators will contract with the Laboratory through standard non-negotiable CRADAs approved by the Department of Energy. The work may be divided into two phases, a Scope and Planning Phase (budget period one) followed by a Research and Development (R&D) phase (budget period two).

Scope and Planning Phase:

During the Scope and Planning Phase (typically less than 6 months), the innovator will work at the Lab and will undertake paper-based analysis such as performing market studies, refining the scope of their research project with Argonne personnel, surveying the intellectual property landscape of their technology, and other activities designed to increase the chance of success in the subsequent R&D Phase. Since no hard R&D is allowed in this phase, background Intellectual Property (IP) will not be of concern. Innovators are expected to develop an Intellectual Property (IP) Management Plan as part of the Scope and Planning phase (budget period 1), subject to the appropriate DOE Technology Manager's approval with concurrence from DOE Patent Counsel, before proceeding to the R&D phase (budget period 2). The IP Management Plan should identify and provide a path for obtaining any background IP rights, if necessary, that may be needed to perform R&D work under the CRADA and commercialize their technology.

In some cases, this phase may be short or not needed at all.

R&D Phase:

Once the Scope and Planning phase has been completed (or if it is not needed), the R&D Phase of the project can proceed (subject to DOE approval).

Please note that as with any other cooperative research and development project conducted with a National Lab, an innovator's failure to abide by its DOE approved IP Management Plan could result in delayed work, deferment or removal from the program. Please note that selected innovators do not have any rights to Lab or third party background IP by virtue of selection or participation in this program. If an innovator requires any Lab background IP they should reach out to the Lab's technology transfer office.

Business Mentorship

Selected innovators will be encouraged to engage with a business mentor organization that meets the qualifications set by Chain Reaction Innovations soon after joining the program. Business

mentors are encouraged, but not required for participation in CRI. Innovators can have mentors outside of the program. However, for a mentor to be considered a designated Chain Reaction Innovations mentor, they need to be qualified by Argonne through the business mentor solicitation process.

For additional information please see

https://www.fbo.gov/index?s=opportunity&mode=form&id=48de4596aac5b221662d3b7231a50157&tab=core&_cview=0

Conflict of Interest Statement

Any work in connection with Chain Reaction Innovations must comply with Argonne's Prime Contract, as well as applicable policies – including those pertaining to the avoidance of apparent or actual conflicts of interest. Innovators who have an affiliation with Argonne National Laboratory, its operator UChicago Argonne LLC, or the University of Chicago will be subject to an organizational conflict of interest management plan. Please see <http://chainreaction.anl.gov/about/faq/> for more information.

Proprietary Application Information – Trade Secrets, Commercial or Financial Information

For information about identifying and protecting proprietary information in your application, please see <http://chainreaction.anl.gov/about/faq/>.

Intellectual Property Including Innovations, Inventions and Patents

The Laboratory has no claim to any background intellectual property that you bring to the program. Selected applicants will be granted certain rights in data, copyrights and patents that innovators create in the course of the program, pursuant to the terms of the CRADA between Argonne and the successful applicants. A copy of the CRADA can be found at <http://chainreaction.anl.gov/wp-content/uploads/sites/68/2016/10/CRI-Short-Form-CRADA-2016-9-2.pdf>.

As a general matter:

1. Selected applicants will have the ability to designate generated information as protected for a period of not more than five years (subject to a government right to use such data for government purposes).
2. Selected applicants may copyright and publish (consistent with appropriate national security considerations, if any) material developed under the CRADA (also subject to a royalty-free license to the government).
3. Selected applicants may retain the principal worldwide patent rights to any invention the applicants develop under the CRADA, subject to a reserved government use license and other limitations that can be found in the Code of Federal Regulations, 37 CFR 401. For inventions developed by Argonne under the CRADA, selected applicants will not own

the invention, but will instead have an option for up to an exclusive license to such Argonne inventions for the term of the CRADA plus six months.

4. An IP Management Plan is established by participants in this program in order to establish clear and transparent set of mutual expectations for management of both the background and subsequently developed intellectual property relevant to the proposed activities.