

Johns Hopkins University Institute for Assured Autonomy (IAA)

Call for Proposals (CFP)

December 19, 2022

Deadline for Notification of Intent to Propose: January 31, 2023

Deadline for Proposal Submission: May 1, 2023

Anticipated Award Start Date: June 2023

Award Duration: Up to 18 months

Award Amount: Up to \$150K

Anticipated Number of Awards to be Granted: Up to 6

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The Johns Hopkins University Institute for Assured Autonomy (IAA) announces a funding opportunity to build interdisciplinary research teams across the Whiting School of Engineering (WSE), the Applied Physics Lab (APL), and other JHU divisions that will develop ideas for large, high-impact projects focused on existential challenges of assured autonomy. The purpose of this seed funding opportunity is to attract and support interdisciplinary research teams that will fully develop their research ideas and pursue large external funding opportunities (e.g. >\$10 million).

Successful submissions to this call for proposals (CFP) will:

- Identify critical challenge(s) that inhibit the rapid, safe, secure, ethical and responsible introduction of autonomy.
- Propose innovative and high-impact conceptual approaches to overcome those critical challenges in an exemplar domain.
- Outline a clear strategy and timeline for engaging one or more specific external funding sources.
- Thoughtfully assess the risks and competitive landscape associated with the strategy for external funding. There is an expectation that ambitious proposals will carry a higher level of risk.
- Provide a proposed budget and describe desired non-financial support from IAA.
- Identify a core interdisciplinary team consisting of a lead PI, co-PI(s) and an initial team committed to building the program.

The fundamental mission of IAA is to ensure the safe, secure, reliable, responsible, and ethical integration of autonomous systems into society. As humans, we have a habit of building artifacts based on technology that we don't completely understand and integrating them into systems and communities that are not entirely prepared for (or even welcoming of) them. The early days of the steam engine, ship building, and even pyramid construction were marked by failures stemming from an imperfect or non-existent understanding of basic principles, ignorance of important failure modes of the engineered system, and an abundance of unintended consequences when these technologies were integrated into human society. We have collectively embarked on another round of 'early implementation' with autonomous systems. We are already building autonomy into

our transportation systems, our healthcare systems, our financial systems, our energy infrastructure, and our homes, yet there are many things that could go wrong, both technically and societally. Addressing the critical challenges of assurance will help us prevent or mitigate these failures while realizing the full potential of the technology.

Autonomy is emerging as a strategic advantage for nations, a competitive advantage for businesses, and a life-improving technology for individuals. Assured artificial intelligence (AI) and autonomy will play a key role in protecting our critical infrastructure, from our water and energy systems to our food supply chains. Autonomy and AI have the potential to fight climate change by optimizing our energy usage and reducing fossil fuel consumption. Autonomous health systems can provide life-saving anomaly detection and interventions. Autonomous military systems have the potential to help our nation defend against unprecedented existential threats. However, introduction of these new applications of AI and autonomy are throttled by the lack of assurance that these systems will function safely, reliably, securely and ethically at both the individual and societal levels. Consequently, improving our ability to develop assured autonomy will greatly accelerate realization of these benefits.

Therefore, the purpose of this call for proposals is to provide seed funding to develop ambitious multidisciplinary foundational and applied research ideas that will help overcome the critical assurance challenges many autonomous systems face, thus enabling society to fully realize the benefits of autonomy. These research ideas will form the basis of large-scale proposals (e.g. >\$10 million) to external funding sources which could include government, industry, and philanthropic organizations.

Examples of external funding mechanisms include, but are not limited to (footnotes are examples):

- NSF AI Institutes¹
- NSF Engineering Research Centers²
- DoD Multi-University Research Initiatives³
- DoD and other government research and development agencies^{4,5}
- NASA⁶
- DARPA⁷
- Industry consortia^{8,9}
- Industry investment¹⁰
- Philanthropic gifts^{11,12}

This will be a highly collaborative process in which the seed-funded teams and IAA leadership will work together to ensure that the teams have the support and flexibility to pursue major external

¹ <https://beta.nsf.gov/funding/opportunities/national-artificial-intelligence-research>

² <https://www.nsf.gov/pubs/2022/nsf22580/nsf22580.htm>

³ <https://govtribe.com/opportunity/federal-grant-opportunity/fy23-dod-multidisciplinary-research-program-of-the-university-research-initiative-muri-n0001422sf002>

⁴ <https://www.nre.navy.mil/work-with-us/funding-opportunities>

⁵ <https://www.arl.army.mil/collaborate-with-us/>

⁶ <https://science.nasa.gov/researchers/sara/grant-solicitations>

⁷ <https://www.darpa.mil/work-with-us/opportunities>

⁸ <https://iucrc.nsf.gov/>

⁹ <https://energy.mit.edu/>

¹⁰ <https://ai2ai.engineering.jhu.edu/>

¹¹ <https://snfagora.jhu.edu/>

¹² <https://cset.georgetown.edu/>

opportunities in this space. In addition to providing financial resources, IAA will also support the funded teams in other ways such as identifying mentors, making introductions, facilitating external engagement, and supporting proposal writing.

The resulting external proposals will be submitted through IAA and supported by the IAA financial and contract team.

Proposal Requirements:

Eligibility and Principal Investigators:

These seed-funding awards are available only to members of the JHU community. Each proposal to IAA will require at least one PI each from APL and from WSE. Additional PIs from other divisions of JHU are encouraged. One of the PIs from APL or WSE will be designated as the lead PI and all others will be designated as co-PIs. Upon conclusion of the IAA grant, the lead PI will be responsible for serving as the organizing PI and for submitting a large-scale proposal to an external funding organization with the co-PIs.

Deliverables and Requirements:

This round of IAA seed funding will be structured similar to a planning grant, where the primary deliverable will be the submission of a large-scale funding proposal to an external funding source. Examples of large-scale funding proposals include NSF AI Institutes, NSF ERC, DoD R&D agencies, other government research agencies, DoD MURI, industry consortia, large philanthropic gifts, etc. If possible, teams should identify the specific funding opportunity to which they will be submitting. In other cases, teams will develop unsolicited proposals either for a specific funding agency or will develop a proposal for bringing together multiple funding partners, such as an industry consortium.

For external funding proposals on which WSE is lead, proposals will be submitted directly through IAA. For external funding proposals on which APL is lead, the funded teams will work with IAA leadership to determine the best avenue for proposal submission.

Funding Limit:

- IAA proposal requests will be considered up to \$150K, which includes indirect costs.
- Funding can be used for salary, necessary travel, convenings, support staff, and indirect costs.

Timeline:

- Notifications of intent (NOI) to propose to this CFP must be submitted by January 31, 2023.
- Funding for APL participation in developing CFP proposals will be allocated to teams based on the NOI after review, no later than February 10, 2023.
- Proposal applications to this CFP must be submitted by May 1, 2023.
- The start date for the awards is anticipated to be June 2023.

- During the period of performance, funded teams will identify and prepare for specific external funding opportunities. External funding proposals are expected to be submitted no later than calendar year 2024.

Notification of Intent to Propose Preparation Guidelines:

Notifications of intent to propose must include the following in this order:

- **Team Leadership:** Identify the lead PI and anticipated co-PI(s) and founding team membership.
- **Abstract:** A 1-2 paragraph abstract outlining the key ideas and potential external funding opportunities.

Proposal Preparation Guidelines:

Proposal applications must include the following in this order:

- **Team Leadership:** Identify the final lead PI and co-PI(s) as well as the founding team membership.
- **Abstract:** The abstract should be only 1-2 paragraphs long. The abstracts should not be too technical and not be taken directly from the text of the proposal.
- **Text:** These proposals are reviewed by an interdisciplinary team so it is best to avoid jargon and lengthy technical narratives. Reviewers will be looking for clear descriptions of your critical assurance challenges and multi-disciplinary approaches for addressing these challenges. A page limit of 6 pages will be strictly enforced. Abstract, graphics and references are not included in this limit.
- **Target External Funding Opportunities:** Each proposal to this CFP will identify and engage one or more external funding opportunities for which a large-scale external proposal will be developed.
- **Budget:** Provide a budget through the IAA financial team that shows proposed expenditures including anticipated monthly expenditures including indirect costs at APL, WSE and any other divisions as appropriate. The budget period is 18 months with an expected start date of June 2023.
- **Budget Justification:** A detailed justification is required to support all costs listed in the budget. Please use the budget template that will be provided to you.
- **Non-Financial Support Requests:** Identify additional requests for support from IAA such as identifying mentors, introductions, communications and graphics, etc.
- **CV:** The PIs should each provide a current CV of no more than two pages.

Proposal Review Criteria:

Proposals will be reviewed according to the following criteria.

- Identification of critical challenge(s) that inhibit the rapid, safe, secure, ethical, and responsible introduction of autonomy.
- Innovative and high-impact conceptual approaches to overcome those critical challenges in an exemplar domain.
- Clear strategy and timeline for engaging one or more specific external funding sources.

- Thoughtful assessment of the risks and competitive landscape associated with your strategy for external funding. There is an expectation that ambitious proposals will carry a higher level of risk.
- Identification of a core interdisciplinary team consisting of a lead PI, co-PI(s) and an initial team committed to building the program.

Watch for the FAQ for additional instructions and advice regarding this solicitation.

Proposals and questions on the Call for Proposals should be directed to the IAA Research Director:

David Silberberg, david.silberberg@jhuapl.edu

IAA Leadership Information:

- James Bellingham, Executive Director, jbellingham@jhu.edu
- Cara LaPointe, co-Director (APL), cara.lapointe@jhuapl.edu
- Anton Dahbura, co-Director (WSE), anton.dahbura@jhu.edu