



Research Announcement
Young Faculty Award
Microsystems Technology Office

DARPA-RA-13-08

5 December 2012

Table of Contents

Part I: Overview Information..... 3

Part II: Full Text of Announcement..... 4

 Sec. I: FUNDING OPPORTUNITY DESCRIPTION 4

 A. Technical Topic Areas 5

 Sec. II: AWARD INFORMATION..... 12

 Sec. III: ELIGIBILITY INFORMATION 13

 A. Eligible Applicants..... 13

 B. Cost Sharing/Matching 15

 C. Other Eligibility Criteria..... 15

 Sec. IV: APPLICATION AND SUBMISSION INFORMATION 15

 A. Address to Request Application Package..... 15

 B. Content and Form of Application Submission..... 15

 Sec. V: APPLICATION REVIEW INFORMATION 23

 A. Evaluation Criteria 23

 B. Review and Selection Process 24

 Sec. VI: AWARD ADMINISTRATION INFORMATION..... 25

 A. Selection Notices 25

 B. Administrative and National Policy Requirements..... 25

 C. Reporting..... 29

 D. Electronic Systems..... 30

 Sec. VII: AGENCY CONTACTS 30

 Sec. VIII: OTHER INFORMATION 30

 A. Intellectual Property..... 30

 B. All Proposers – Patents 32

 C. All Proposers – Intellectual Property Representations 32

Part I: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title** – Young Faculty Award (YFA)
- **Announcement Type** – Initial Announcement.
- **Funding Opportunity Number** – DARPA-RA-13-08
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910 Research and Technology Development.
- **Dates**
 - Posting Date: 5 December 2012
 - Proposal Due Date: 5:30pm ET, January 21, 2013
 - Estimated period of performance start: April 30, 2013
- **Concise description of the funding opportunity:** This RA solicits ground-breaking single-investigator proposals from junior faculty at universities and their equivalent at non-profit research institutions for research and development in the specific areas of Science, Mathematics and Engineering of interest to DARPA's Microsystems Technology Office (MTO) and Defense Sciences Office (DSO).
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Anticipated funding Type** – 6.1
- **Types of instruments that may be awarded** – DARPA intends to award grants to eligible university faculty and nonprofit research organizations; each grant will encompass funding for a 24-month base period consisting of two 12-month phases (a maximum of \$250,000 per 12-month phase) and a 12-month option period (a maximum of \$500,000).
- **Any cost sharing requirements** – None.
- **Agency contact**

The RA coordinator for this effort can be reached via electronic mail:
DARPA-RA-13-08@darpa.mil

DARPA/MTO
ATTN: DARPA-RA-13-08
675 North Randolph Street
Arlington, VA 22203-2114

PROPOSERS ARE CAUTIONED THAT EVALUATION RATINGS MAY BE LOWERED AND/OR PROPOSALS REJECTED IF PROPOSAL PREPARATION (PROPOSAL FORMAT, CONTENT, ETC.) AND/OR SUBMITTAL INSTRUCTIONS ARE NOT FOLLOWED.

THOSE INTENDING TO SUBMIT A PROPOSAL FOR AN ASSISTANCE INSTRUMENT (GRANT OR COOPERATIVE AGREEMENT) ARE STRONGLY ENCOURAGED TO READ THE INSTRUCTIONS PROVIDED AT SECTION IV(B)(6) REGARDING THE TIME REQUIRED TO RECEIVE VALIDATION OF SUBMISSIONS MADE THROUGH GRANTS.GOV. PROPOSALS THAT ARE VALIDATED AFTER THE PROPOSAL DUE DATE/TIME WILL BE CONSIDERED LATE AND, AS SUCH, WILL NOT BE REVIEWED.

Part II: Full Text of Announcement

Sec. I: FUNDING OPPORTUNITY DESCRIPTION

The Defense Advanced Research Projects Agency (DARPA) often selects its research efforts through the Research Announcement (RA) process. The RA will appear on the Grants.gov website at <http://www.grants.gov/>. The following information is for those wishing to respond to the RA.

The DARPA Young Faculty Award (YFA) program aims to identify and engage rising stars in junior faculty positions in academia and equivalent positions at non-profit research institutions and expose them to Department of Defense (DoD) and National Security challenges and needs. In particular, YFA will provide high-impact funding to elite researchers early in their careers to develop innovative new research directions in the context of enabling transformative DoD capabilities. The long term goal of the program is to develop the next generation of scientists and engineers in the research community who will focus a significant portion of their future careers on DoD and National Security issues.

This RA solicits ground-breaking single investigator proposals for research and development in specific technical areas of interest within Physical Sciences, Engineering, Materials, Mathematics, Biology, Computing, Informatics, and Manufacturing of interest to DARPA's Microsystems Technology Office (MTO) and Defense Sciences Office (DSO). Further detail regarding technical areas of interest can be found in the Technical Areas topics list. Proposals that fail to respond directly to a Technical Area will be considered nonresponsive.

Proposals responding to this RA should clearly describe the DoD problem being addressed, the current state-of-the-art technology, new insights to address the problem, a credible research plan and schedule, and critical, quantitative milestones to be pursued over each 12 month phase. Proposers should familiarize themselves with and address the Heilmeier Catechism in responding to this RA.

Proposed research should focus on innovations that will enable revolutionary advances in the selected topic area. Proposals that fail to respond directly to a Technical Area will be considered nonresponsive. High-risk/high-payoff ideas that could potentially transform a field or technology are strongly encouraged. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

Proposals that offer only incremental advances upon existing R&D and technologies will be deemed nonresponsive to this RA.

This solicitation is limited to participation by young investigators as defined in the Eligibility Information, Section III. The RA seeks proposals for a research activity consisting of a 24-month base period broken into two 12-month phases with a maximum funding level of \$250,000 per phase (\$500,000 maximum total funding for the 24-month base period).

For exceptional YFA project performance over the 24-month base period, up to 4 YFA performers will be awarded a “Director’s Fellowship” with a maximum of an additional \$500,000 in follow-on funding for an additional 12 month period. Applicants should include a short summary of proposed follow-on work for the Director’s Fellowship in responding to this RA; if selected as a Director’s Fellow the proposed follow-on work will be updated as necessary prior to the start of the 12-month option period.

Proposals should include a 24-month base period consisting of two 12-month phases accompanied by a short summary of the proposed follow-on work for the 12-month option period. A cost proposal must be included for the 12-month Director’s Fellowship option. During the second 12-month phase of the base YFA program, the performers who are nominated to receive the Director’s Fellowship may be required to update their proposals (including costs) to reflect expected future technical tasks based off of the actual progress made previously.

During the 24-month base period, a number of visits/exercises at a variety of DoD sites and facilities will be scheduled. These briefings and visits will provide YFA recipients a unique, first-hand exposure to DoD personnel and technologies in the field, issues faced by the Services in execution of their missions, and current National Security challenges. It is expected that YFA recipients will participate in a subset of the visit/exercises made available to them. Participation in all such opportunities is not a requirement; however, lack of participation may impact the award of the Director’s Fellowship. Proposers are expected to include funds for such visits within the total budget of their proposal.

The proposals will be reviewed by panels of Government experts. The proposal review process is expected to be very competitive and highly selective.

A. Technical Topic Areas:

This RA solicits single investigator proposals for research and development in the specific technical areas of interest to DARPA’s Microsystems Technology Office (MTO) and Defense Sciences Office (DSO) articulated below. **Proposers must specify ONE and only one of these topic areas for their proposal and identify this on the cover page.** Note: DARPA reserves the right to assign proposals to a different topic area than that which was indicated by the proposer.

Applicants who have questions about specific topic areas should email DARPA-RA-13-08@darpa.mil with the topic area stated in the subject line. Your question will be distributed to the appropriate contact.

Proposers are encouraged to review the DARPA mission statement and current program descriptions at the DARPA website <http://www.darpa.mil/> to view examples of current DARPA investments. This is not meant as instruction to duplicate those efforts, but rather to illustrate that current programs are aimed at research which will substantially advance our capabilities in these areas. Once awards are made, each YFA performer will be assigned a DARPA Program Manager with interests closely related to their research topic. The Program Manager will act as project manager and mentor to the YFA performer.

Once again: Proposers should familiarize themselves with and address the Heilmeyer Catechism in responding to this RA. Proposals that offer only incremental advances upon existing R&D and technologies will be deemed nonresponsive.

1. Expanding the language of biology

The diversity of products that can be generated biologically is constrained by the relatively limited number of proteinogenic amino acids and by the handful of elements from the periodic table available for use by biology. However, there are many valuable materials, chemicals, and therapeutics not made by nature (i.e. non-natural products) whose production via biological synthesis would be beneficial. DARPA seeks novel and transformative approaches for expanding the natural language of biology while still harnessing the power of biological machinery for the predicted and targeted synthesis of new, functional materials—in particular those that are difficult or impossible to produce through known synthetic methods.

Expanding the language of biology will entail integrating a wider palette of elements from the periodic table (i.e. those not typically used by biological systems) and increasing the library diversity and incorporation of non-natural amino acids (NNAAs) at high efficiencies for utilization in biologically-based production. While numerous examples of NNAAs have been developed and there has been some progress in incorporating NNAAs into proteins, demonstrations and benefits have largely been limited to laboratory scales, constrained in part by inefficient and inaccurate incorporation and toxicity to the host organism.

The enhanced biological language coupled with the efficiencies and precision inherent to biological machinery should be geared towards developing new functional materials (e.g. polymers, electronic materials, solid-state nanomaterials, chemicals, therapeutics, catalysts, etc.) through new structures, chemistries and tunable material properties and should open up the possibility of enabling the directed evolution of new functionalities.

Proposers should explicitly address how their proposed approach is new, addresses the limitations of the state of the art (SOA), and will result in a transformative capability beyond SOA today—particularly if the proposed approach includes incorporation of NNAAs.

2. Next generation thermal interface materials

DARPA seeks innovative thermal interface materials capable of providing a thermal resistivity of less than 10^{-3} cm² K/W with epoxy-like shear modulus.

In many DoD applications, the need for reworkability and high reliability has resulted in the thermal resistance of the thermal interface materials (TIM) being a substantial portion of the total thermal resistance from device to the cooling fluid. Consequently, the increased power consumption of DoD electronics have required significant TIM improvements. While solder TIMs do offer high thermal conductivities and low thermal interface resistances, their mechanical stiffness makes them inappropriate for use across interfaces between materials with large differences in thermal expansion coefficients, due to the risk of delamination and chip cracking. Epoxy-based TIMs are more compliant, but their relatively low thermal conductivity

and poor thermal transport across the boundaries between the epoxy and the surrounding materials in the system pose a significant thermal barrier to high power operation.

Current DARPA efforts are investigating TIMs with extremely low, solder-like thermal resistance along with high, epoxy-like mechanical compliance with the goal of providing 10^{-2} $\text{cm}^2 \text{K/W}$. This effort seeks to advance state-of-the-art TIMs by reducing the thermal resistance by another factor of 10, without compromising the mechanical compliance of the TIM.

3. Applications of nonlinear dimensionality reduction in bioinformatics

Biological systems are inherently non-linear in many respects. Traditional approaches in the biological sciences toward measuring and reporting biological experimental information have relied primarily on fixing variables within the confines of a linearity in order to apply linear statistics. This approach means that non-linearities tend to be ignored or improperly analyzed.

Analysis of biological information is further confounded by the fact that data are retrieved from many different sources and categories. Imaging, textual, and physical data may all be obtained in a standard biomedical experiment and yet most analyses are performed taking each data type independently rather than in concert. Phenomena that involve co-variant but heterogeneous data are difficult to represent in a purely analytic capacity. For instance, the emotion of anger, while clearly visible on face images, functional magnetic resonance imaging (fMRI) images, heart rate variability data, mean pore diameter, pupillary dilation, and core body temperature, remains difficult to objectively quantify.

Research proposals should be designed around DoD relevant biomedical research questions where nonlinear dimensionality reduction should in theory provide added insights into the diagnosis, treatment, or quantization of a given state, including pathological and/or human performance related states. Ideally, proposers will apply at least three methods of any given problem and provide a rationale as to the selection of these methods insuring that specific weaknesses of any one approach are mitigated in the application of the additional approaches. Analysis of information already residing in existing biomedical databases is encouraged.

4. Probabilistic and approximate computing

As we move to sub 20 nm processes, device behavior is becoming increasingly variable and probabilistic. In addition, single event upsets (SEUs) are becoming more commonplace. Other problems include differential aging as well as the presence of defects that are not detectable during test and burn-in.

Applicants to this topic should propose new approaches for tolerating and correcting these problems in one of the following areas: 1) characterizing the degree of variation and soft errors in highly scaled devices; 2) techniques, operational at both the hardware as well as the software level, for correcting for soft errors, probabilistic variation, and approximate results; 3) enhanced CAD tools for designing with probabilistic varying devices and soft errors; 4) techniques for exploiting probabilistic components in the processing of sensor data, such as hardware assisted

probabilistic inference; and 5) new kinds of devices that both leverage and control probabilistic variation.

5. Circuit design using discretized post-CMOS transistors

DARPA seeks innovative experimental and theoretical research leading to circuit architectures which leverage the discretized nature of multiple post-CMOS devices.

It has been observed that a preponderance of charge-based post-CMOS switch candidates deliver current in small discrete, quantized units, owing to the nature of their structure. Examples include Carbon Nanotube FETs (CNFETs), Gate-All-Around Silicon Nanowires (GAA-SiNWs), and FinFETs. Current circuit design techniques require however that large multiples of these units be used to provide drive currents needed to support the prevailing static combinatorial CMOS topologies in use.

This project seeks to find circuit topologies and logic evaluation mechanisms which enable logic transactions to be retired using a single or a low number of discrete devices. Innovations may include the use of alternative circuit families that reduce Miller capacitance, source-follower effects, GIDL, and NCE effects; improved interconnect schemes; or ways of reducing parasitic capacitance. Exemplary alternative circuit families might include Dominos, Cascode Voltage Switching, ZipperCMOS, NORA Logic, or Pass-transistor logic. Many of these proposed devices also exhibit intrinsic non-volatility, which presently is also not yet exploited within existing logic structures.

Target applications relevant to the military include the dramatic reduction in the size, weight, and power (SWaP) of microelectronic devices for use in field appliances; and in the reduction of RF emanations to mitigate unintended data leakage to improve security.

6. Fusing the synthetic with the biological to transduce episignals for enhanced function

Advances in technology are demonstrating unprecedented integration between synthetic and biological systems, enabling mechanical, electrical, optical and other information transfer to/from biological systems at a variety of length scales (e.g. cells, tissues, human body).

DARPA seeks unconventional approaches to developing hybrid synthetic/biological systems to controllably actuate novel/new signals (episignals) transduction.

Multiple implementation modes are envisioned for realizing hybrid systems through the seamless integration between synthetic and biological components (whether at the level of biological machinery, cells, tissues, or organisms). Specifically, synthetic systems designed to allow biological entities to accept new sensory information through non-natural transduction mechanisms (e.g. electroreception, detection of optical wavelengths outside of the natural range of an organism, haptics, etc.) are of interest. Such systems may require supporting

methodologies/technology to ensure the additional processing burden does not overwhelm the host; therefore additional considerations into methods that can augment the connection between sensory input and processing should be considered.

Contra-wise, DARPA is also interested in fusing biological and synthetic components to augment the function and/or performance of synthetic systems.

In all implementations, the fundamental challenge of developing epigenal transduction mechanisms and the accompanying enhancements to existing information processing methods are paramount.

The new hybrid approaches combined with a mechanistic understanding may lead to new capabilities in information processing, sensing, robotics, regenerative medicine and other biomedical applications.

7. Supervised autonomy

Many of today's defense robots (for example, Explosive Ordnance Disposal robots) are tele-operated, enhancing protection by providing action at a distance. Although these robots help to remove their operators from danger, they do not usually improve productivity. In fact, in some cases they lower productivity, as tele-operators usually have worse situational awareness and less control fidelity than is typical for direct observation and action.

DARPA's Autonomous Robotic Manipulation (ARM) program, Legged Squad Support System (LS3) and the DARPA Robotics Challenge (DRC) are exploring greater autonomy in robotics with the purpose of improving productivity as well as protection. In ARM, robots are given task-level instructions instead of motion commands to command grasping and manipulation (e.g. "unlock that door" instead of "move left"). In LS3, a legged robot must carry loads over rough terrain and follow commands while requiring no more supervision than a human being. In the DRC, autonomy will be forced indirectly by a DARPA-controlled deteriorated communications channel between the operator and robot.

DARPA seeks revolutionary answers to some or all of the following questions in supervised autonomy: Can modes beyond simple imperatives be used to enhance supervision of a robot? Given the asymmetric bandwidth of human input/output (the visual system is relatively high bandwidth, the motor system much lower) can other modalities be used to communicate enhanced situational awareness and state from a robot to its supervisor? What should the language of supervised autonomy communications between a human and a robot be? How can supervision methods be made robust to communications degradation (in latency, bandwidth, and availability)? How can multiple robots be controlled and coordinated by smaller numbers of supervisors? How would the necessary autonomy intelligence be implemented in the robot?

8. Sensory feedback for improved neural-system control

DARPA seeks innovative approaches to develop reliable interface technology for providing sensory-feedback information from prosthetic limbs directly to the nervous system. Existing approaches for providing feedback only use visual feedback, which greatly limits performance

and patient acceptance. Furthermore, the degradation of chronic neural microstimulation interfaces prevents long-term use, which is required to address the needs of the amputee population. The goal of this topic is to create clinically viable closed-loop neural interfaces capable of controlling the prosthetic limbs of wounded warriors.

Movement is a product of central-nervous-system (CNS) and peripheral-nervous-system (PNS) activity. Motor outcomes depend on brain-derived goals (CNS) and communicated commands, muscle activation via nerves (PNS) and spinal force fields (sensory and motor neurons) to execute joint torques and deal with perturbations in the environment. Sensory activity in the PNS also provides multiple feedback signals related to goal achievement and the need for goal modification.

The underlying problem is that existing neural-interface technologies used to drive prosthetic limbs provide only visual feedback and not direct sensory feedback. The dramatic performance degradation caused by omitting only proprioceptive and somatosensory feedback information is clearly demonstrated in patients suffering from complete large-diameter-fiber neuropathy. Such patients have great difficulty executing even the most mundane tasks (e.g., drinking from a cup) despite having the best possible limbs (i.e., completely intact human limbs with full muscle power). By ignoring the important contribution sensation provides in motor control, a low ceiling is imposed on the performance possible with existing prosthetic-limb systems, both in terms of returning active service members to duty and maximizing the post-service quality of life for veterans.

9. Quantum materials by design

DARPA seeks innovative experimental and theoretical research aimed at establishing and validating design principles for strongly-correlated quantum materials.

In quantum materials correlations between electrons and the interplay between their motional, spin, and orbital character lead to novel phenomena such as high-temperature superconductivity and giant magnetoresistance. These unique properties could enable efficient and lightweight electric motors, low-loss power transmission, and high-density data storage. However, a detailed physical understanding of strongly-correlated quantum materials has proven elusive due to the complexity of interactions; computational complexity grows exponentially with particle number. Recently, theoretical, computational, and experimental approaches have been developed to close this knowledge gap.

This topic seeks to uncover the basic mechanisms underlying strongly correlated quantum systems and to establish design rules to improve their properties. Topics of interest include experimental tools for simulating and rapidly prototyping strongly-correlated materials; novel numerical methods including Diagrammatic Monte Carlo and Dynamical Mean Field Theory; and precise synthesis and characterization of engineered quantum materials and heterostructures.

10. High-speed nanophotonic LEDs

DARPA seeks innovative experimental and computational research leading to a demonstration of sub-micron light-emitting diodes with electrically driven modulation rates exceeding 100 GHz.

Recent research has demonstrated the potential to engineer the photon and electron density of states through device geometry and material selection. This suggests that optical transitions that are highly improbable and slow in bulk media can be made dominant and fast, allowing for extremely high-speed modulation of light-emitting diodes up to an order of magnitude beyond the state of the art.

This topic seeks to experimentally demonstrate high-bandwidth optical signals from electrically pumped light emitting diodes in the visible or infrared. Areas of research could include, but are not limited to, the development of new modeling, fabrication and test techniques.

Target applications relevant to the military include: efficient communication for low energy super-computing; improved devices for EMI-resistant, high-bandwidth communications; and chemical sensing.

11. Manufacturing science for austere environments

DARPA seeks innovative experimental and theoretical research with novel computational and processing approaches to manufacturing in areas with limited material and manufacturing resources. Austere environments being considered include remote installations, small villages, and areas with limited infrastructure.

This topic seeks to identify specific solutions that enable manufacturing in austere environments. Areas of research could include, but are not limited to processing with local materials, advanced processing techniques with local capabilities, toolsets to enable design and processing decisions by non-experts, and approaches to easily deployed processing platforms.

Target applications relevant to the military include: in-the-field replacement of damaged components (performance can be “good enough”), and reduced logistical tail for ship and depot supply.

12. Understanding virtual transfer of learning

Virtual-world interactions are part of life for most people (for example, there were over one billion unique users of avatars in virtual worlds in 2011). However, the impact of virtual world interactions on core mechanisms of learning which could in turn influence real world behaviors has been understudied.

Applicants to this topic should propose work which explores the interaction of virtual worlds (especially those used by many people) with core neurobiological processes such as learning mechanisms or theory of mind, and demonstrate a "transfer of learning" from a virtual interaction having an impact on real-world behaviors, especially those salient to pedagogy or influence.

This work should have the potential to revolutionize Department of Defense training and education approaches.

13. Topological/geometric multi-scale analysis of data sets

DARPA seeks theoretical and algorithmic research into the uses of Topological and/or Geometric Multi-Scale Analysis for data sets. This is to be combined with statistical techniques for the detection and encoding of topological, geometric and stochastic structure, the most common example being that of intrinsically low dimensional data embedded in high-dimensional Euclidean space.

Recent advances in approaches such as Topological Data Analysis (TDA), robust Principal Component Analysis (rPCA), etc., have demonstrated that accurate discovery of algebraic invariants or piecewise linear (PL) structure of can be achieved algorithmically, even in the presence of noisy measurements. What are desired are techniques that go beyond these, while simultaneously providing statistical figures of merit.

This topic seeks to extend existing methods by developing robust computational tools that detect and analyze the structure of non-linear data sets. The emphasis is on scalable methods that allow the global approximation of this data; for example, the use of PL structures that are “best fit” at a given length scale of interest. It is preferable that such frameworks make minimal assumptions, (e.g. one should avoid hypothesizing a smooth underlying parameterization). Furthermore, the proposed methods should include a statistical analysis of the underlying distribution of the data, both the noise and potential outliers.

Target applications relevant to the military include: de-noising of corrupted data sets such as hyperspectral images, quantitative data compression, anomaly detection, fast methods for the modeling of time varying data sets.

Sec. II: AWARD INFORMATION

The amount of resources made available under this RA will depend on the quality of the proposals received and the availability of funds. Multiple awards are anticipated, each at up to \$250,000 per phase for a maximum of \$500,000 over the 24-month base period (consisting of two 12- month phases) and a potential, additional follow-on 12-month option period at up to \$500,000.

The Government reserves the right to select for negotiation of all, some, one, or none of the proposals received in response to this solicitation, and to make awards without discussions with proposers. The Government also reserves the right to conduct discussions if it is later determined to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that proposer. The Government reserves the right

to fund proposals in phases with options for continued work at the end of one or more of the phases.

Awards under this RA will be made to proposers on the basis of the evaluation criteria listed below (see section labeled “Application Review Information”, Sec. V.), and program balance to provide overall value to the Government. The Government reserves the right to request any additional, necessary documentation once it makes the award instrument determination. Such additional information may include but is not limited to Representations and Certifications. The Government also reserves the right to remove proposers from award consideration should the parties fail to reach agreement on award terms, conditions and cost/price within a reasonable time or the proposer fails to provide timely requested additional information.

As of the date of publication of this RA, DARPA expects that program goals for this RA may be met by proposers intending to perform 'fundamental research,' i.e., basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization the results of which ordinarily are restricted for proprietary or national security reasons. Notwithstanding this statement of expectation, DARPA is not prohibited from considering and selecting research proposals that, while perhaps not qualifying as 'fundamental research' under the foregoing definition, still meet the RA criteria for submissions. In all cases, the contracting officer shall have sole discretion to select award instrument type and to negotiate all instrument provisions with selectees.

Sec. III: ELIGIBILITY INFORMATION

A. Eligible Applicants

This RA solicits single investigator proposals for research and development in the specific technical areas of interest to DARPA’s Microsystems Technology Office (MTO) and Defense Sciences Office (DSO) as outlined in Part II, Section I.A.

Participation is limited to untenured Assistant or Associate Professors within 5 years of appointment to a tenure-track position at a U.S. institution of higher education or equivalent at a non-profit science and technology research institution.

Previous YFA recipients are not eligible to apply to this or any future YFA program. Applicants are limited to a maximum of three (3) applications to the DARPA YFA program during their term of eligibility. As this was a new requirement as of the 2009 YFA program, previous unsuccessful submissions to the program prior to 2009 will NOT be counted against the limit. Applicants should clearly state on the cover sheet any prior YFA submissions. Applicants are also limited to ONE submission to this RA.

Proposers should provide in their proposal a listing of past, current, and pending support, including sponsor, funding level, performance dates, and level of all federally funded research efforts. DARPA is particularly interested in identifying outstanding researchers who have previously not been performers on DARPA programs, but the program is open to all qualified applicants with innovative research ideas. If you have been or currently are a performer on a DARPA program, please list this clearly on the cover sheet as indicated in Section IV.

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCU's) and Minority Institutions (MI's) are encouraged to submit proposals.

Foreign participants and/or individuals may participate to the extent that such participants comply with any necessary Non-Disclosure Agreements, Security Regulations, Export Control Laws, and other governing statutes applicable under the circumstances.

The Government anticipates that full proposals submitted under this RA will be UNCLASSIFIED. Applicants considering classified submissions (or requiring access to classified information during the life-cycle of the program) shall ensure all industrial, personnel, and information system processing security requirements are in place and at the appropriate level (e.g. Facility Clearance (FCL), Personnel Security Clearance (PCL), certification and accreditation (C&A) and any Foreign Ownership Control and Influence (FOCI) issues are mitigated prior to such submission or access). Additional information on these subjects can be found at: <http://www.dss.mil>.

B. Procurement Integrity, Standards of Conduct, Ethical Considerations, and Organizational Conflicts of Interest

Current federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC 203, 205, and 208). The DARPA Program Manager for this RA is Dr. Alicia Jackson. Once the proposals have been received, and prior to the start of proposal evaluations, the Government will assess potential conflicts of interest and will promptly notify the Proposer if any appear to exist. (Please note, the Government assessment does NOT affect, offset, or mitigate the Proposer's own duty to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.)

Without prior approval or a waiver from the DARPA Director, in accordance with FAR 9.503, a Contractor cannot simultaneously provide scientific, engineering, technical assistance (SETA) or similar support and also be a technical performer. Therefore, all Proposers as well as proposed subcontractors and consultants must affirm whether they (their organizations and individual team members) are providing SETA or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the Proposer, subcontractor, consultant, or individual supports and identify the prime contract number(s). Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure must include a description of the action the Proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. If in the sole opinion of the Government after full consideration of the circumstances, a proposal fails to fully disclose potential conflicts of interest and/or any identified conflict situation cannot be effectively mitigated, the proposal will be rejected without technical evaluation and withdrawn from further consideration for award.

If a prospective Proposer believes that any conflict of interest exists or may exist (whether organizational or otherwise) or has questions on what constitutes a conflict of interest, the Proposer should promptly raise the issue with DARPA by sending his/her contact information and a summary of the potential conflict to the RA mailbox (DARPA-RA-13-08@dapra.mil) before time and effort are expended in preparing a proposal and mitigation plan.

C. Cost Sharing/Matching

Cost sharing is not required for this particular program; however, cost sharing will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., for any Other Transactions under the authority of 10 U.S.C. § 2371). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

D. Other Eligibility Criteria

1. Collaborative Efforts

This solicitation is for single author proposals only. After final selection and prior to issuance of award, the authors will be given the opportunity to discuss teaming, should it be required. Should DARPA and a selected author agree that it is necessary to team, potential team members must also be university professors or equivalent at a non-profit research institution, with preference given to those that fit the eligibility guidelines stated in this solicitation. Specific content, communications, networking, and team formation will be the sole responsibility of the participants.

Sec. IV: APPLICATION AND SUBMISSION INFORMATION

A. Address to Request Application Package

This solicitation contains all information required to submit a proposal. No additional forms, kits, or other materials are needed. This notice constitutes the total RA. No additional information is available, nor will a formal Request for Proposal (RFP) or additional solicitation regarding this announcement be issued. Requests for same will be disregarded.

B. Content and Form of Application Submission

1. Security and Proprietary Issues

The Government anticipates proposals submitted under this RA will be UNCLASSIFIED.

Proprietary Data: All proposals containing proprietary data should have the cover page and each page containing proprietary data clearly marked as containing proprietary data. It is the Proposer's responsibility to clearly define to the Government what is considered proprietary data.

Security classification guidance via a DD Form 254, “DoD Contract Security Classification Specification,” will not be provided at this time since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is made that the award instrument may result in access to classified information; a DD Form 254 will be issued and attached as part of the award.

2. Proposal Submission Information

The YFA proposal process consists of a full-proposal submission only. There will not be a proceeding abstract phase. The technical volume of the proposal will consist of a one (1) page cover sheet, a one (1) page transmittal letter, a one (1) page executive summary slide (template available in Attachment 1), a five (5) page technical proposal and statement of work (SOW), a one (1) page biosketch, and a list of references.

Proposers are required to submit full proposals by the time and date specified in the RA. **Early submission of full proposals is strongly encouraged. Applicants are strongly encouraged to discuss their YFA submission with their Office of Sponsored Research (or equivalent) several weeks in advance of the submission deadline.** DARPA will review all full proposals submitted using the published evaluation criteria. The typical proposal should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed efforts should not be included into a single proposal. **Proposals may not be submitted by fax or email;** any proposals sent via these methods will be disregarded.

Restrictive notices notwithstanding, proposals may be handled, for administrative purposes, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate non-disclosure requirements.

All administrative correspondence and questions about this solicitation, including requests for information on how to submit a full proposal to this RA, should be directed to the RA Administrator at DARPA-RA-13-08@darpa.mil. DARPA intends to use electronic mail only for all correspondence regarding DARPA-RA-13-08. DARPA encourages use of the Internet for retrieving the RA and any other related information that may subsequently be provided, including but not limited to a FAQ page.

For Proposers Requesting an Assistance Instrument:

Grant or cooperative agreement proposals may only be submitted to DARPA through Grants.gov or in hard-copy. Grant or cooperative agreement proposals may not be submitted through any other means (including T-FIMS and other comparable systems). If proposers intend to use Grants.gov as their means of submission, then they must submit their entire proposal through Grants.gov; applications cannot be submitted in part to Grants.gov and in part as a hard-copy. Proposers using the Grants.gov APPLY do not submit paper proposals in addition to the Grants.gov APPLY electronic submission.

Proposers must complete the following steps in the order listed below before submitting proposals on Grants.gov (these steps are also detailed at www.grants.gov/applicants/get_registered.jsp):

- Proposers must obtain a DUNS number
- Proposers must register their organization in the System for Award Management (SAM)(<https://www.sam.gov>)
- Proposers must register the Authorized Organization Representative (AOR) in Grants.gov
- Proposers must have the organization's E-BIZ point of contact authorize the AOR to submit applications.

Once Grants.gov has received a proposal submission, Grants.gov will send two email messages to advise proposers as to whether or not their proposals have been validated or rejected by the system; IT MAY TAKE UP TO TWO DAYS TO RECEIVE THESE EMAILS. The first email will confirm receipt of the proposal by the Grants.gov system; this email only confirms receipt, not acceptance, of the proposal. The second will indicate that the application has been successfully validated by the system prior to transmission to the grantor agency or has been rejected due to errors. If the proposal is validated, then the proposer has successfully submitted their proposal. If the proposal is rejected, the proposer will have to resubmit their proposal. Once the proposal is retrieved by DARPA, the proposer will receive a third email from Grants.gov. To avoid missing deadlines, proposers should submit their proposals in advance of the final proposal due date with sufficient time to receive confirmations and correct any errors in the submission process through Grants.gov. For more information on submitting proposals to Grants.gov, visit the Grants.gov submissions page at: http://grants.gov/applicants/apply_for_grants.jsp

Proposers electing to submit grant or cooperative agreement proposals via grants.gov must complete the SF 424 R&R form (Application for Federal Assistance, Research and Related) and the SF-LLL (if required). Please use the Attachments Form and upload, as two separate documents, Volume I, Technical and Management Proposal and Volume II, the Cost Proposal, as well as any other documents require by the BAA (i.e., subcontract proposals). No other Grants.gov forms are required. Please note that Grants.gov does not accept zipped or encrypted documents uploaded at attachments. Please follow the document made available on grants.gov as part of the solicitation entitled "Instructions for Using Grants.gov to Apply for a Grant or Agreement from DARPA (Short Form)," dated 20 October 2011, for more information.

If submitting hard-copy, an original and (4) copies of the proposal and (4) electronic copies of the proposal on a CD-ROM shall be submitted to DARPA/MTO, via 675 North Randolph Street, Arlington VA 22203-2114 (Attn: DARPA-RA-13-08), no later than time and date specified in Section IV.B.6 Submission Dates and Times.

Technical support for Grants.gov submissions may be reached at 1-800-518-4726 or support@grants.gov.

3. Full Proposal Format

All full proposals must be in the format given below. Nonconforming proposals will be rejected without review. Proposals submitted to Grants.gov must adhere to guidelines outlined on the grants.gov website but shall contain a clearly identifiable Technical and Cost Volumes as identified in the previous section (Section IV.B.2). All proposals pages shall be printable on single-spaced, 8-1/2 by 11 inch paper with type not smaller than 12 point font. Smaller font may be used for figures, tables, and charts. The page limitation for full proposals includes all figures, tables and charts. Volume I, Technical Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished), which document the technical ideas and approaches upon which the proposal is based. Intellectual Property/Patents Requirements and the bibliography are not included in the page counts. The submission of other supporting materials along with the proposal is strongly discouraged and will not be considered for review. Not including the attached bibliography, **Volume I shall not exceed 9 pages**. This page limit includes the one (1) page required cover sheet described in Section I. Maximum page lengths for each section are shown in braces { } below. All full proposals must be written in English.

4. Volume I, Technical and Management Proposal

Section I. Administrative

- A. {1} Cover sheet to include:
- (1) RA number;
 - (2) Technical topic area (proposers may only submit to ONE topic area);
 - (3) Organization submitting proposal;
 - (4) Contractor's reference number (if any);
 - (5) Proposal title;
 - (6) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available);
 - (7) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available), total funds requested from DARPA, and the amount of cost share (if any);
 - (8) Date proposal was submitted;
 - (9) Total proposed cost separated by basic award and options (if any);
 - (10) Number of previous submissions to YFA RA and submission date(s);
 - (11) Date of Tenure-track appointment position;
 - (12) List of any and all current and past involvement with DARPA as a performer.
- B. {1} Official transmittal letter.

Section II. Summary of Proposal

- A. {1} Executive summary slide to include the following (see Attachment 1 for template format):

- High Level Vision: What’s the Big Idea/What Problem are you Solving and Who Cares?
- Project Impact
- Potential Department of Defense application
- Technical Approach
- Major Technical Risks and Risk Mitigation Strategies

B. {5} **Technical proposal and Statement of Work (SOW)** specifically address the following questions as they relate to the topic area-variants of the Heilmeyer Catechism. Note each question should be recapitulated and clearly addressed within the proposal:

- (1) What are you trying to do/what big problem are you trying to solve? Objectives should be articulated using absolutely no jargon. (Note this must relate to the Technical Area that you are addressing)
- (2) What is the end goal? Who cares? This should focus on the ultimate project vision.
- (3) SOA: How is it done today, and what are the limits of current practice?
- (4) What is the new technical idea proposed? What recent discoveries support the idea or increase the likelihood of success?
- (5) What is the impact if successful? Be quantitative to the extent possible.
- (6) What is the technical approach and plan? How will the project be organized?
- (7) How will you measure progress of your work? What are the midterm and final ‘exams’ over the first and second phases of the base period of the project to check for success?
- (8) What are the major technical challenges/risks to this project, and how will you plan to address each?
- (9) Proposed follow-on work for “Directors Fellowship”: Include a short summary for proposed follow-on work if successful during the 24-month base period. If selected as a Director’s Fellow the proposed follow-on work will be updated as necessary prior to the start of the 12-month option period.

Statement of Work (SOW): Succinctly and clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. Include the completion criteria for each task/activity - a product, event or milestone that defines its completion. An example template is shown below:

SOW:

Phase I (12 mos.):

Task	Description	Completion Criteria	Mos
1.1			(e.g. 0-6 mos)
1.2			
...			
2.1			

2.2			
...			

Phase II (12 mos):

Task	Description	Completion Criteria	Mos (e.g. 12-18)

Option (12 mos):

Task	Description	Completion Criteria	Mos (e.g. 24-30)

C. {1} Biosketch

Section III. Additional Information

- A. {No page limit} A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based.
- B. {No page limit} Listing of past, current, and pending support, including sponsor, funding level, performance dates, and level of effort.

5. Volume II, Cost Proposal – {No Page Limit}

A. Cover sheet to include:

- (1) RA number;
- (2) Technical topic area (proposers may only submit to ONE topic area, and ONE subtopic area if applicable);
- (3) Organization submitting proposal;
- (4) Contractor’s reference number (if any);
- (5) Proposal title;
- (6) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available);
- (7) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), and electronic mail (if available);
- (8) Place(s) and period(s) of performance;
- (9) Total proposed cost separated by basic award and option(s) (if any);

- (10) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known*);
- (11) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
- (12) Proposal Date;
- (13) DUNS number;
- (14) TIN number;
- (15) Cage Code;
- (16) Proposal validity period.

The Government requests and recommends that tables included in the cost proposal also be provided in MS Excel™ format with calculations formulae intact to allow traceability of the cost proposal numbers across the performer. If the PDF submission differs from the Excel submission, the PDF will take precedence. Each copy must be clearly labeled with the DARPA RA number, proposer organization, and proposal title (short title recommended).

The Government also requests and recommends that the Cost Proposal include MS Excel file(s) that provide traceability between the Bases of Estimate (BOEs) and the proposed costs across all elements and phases. This includes the calculations and adjustments that are utilized to generate the Summary Costs from the source labor hours, labor costs, material costs, etc. input data. It is requested that the costs and Subcontractor proposals be readily traceable to the Prime Cost Proposal in the provided MS Excel file(s). The Government prefers receiving cost data as Excel files; however, this is not a requirement.

Detailed cost breakdown to include:

- (1) Total program cost breakdown by major cost items:
 - a. Direct Labor – Including individual labor categories with associated labor hours and direct labor rates;
 - b. Indirect Costs – Including Fringe Benefits, Overhead, General and Administrative Expense, Cost of Money, Fee, etc. (must show base amount and rate);
 - c. Travel – Provide the purpose of the trip, number of trips, number of days per trip, departure and arrival destinations, number of people, etc.;
 - d. Other Direct Costs – Itemized with costs; Back-up documentation is to be submitted to support proposed costs;
 - e. Equipment Purchases – Itemization with costs, including quantities, unit prices, proposed vendors (if known), and the basis of estimate (e.g. quotes, prior purchases, catalog price lists, etc.); Any item that exceeds \$3,000 must be supported with back-up documentation such as a copy of catalog price lists or quotes prior to purchase; (NOTE: For equipment purchases, include a letter stating why the proposer cannot provide the requested resources from its own funding);
 - f. Materials – Itemization with costs, including quantities, unit prices, proposed vendors (if known), and the basis of estimate (e.g. quotes, prior purchases, catalog price lists, etc.); Any item that exceeds \$3,000 must be supported with

back-up documentation such as a copy of catalog price lists or quotes prior to purchase;

g. Major program tasks by month

(2) A summary of total program costs by phase (Phase I, Phase II, Director's Fellow Ship Option) and calendar fiscal year;

(3) A priced Bill-of-Materials (BOM) clearly identifying, for each item proposed, the source of the unit price (i.e., vendor quote, engineering estimate, etc.) and the type of property (i.e. material, equipment, special test equipment, plant equipment, information technology (IT), for each computer hardware cost, computer software cost, and other related costs such as computer maintenance fees or support services costs (NOTE: If you propose materials DARPA expects that you are able to defend it.);

(4) The source, nature, and amount of any industry cost-sharing. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each;

(5) Identification of pricing assumptions of which may require incorporation into the resulting award instrument (e.g. use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Expert(s), etc.); and

(6) A copy of the proposing organizations approved rate agreement.

NOTE 1: PROPOSERS ARE CAUTIONED THAT EVALUATION RATINGS MAY BE LOWERED AND/OR PROPOSALS REJECTED IF SUBMITTAL INSTRUCTIONS ARE NOT FOLLOWED.

6. Submission Dates and Times

FULL PROPOSALS MUST BE RECEIVED ON OR BEFORE 5:30PM ET ON MONDAY, JANUARY 21, 2013 IN ORDER TO BE CONSIDERED. Early submissions are strongly encouraged. A proposal received after this date and time will not be reviewed.

DARPA will acknowledge receipt of complete submissions via email and confirm control numbers that should be used in all further correspondence regarding proposals. If no confirmation is received within two business days, please contact the RA Administrator at DARPA-RA-13-08@darpa.mil to ensure the proposal was submitted properly.

Proposals should be submitted online via <http://www.grants.gov> or mailed hard copy as indicated in Section IV. Further detail regarding submission methods can be found in Section IV.

DARPA will post a consolidated Questions and Answers response on the MTO website, once the RA has been published. If you have a question regarding the RA, you must submit your question to the RA Administrator at DARPA-RA-13-08@darpa.mil no later than one week before the RA closing date/due date listed in this solicitation in order to receive an answer.

7. Intergovernmental Review

Not Applicable.

8. Funding Restrictions

The RA seeks proposals for a research activity consisting of a 24-month base period broken into two 12-month phases, with a maximum funding level of \$250,000 per 12-month phase (\$500,000 maximum in total funding for the 24-month base period). Applicants should include a short summary of proposed follow-on work for the Director's Fellowship in responding to this RA; if selected as a Director's Fellow the proposed follow-on work will be updated as necessary prior to the start of the 12-month option period (\$500,000 maximum in total funding for the 12-month option period).

9. Other Submission Requirements

All proposals should clearly indicate limitations on the disclosure of their contents. Proposers who include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall do the following:

- (1) Mark the title page with the following legend: This proposal includes data that shall not be disclosed – in whole or in part – for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this proposer as a result of, or in connection with, the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction; and
- (2) Mark each sheet of data they wish to restrict with the following legend: Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

Markings such as "Company Confidential" or other phrases that may be confused with national security classifications should be avoided. The proposer may be required to remove such markings before the proposal will be accepted. "Proprietary" or "Company Proprietary" are acceptable notations.

Sec. V: APPLICATION REVIEW INFORMATION

A. Evaluation Criteria

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal using the following mandatory criteria listed in descending order of importance: (a) Overall Scientific and Technical Merit; (b) Potential Contribution and Relevance to the DARPA Mission; (c) Cost Realism; and (d) Realism of Proposed Schedule. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after the due date; however, proposals may be reviewed periodically for administrative reasons.

The following are descriptions of the evaluation criteria:

(a) Overall Scientific and Technical Merit

The proposed technical approach is feasible, achievable, complete and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final outcome that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

(b) Potential Contribution and Relevance to the DARPA Mission

The potential contributions of the proposed effort with relevance to the national technology base will be evaluated. Specifically, DARPA's mission is to maintain the technological superiority of the U.S. military and prevent technological surprise from harming our national security by sponsoring revolutionary, high-payoff research that bridges the gap between fundamental discoveries and their application.

(c) Cost Realism

The objective of this criterion is to establish that the proposed costs are realistic for the technical and management approach offered, as well as to determine the proposer's practical understanding of the effort. The proposal will be reviewed to determine if the costs proposed are based on realistic assumptions, reflect a sufficient understanding of the technical goals and objectives of the RA, and are consistent with the proposer's technical approach (to include the proposed Statement of Work). At a minimum, this will involve review of the type of personnel planned to perform each task as well as the types and kinds of materials, equipment and fabrication costs proposed. It is expected that the effort will leverage all available relevant prior research in order to obtain the maximum benefit from the available funding. The evaluation criterion recognizes that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies.

(d) Realism of Proposed Schedule

The proposer's abilities to aggressively pursue performance metrics in the timeframe indicated in this RA and to accurately account for that timeframe will be evaluated, as well as proposer's ability to understand, identify, and mitigate any potential risk in schedule.

B. Review and Selection Process

Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work to the overall research program and the availability of funding for the effort.

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. Pursuant to FAR 35.016, the primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. In order to provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas.

Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. For evaluation purposes, a proposal is the document described in "Proposal Information", Section IV.B.. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Restrictive notices notwithstanding, proposals may be handled for administrative purposes by support contractors. These support contractors are prohibited from competition in DARPA technical research and are bound by appropriate non-disclosure requirements. Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants /experts who are strictly bound by the appropriate non-disclosure requirements.

It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. After proposals have been evaluated and selections made, the original of each proposal received will be retained at DARPA and all other copies will be destroyed.

Sec. VI: AWARD ADMINISTRATION INFORMATION

A. Selection Notices

As soon as the evaluation of a proposal is complete, the proposer will be notified that 1) the proposal has been selected for funding pending negotiations with the Grants Officer, or 2) the proposal has not been selected. These official notifications will be sent via email and/or letter to the Technical POC identified on the proposal coversheet.

B. Administrative and National Policy Requirements

1. Meeting and Travel Requirements

There will be a program kickoff meeting and all key participants are required to attend. In addition, during the 24-month base period, a number of visits/exercises at a variety of DoD sites and facilities will be scheduled. Participation in all such opportunities are not required, however lack of participation may impact the award of the Director's Fellowship. Proposers are expected to include funds for two program review meetings and at least one three-day military visit within the total budget of their proposal.

2. Human Use

All research involving human subjects, to include use of human biological specimens and human data, selected for funding must comply with the federal regulations for human subject protection. Further, research involving human subjects that is conducted or supported by the DoD must comply with 32 CFR 219, Protection of Human Subjects (http://www.access.gpo.gov/nara/cfr/waisidx_07/32cfr219_07.html) and DoD Directive 3216.02, Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research (<http://www.dtic.mil/whs/directives/corres/pdf/321602p.pdf>).

Institutions awarded funding for research involving human subjects must provide documentation of a current Assurance of Compliance with Federal regulations for human subject protection, for example a Department of Health and Human Services, Office of Human Research Protection Federal Wide Assurance (<http://www.hhs.gov/ohrp>). All institutions engaged in human subject research, to include subcontractors, must also have a valid Assurance. In addition, personnel involved in human subjects research must provide documentation of completing appropriate training for the protection of human subjects.

For all proposed research that will involve human subjects in the first year or phase of the project, the institution must provide evidence of or a plan for review by an Institutional Review Board (IRB) upon final proposal submission to DARPA. The IRB conducting the review must be the IRB identified on the institution's Assurance. The protocol, separate from the proposal, must include a detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection, and data analysis. Consult the designated IRB for guidance on writing the protocol. The informed consent document must comply with federal regulations (32 CFR 219.116). A valid Assurance along with evidence of appropriate training all investigators should all accompany the protocol for review by the IRB.

In addition to a local IRB approval, a headquarters-level human subjects regulatory review and approval is required for all research conducted or supported by the DoD. The Army, Navy, or Air Force office responsible for managing the award can provide guidance and information about their component's headquarters-level review process. Note that confirmation of a current Assurance and appropriate human subjects protection training is required before headquarters-level approval can be issued.

The amount of time required to complete the IRB review/approval process may vary depending on the complexity of the research and/or the level of risk to study participants. Ample time should be allotted to complete the approval process. The IRB approval process can last between one to three months, followed by a DoD review that could last between three to six months. No DoD/DARPA funding can be used towards human subjects research until ALL approvals are granted.

3. Animal Use

Any Recipient performing research, experimentation, or testing involving the use of animals shall comply with the rules on animal acquisition, transport, care, handling, and use in: (i) 9 CFR parts 1-4, Department of Agriculture rules that implement the Laboratory Animal Welfare Act of 1966, as amended, (7 U.S.C. 2131-2159); (ii) the guidelines described in National Institutes of

Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals"; (iii) DoD Directive 3216.01, "Use of Laboratory Animals in DoD Program."

For submissions containing animal use, proposals should briefly describe plans for Institutional Animal Care and Use Committee (IACUC) review and approval. Animal studies in the program will be expected to comply with the PHS Policy on Humane Care and Use of Laboratory Animals, available at <http://grants.nih.gov/grants/olaw/olaw.htm>.

All Recipients must receive approval by a DoD certified veterinarian, in addition to an IACUC approval. No animal studies may be conducted using DoD/DARPA funding until the USAMRMC Animal Care and Use Review Office (ACURO) or other appropriate DoD veterinary office(s) grant approval. As a part of this secondary review process, the Recipient will be required to complete and submit an ACURO Animal Use Appendix, which may be found at https://mrmc-www.army.mil/index.cfm?pageid=Research_Protections.acuro&rn=1.

4. Publication Approval

It is the policy of the Department of Defense that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. The definition of Contracted Fundamental Research is:

“Contracted Fundamental Research includes [research performed under] grants and contracts that are (a) funded by budget category 6.1 (Basic Research), whether performed by universities or industry or (b) funded by budget category 6.2 (Applied Research) and performed on-campus at a university. The research shall not be considered fundamental in those rare and exceptional circumstances where the applied research effort presents a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense, and where agreement on restrictions have been recorded in the contract or grant.” Such research is referred to by DARPA as “Restricted Research.”

Pursuant to DoD policy, research performed under grants and contracts that are (a) funded by budget category 6.2 (Applied Research) and NOT performed on-campus at a university or (b) funded by budget category 6.3 (Advanced Research) does not meet the definition of fundamental research. Publication restrictions will be placed on all such research.

Research to be performed as a result of this RA is expected to be Fundamental. DARPA does not anticipate applying publication restrictions of any kind.

Proposers are advised if they propose grants or cooperative agreements, DARPA may elect to award other award instruments due to the need to apply publication or other restrictions. DARPA will make this election if it determines that the research resulting from the proposed program will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program and will be considered Restricted Research.

The following same or similar provision will be incorporated into any resultant Restricted Research or Non-Fundamental Research procurement contract or other transaction:

There shall be no dissemination or publication, except within and between the Contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract without prior written approval of DARPA's Public Release Center (DARPA/PRC). All technical reports will be given proper review by appropriate authority to determine which Distribution Statement is to be applied prior to the initial distribution of these reports by the Contractor. With regard to subcontractor proposals for Contracted Fundamental Research, papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and this review requirement, pursuant to DoD Instruction 5230.27 dated October 6, 1987.

5. Subcontracting

This RA solicits single-investigator proposals only.

6. Electronic and Information Technology

All electronic and information technology acquired through this solicitation must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C. 794d) and FAR Subpart 39.2. Each proposer who submits a proposal involving the creation or inclusion of electronic and information technology must ensure that Federal employees with disabilities will have access to and use of information that is comparable to the access and use by Federal employees who are not individuals with disabilities and members of the public with disabilities seeking information or services from DARPA will have access to and use of information and data that is comparable to the access and use of information and data by members of the public who are not individuals with disabilities.

7. System for Award Management Registration and Universal Identifier Requirements

Unless the proposer is exempt from this requirement, as per FAR 4.1102 or 2 CFR 25.110 as applicable, all proposers must be registered in the System for Award Management (SAM) and have a valid Data Universal Numbering System (DUNS) number prior to submitting a proposal. Information on SAM registration is available at www.sam.gov. All proposers must maintain an active registration in SAM with current information at all times during which they have an active Federal award or proposal under consideration by DARPA. All proposers must provide the DUNS number in each proposal they submit.

DARPA cannot make an assistance award to a proposer until the proposer has provided a valid DUNS number and has maintained an active SAM registration with current information.

8. Reporting Executive Compensation and First-Tier Subcontract Awards

The FAR clause 52.204-10, “Reporting Executive Compensation and First-Tier Subcontract Awards,” will be used in all procurement contracts valued at \$25,000 or more. A similar award term will be used in all grants and cooperative agreements.

9. Controlled Unclassified Information on Non-DoD Information Systems

Controlled Unclassified Information (CUI) refers to unclassified information that does not meet the standards for National Security Classification but is pertinent to the national interests of the United States or to the important interests of entities outside the Federal Government and under law or policy requires protection from unauthorized disclosure, special handling safeguards, or prescribed limits on exchange or dissemination. All non-DoD entities doing business with DARPA are expected to adhere to the following procedural safeguards, in addition to any other relevant Federal or DoD specific procedures, for submission of any proposals to DARPA and any potential business with DARPA:

- Do not process DARPA CUI on publicly available computers or post DARPA CUI to publicly available webpages or websites that have access limited only by domain or Internet protocol restriction.
- Ensure that all DARPA CUI is protected by a physical or electronic barrier when not under direct individual control of an authorized user and limit the transfer of DARPA CUI to subcontractors or teaming partners with a need to know and commitment to this level of protection.
- Ensure that DARPA CUI on mobile computing devices is identified and encrypted and all communications on mobile devices or through wireless connections are protected and encrypted.
- Overwrite media that has been used to process DARPA CUI before external release or disposal.

C. Reporting

The number and types of reports will be specified in the award document, but will include as a minimum quarterly financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

D. Electronic Systems

1. Representations and Certifications

Accepted proposers are required to complete representations and certifications as presented by the grants officer after selection.

2. Wide Area Work Flow (WAWF)

Unless using another approved electronic invoicing system, performers will be required to submit invoices for payment directly via the Internet/WAWF at <http://wawf.eb.mil>. Registration to WAWF will be required prior to any award under this RA.

3. i-Edison

The award document for each proposal selected for funding will contain a mandatory requirement for patent reports and notifications to be submitted electronically through i-Edison (<http://s-edison.info.nih.gov/iEdison>).

Sec. VII: AGENCY CONTACTS

Administrative, technical or contractual questions should be sent via e-mail to DARPA-RA-13-08@darpa.mil. All requests must include the name, email address, and phone number of a point of contact.

The technical POC for this effort is:

Dr. Alicia Jackson
DARPA/MTO
ATTN: DARPA-RA-13-08
675 North Randolph Street
Arlington, VA 22203-2114
EMAIL: DARPA-RA-13-08@darpa.mil

Sec. VIII: OTHER INFORMATION

A. Intellectual Property

1. Data Rights Restrictions

Proposers responding to this RA shall appropriately identify any potential restrictions on the Government's use of any Intellectual Property contemplated under the resulting assistance instrument (e.g., grant or cooperative agreement). This includes both Noncommercial Items and Commercial Items. Although not required, proposers may use a format similar to that described in Paragraphs 1.a and 1.b below. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions, and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions. If no restrictions are

intended, then the proposer should state “NONE.” Failure to provide full information may result in a determination that the proposal is not compliant with the RA – resulting in nonselectability of the proposal.

a. Noncommercial Items (Technical Data and Computer Software)

Proposers responding to this RA requesting a procurement contract to be issued under the FAR/DFARS shall identify all noncommercial technical data and noncommercial computer software that it plans to generate, develop, and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights, and to assert specific restrictions on those deliverables. Proposers shall follow the format under DFARS 252.227-7017 for this stated purpose. In the event that proposers do not submit the list, the Government will assume that it automatically has “unlimited rights” to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and noncommercial computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, then proposers should identify the data and software in question, as subject to Government Purpose Rights (GPR). In accordance with DFARS 252.227-7013 Rights in Technical Data - Noncommercial Items, and DFARS 252.227-7014 Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation, the Government will automatically assume that any such GPR restriction is limited to a period of five (5) years in accordance with the applicable DFARS clauses, at which time the Government will acquire “unlimited rights” unless the parties agree otherwise. Proposers are advised that the Government will use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.” It is noted an assertion of “NONE” indicates that the Government has “unlimited rights” to all noncommercial technical data and noncommercial computer software delivered under the award instrument, in accordance with the DFARS provisions cited above. Failure to provide full information may result in a determination that the proposal is not compliant with the RA – resulting in nonselectability of the proposal.

A sample list for complying with this request is as follows:

Accepted proposers are required to complete representations and certifications as presented by the grants officer after selection.

NONCOMMERCIAL				
Technical Data Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(NARRATIVE)	(LIST)	(LIST)	(LIST)

b. Commercial Items (Technical Data and Computer Software)

Proposers responding to this RA requesting a procurement contract to be issued under the FAR/DFARS shall identify all commercial technical data and commercial computer software that may be embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government’s use of such commercial technical data and/or commercial computer software. In the event that proposers do not submit the list, the Government will assume that there are no restrictions on the Government’s use of such commercial items. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.” Failure to provide full information may result in a determination that the proposal is not compliant with the RA – resulting in nonselectability of the proposal.

A sample list for complying with this request is as follows:

COMMERCIAL				
Technical Data Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(NARRATIVE)	(LIST)	(LIST)	(LIST)

B. All Proposers – Patents

Include documentation proving your ownership of or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under your proposal for the DARPA program. If a patent application has been filed for an invention that your proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, you may provide only the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and a summary of the patent title, together with either: 1) a representation that you own the invention, or 2) proof of possession of appropriate licensing rights in the invention.

C. All Proposers – Intellectual Property Representations

Provide a good faith representation that you either own or possess appropriate licensing rights to all other intellectual property that will be utilized under your proposal for the DARPA program. Additionally, proposers shall provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research

Attachment 1

Executive Summary Slide Template