



RA 07-43

Proposer Information Pamphlet

2008 Computer Science Study Group (CSSG)

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A OVERVIEW

The Defense Advanced Research Projects Agency (DARPA) is soliciting proposals from U.S. institutions of higher learning nominating junior faculty to participate in the Computer Science Study Group (CSSG). The CSSG will focus on computer science technology and its application to associated problems of interest to, and in support of, Department of Defense (DoD) objectives. The CSSG consists of two principal functional areas:

- 1) Participation in the FY08 Computer Science Study Panel (CS Study Panel); and
- 2) Possible participation in future Computer Science Research Projects (CS Research Projects).

PHASE 1

Phase 1 (12 months) consists of participation on the CS Study Panel. The CS Study Panel anticipates meeting at least four times throughout the 2008 calendar year, totaling approximately twenty days. Two of the meetings will occur during the academic year and will take place in the Washington, D.C. metropolitan area. Two extended meetings, lasting approximately one week each, will take place during the summer, and will involve travel throughout the United States. The Institute for Defense Analyses (IDA) will have administrative responsibility for the CS Study Panel, which includes organizing and leading the meetings. These meetings, which consist of trips to Government and industry sites, may require a SECRET security clearance. In addition, participation in this program may expose participants to proprietary and other non-public data. As a result, participants will be required to sign Non-Disclosure Agreements (NDA)/Conflict of Interest (COI) forms or other related forms, as required by DARPA. In performing its administrative functions under the program, IDA will hold all participants' clearances and NDAs/COIs. Due to this, all participants on the panel must either already have a minimum of a SECRET security clearance or apply for and receive a U.S. Department of Defense SECRET security clearance through IDA. Participants may be required to apply for and receive a TOP SECRET clearance, at DARPA's discretion. For successful proposers, host institutions will receive grants or other assistance instruments for up to \$100,000. The funding to the host institution will support participant travel expenses for Panel meetings; it will also support participant salary, to include time spent while participating in the CS Study Panel and time to connect the participants' computer science research to critical DoD needs identified during their Panel trips. The funding may also support research assistants' summer salary and costs for administrative support.

Although no classified work will be conducted at the host institution, CS Study Panel participants will take part in classified meetings and onsite visits. Further, as noted above, the participant should be a "junior faculty member" at a U.S. "Institution of Higher Learning." Generally speaking, this means that the participant is a full-time employee of an institution engaged in teaching courses and managing research, primarily a domestic college or university, and that the participant is both pre-tenure and no more than seven years beyond receiving a doctoral degree.

PHASE 2

Phase 2 (12 to 24 months) consists of continuation of Phase 1 CS Study Panel participation, as well as work on a CS Research Project. Before the end of Phase 1, each participant will be eligible to submit a proposal for a CS Research Project, for which they would become the Principal Investigator (PI) for the proposed research. A participant is not required to submit a proposal for Phase 2; however, any participant who does not submit a proposal will not be eligible for future funding under this program. The research should present novel ideas in computer science and its application that will lead to fundamental advances in the field rather

than incremental change (examples listed in Section D - Sample Research Areas of Interest). Proposal submissions for Phase 2 CS Research Projects will be made directly to DARPA's Defense Sciences Office (DSO) at <http://www.sainc.com/dsobaa/>. Details of the requirements for the research proposal will be provided to the CS Study Panel in the course of the first year of program participation. Each selected Phase 2 CS Research Project will be funded in an amount not to exceed \$500,000 for a period of 12 to 24 months. The funding is estimated to occur in the spring of 2009. Research activities will take place at the host institution, and will be confined to unclassified, fundamental research that supports the objectives of the program. Participants who submit a proposal for Phase 2 and are not selected for award will not be eligible to submit proposals for funding in Phase 3 of the program.

PHASE 3

Phase 3 (12 months) consists of a CS Research Project only. Participants are required to obtain matching funds in addition to requesting funding from DARPA, total amount not to exceed \$500,000 (up to \$250,000 in DARPA funding and up to an additional \$250,000 in matched funds). It is expected that PIs will be eligible to submit proposals for the Phase 3 CS Research Project sometime in late 2009 or 2010, depending on the duration of their Phase 2 CS Research Project. The designated funds to be matched may come from any Government or industrial source, but must support the ongoing research project in a manner consistent with the fundamental computer and information technology developed in the Phase 2 CS Research project. Proposal submissions for Phase 3 CS Research Projects will be made directly to DARPA's Defense Sciences Office (DSO) at <http://www.sainc.com/dsobaa/>. Details of the requirements for the research proposal will be provided during the second year of program participation. Participants who submit a proposal for Phase 3 and are not selected for award will not be eligible for future funding, if available, under this program.

TECHNOLOGIES OF INTEREST

The goal of the 2008 CSSG program will be to identify and develop innovative ideas with high payoff in computer science and related disciplines. Examples of potential areas of interest are given in Section D. Research will focus on ideas that can lead to revolutionary technology to permit significant advances in computational modeling, simulation, control, information analysis and DoD functional capabilities. Technologies should be derived from the broad area of computer science, although respondents do not necessarily need to be members of traditional computer science departments.

TECHNICAL AND ADMINISTRATIVE INQUIRIES

This 2008 CSSG Proposer Information Pamphlet (PIP) and the RA 07-43 solicitation document are available online at <http://www.darpa.mil/dso/solicitations/solicit.htm>. Administrative or technical questions should be sent via e-mail to RA07-43@darpa.mil. Questions for the DARPA Grants Officer, including budget questions, should also be directed to RA07-43@darpa.mil. Note that the process of negotiating the initial grant or other assistance instrument begins after a proposer is notified of his or her selection as a participant on the CS Study Panel and has obtained a SECRET clearance. Questions regarding the clearance process should be e-mailed to CS2P.ClearanceQuestions@ida.org. All questions and answers of relevance to the community will be posted to a "Frequently Asked Questions (FAQ)" web page accessible at the URL <http://www.darpa.mil/dso/solicitations/FY2008CSSGFAQ.htm>.

OTHER IMPORTANT INFORMATION

This 2008 CSSG PIP, along with the RA 07-43 solicitation, constitutes a DARPA Research Announcement (RA), which is a Broad Agency Announcement (BAA) as contemplated in the FAR 6.102 (d)(2). All prospective proposers MUST also refer to the RA 07-43 solicitation, in addition to this PIP, before submitting a proposal. The Government reserves the right to select

for award all, some, or none of the proposals in response to this announcement. Only U.S. institutions of higher learning are eligible for awards under this RA, and participants must be junior faculty members who are able to receive a U.S. Department of Defense SECRET security clearance. All responsible sources may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals.

RA 07-43 will remain open through August 10, 2007, no later than 4:00PM, ET, which is the due date for CS Study Panel Phase 1 proposals. Only those candidates receiving awards for CS Study Panel participation will be eligible to submit proposals for Phase 2 CS Research Projects. Only those CS Study Panel participants who receive a Phase 2 CS Research Project award will be eligible to submit proposals for Phase 3 CS Research Projects. Details regarding research proposal submissions for Phase 2 and 3 will be communicated to the selected CS Study Panel participants during Phase 1 and 2 respectively. Phase 2 and 3 CS Research Project proposals will also be evaluated in accordance with evaluation criteria listed in this PIP. It should be noted that no further RA announcement or amendment is anticipated for Phase 2 and 3 CS Research Project awards.

B COMPUTER SCIENCE STUDY GROUP (CSSG) PROGRAM COMPONENTS

B.1 COMPUTER SCIENCE STUDY PANEL (CS STUDY PANEL)

B.1.1 CS Study Panel - Phase 1

Junior faculty members are invited to apply as candidate participants for the CS Study Panel. Participants should be both pre-tenure and no more than seven years beyond receiving a doctoral degree, with demonstrated exceptional potential for world-class contributions to the field of computer science. Each participant shall have intense research interest in a computer science topic of relevance to DoD and demonstrate novel ideas that lead to fundamental advances rather than incremental work in the field. Section D contains a description of example topics, but is not intended to be a complete list. Other topics will be considered, and will be judged according to their innovativeness and potential relevance to applications of interest to DoD.

Candidate's proposals will be selected based on the "Criteria for Selection" explained in Section F.4. If they do not already have an appropriate security clearance, each selected participant will immediately submit a full application for a SECRET level security clearance through IDA. If they already have an appropriate clearance IDA will have to verify its validity. DARPA may require a participant to apply for and receive a TOP SECRET clearance in order to participate on the CS Study Panel. Clearance applications involve completion of Standard Form SF-86 (see <http://www.dss.mil/epsa/>), which can be completed through an online process. A general determination for each candidate as to whether their clearance nomination is likely to be successful will be made as soon as possible. Negotiation for awards to the associated institutions will take place once the selected participant has obtained their SECRET security clearance.

Multiple candidates may apply from any institution. DARPA estimates that there will be at most a dozen participants on this year's Panel during 2008.

The meetings of the Panel will consist largely of briefings and visits, and will provide to the combined members of the Study Panel information about the challenges and successes of the DoD in the field of computer science.

The first formal meeting of the CS Study Panel will occur about March 2008. This session will last three days and will take place at IDA in Alexandria, Virginia. The session will consist primarily of briefings and discussions at the IDA facility.

There will be two summer sessions in 2008, each meeting lasting roughly a week. Participants will receive, well in advance, instructions as to a date, time, and location where the meeting will commence, and a date, time, and location where the meeting will end. Both locations will be somewhere in the Continental United States. Travel to and from the participant's host institution to the starting point and from the finish point will be arranged individually by the participant's host institution. For the time in between the start and finish points, transportation, transfers, hotel bookings, and some meals will be arranged by a travel agency designated by IDA, which will assess an applicable cost for the session. Participants will visit industrial and Government laboratories, factories, assembly plants, and military ranges and facilities where important applications of computer science technology are currently operational. Participants will meet with Operational Workers, Project Managers, Commanding Officers, Government Researchers, and many others. To receive the full benefit of all the visits, there will be occasions where moderate physical activity or ability will be required.

A final session in 2008 will be held in the fall, again at IDA. This session will likely include visits in the Washington, D.C. region and transportation will be provided from IDA. All funding for travel expenses will be provided by the grant.

B.1.2 CS Study Panel - Phase 2

The CS Study Panel portion of Phase 2 may consist of two meetings, lastly roughly three days each. The main focus of this phase will be to work on the CS Research Projects (as explained in B.2.1 below). All funding for travel expenses will be provided by the grant. Only Phase 1 participants whose proposals were selected for Phase 2 will be eligible to attend the two additional panel meetings.

B.2 COMPUTER SCIENCE RESEARCH PROJECTS (CS RESEARCH PROJECTS)

B.2.1 CS Research Projects - Phase 2 (100% DARPA Funding)

Each participant in the CS Study Panel, Phase 1, will be eligible to submit a proposal for a Phase 2 CS Research Project, with the participant as the PI. Proposals will be due approximately mid-November 2008; details regarding the Phase 2 CS Research Project proposals will be communicated to the CS Study Panel participants during Phase 1. Each proposed project will support revolutionary ideas for fundamental research in the broad computer science field to provide capabilities relevant to the mission of DoD.

Phase 2 proposals will also be selected based on the "Criteria for Selection" explained in Section F.4, and DARPA or its agents will negotiate award grants or other assistance instruments, as applicable, to the selected U.S. institutions to fund the research projects. The funding will support the continued participation by the PI on the CS Study Panel (see section B.1.2) and CS Research Project. A participant is not required to submit a proposal for a Phase 2 CS Research Project. However, any participant who does not submit a proposal for a Phase 2 CS Research Project will not be eligible for future funding under this program. A participant who's Phase 2 CS Research Project is not selected for award will not be eligible to submit a proposal for Phase 3 CS Research Projects.

The funding for the research, as specified in the proposal, will typically start in the summer of 2009 and continue for a period of 12 to 24 months. The research will be conducted by the PI and the PI's research team. The PIs will be encouraged to make use of resources and collaborations that arise as a result of their participation on the CS Study Panel, but the research will take place in the institution environment and will be unclassified fundamental research with general scientific objectives that makes use of unclassified data.

B.2.2 CS Research Projects - Phase 3 (50% DARPA Funding, 50% Matched Funding)

Before the end of calendar year 2009 or 2010, depending on the duration of each Phase 2 proposal, each CS Research Project PI may submit a proposal with plans for continued research for Phase 3. DARPA will consider co-funding continuations of CS Research Projects, matching other sources dollar-for-dollar (up to \$250,000 in DARPA funding and up to an additional \$250,000 in matched funds), with the following limitations:

- The CS Research Project PI must present evidence of progress and potential utility.
- The PI will remain the PI.
- The institution's administrative support to the CS Research Project must be adequate.
- The funds to be matched must support the research in a manner that permits the project to continue in largely the same manner as the ongoing project. That is, the personnel will largely remain the same, the research topic or focus idea is consistent with the original focus (albeit, the work might move toward greater applicability, or be modified on the basis of results and experiments conducted during the previous phases of the research), and the scope of the effort, in terms of personnel and expenditures, will remain approximately the same, relative to the total amount of funding available.
- The funds to be matched might come from industry, a DoD service lab, or another Government research funding agency. DARPA support for the Phase 3 CS Research Project is intended to last approximately 12 months.

C OBJECTIVE

DoD conducts research to develop computational capabilities by developing a broad range of technologies in areas of computer science of interest for military applications. These areas include, but are not limited to, a number of broad categories of particular interest, including operation, control, and optimum exploitation of unmanned vehicles; optimum deployment and networking of sensors and other information sources, and efficient and economic means of presenting and exploiting the data they generate; modeling and simulation of the modern air, sea and land battlefield, including terrain, weather and environmental conditions, enhanced methods for secure sharing, collaboration, transmission, archiving and retrieval of information, and improved planning methodologies for deployment of military resources. The purpose of this program is to rapidly identify ideas in the field of computer science that can be used to provide revolutionary advances in the broad areas outlined above, as well as other areas that are deemed relevant to military applications, and to rapidly investigate the application of those ideas in problems of significance to DoD. Research should demonstrate innovation and creative thought to move beyond current practices and applications to achieve fundamental advances in the field.

D SAMPLE RESEARCH AREAS OF INTEREST

D.1 POTENTIAL CSSG RESEARCH AREAS

A number of areas have been suggested below that might become the basis of a CS Research Project. The list is not exhaustive; a successful proposer may well have research interests in other areas. Further, a CS Research Project proposed later by a CS Study Panel participant may be different than the research areas that were described in the original proposal. The CS Research Project should demonstrate novel approaches and innovation that leads to fundamental advances rather than incremental work in the field. These example areas of interest are provided simply to indicate the large breadth of interest that DoD has for the application of computer science research to topics of relevance to its needs.

D.1.1 Bio-inspired Exploitation Systems

Bat sonar, ant colonies, and immune systems are examples of biological systems that have inspired the development of algorithms applicable to hard and large problems in a variety of areas. Examples include genetic and evolutionary algorithms, neural networks, new ideas for developing routing algorithms in wireless networks inspired by biology, including software and algorithms endowed with capabilities such as adaptation, evolution, growth, healing, replication and learning. Potential applications of interest to the military include autonomous intelligent vehicles, adaptive video processing algorithms, flight and other control systems, and analysis of medical data.

D.1.2 Biometrics

Biometrics is the science and technology of measuring and analyzing biological data. We are interested in the development of novel and improved technologies for measuring and analyzing human body characteristics, such as fingerprints, eye retinas and irises, voice patterns, facial patterns and hand measurements, for authentication purposes. Desirable characteristics of proposed techniques include minimizing key metrics such as the percent of invalid users who are incorrectly accepted as genuine users, the percent of valid users who are rejected as imposters, and the percent of valid users who are not recognized by the system.

D.1.3 Cognitive Unifying Exploitation Theory

Exploitation systems that provide tools for the analysis of large bodies of information have historically been developed as stand-alone systems pursuant to specific military problems (e.g., target recognition) and specific objectives (e.g., battlespace domination). The integration of disparate analysis systems provides the opportunity to fully utilize existing and evolving information technology as synergistic components in an encompassing cognitive exploitation structure. We will consider research on such general models of cognition that have the potential to facilitate information analysis for Defense applications.

D.1.4 Complexity Theory

Complexity theory deals with classifying computational problems by the amount of computational resources they require, or, more specifically, the number of processing steps and the memory required for their solution. An example of a problem of current interest in this area is the question of whether efficient approximation algorithms exist for problems that are inherently complex. We are particularly interested in means of determining what techniques exist for speeding up the solution of problems in high performance computing, and what the

bounds on speed of computation are for various types of computer architectures, including scalar, parallel, distributed network, etc.

D.1.5 Computational Mapping and Terrain Visualization

Terrain information supplies an important context for ground operations. The layout of terrain is a determining factor in arraying of forces, both friendly and enemy, and the structuring of Courses of Action (COAs). Combining information about terrain features with hypotheses about enemy assets can lead to inferences about possible avenues of approach, areas that provide cover and concealment, areas that are vulnerable to enemy observation, or choke points, etc. We are interested in applications of computer science combined with multi-sensor, high-resolution data to quickly create accurate maps and identify features of military significance.

D.1.6 Computer Graphics

We are interested in the development of fast, realistic computer graphics methods for applications in battlefield simulations, flight and vehicle simulators, virtual training devices, terrain mapping and shading under various lighting conditions, and scientific visualization of the results of complex 2D/3D computer codes. Methods that are both fast enough for real-time simulation, yet preserve complex visual cues resulting from effects such as multiple scattering from surfaces ranging from specular to diffuse, realistic shading, atmospheric scattering, absorption and dispersion, etc. are of particular interest.

D.1.7 Computer Vision

Computer vision is devoted to the analysis of pictures and videos with the ultimate goal of achieving results comparable to those of a human viewer. Applications of interest to DARPA include medical imaging, video surveillance, detection and tracking of individuals and vehicles, and video compression. Methods that include implementation of machine learning are of particular interest, but we will also consider methods designed to solve specific tasks more effectively than previous systems.

D.1.8 Detecting Deviations from Normalcy

Pattern recognition theory tends to focus on events and patterns that are relatively constant over time. Dynamic models of activity, however, attempt to analyze trends and extrapolate patterns to expected patterns of behavior in the future. But, beyond predicting trends in patterns that an analyst might wish to detect because they represent a threat, more advanced theories might attempt to model, or predict, patterns that represent normal behavior, so that threats can be detected as deviations from that normalcy pattern. Applications of interest include the detection of intrusions in computer systems and networks, and the detection of medical anomalies.

D.1.9 Information Accessibility, Integration, and Management

We are interested in next-generation methods, tools, and technologies to make it possible to access, integrate, analyze, and efficiently manage massive stores of widely distributed, heterogeneous information (e.g., science and engineering research data, Federal records). These capabilities will help human analysts make better use of all available information resources in the pursuit of knowledge relevant to military applications. Examples of possible research areas include development of human-computer interaction capabilities that enable rapid, easy access to, and understanding of, heterogeneous information, and of cognitive systems able to “learn,” adjust to change, and repair themselves to enhance the capabilities and deployability of robotic devices designed for the modern battlefield. This area also includes

investigation of software systems to more effectively assemble raw data from sensors into meaningful data sets.

D.1.10 Machine Learning

Machine learning is the study of computer algorithms that improve automatically through experience, typically involving systems that perform tasks associated with artificial intelligence (AI). We are interested in techniques for improving the efficiency and effectiveness of systems via the autonomous acquisition and integration of knowledge, and exploitation of this knowledge to enable continuous self-improvement. Examples of applications of potential interest to the Military include robot locomotion, wargaming, object recognition in computer vision, speech and handwriting recognition, bioinformatics, and medical diagnosis.

D.1.11 Network Management and Modeling

Our military services depend on a broad array of interacting physical, informational, cognitive, and social networks. Greater fundamental understanding of these networks is essential to ensure they function reliably and smoothly, and are not vulnerable to attack. This gap between what is known and what is needed to ensure the reliable and secure operation of complex networks makes the transition to network-centric operations (NCO) problematic. We are interested in developing the fundamental knowledge necessary to design large, complex networks in a predictable manner. The focus should be on advancing fundamental knowledge rather than on specific applications.

D.1.12 Novel Sensing and Information Gathering

Sensing technology has rapidly moved beyond still and video cameras as other modalities have become available. Information analysis not only requires that analytic methods be developed for a variety of sensor types, but also that relevant sensor data be gathered, which may require the development of novel information gathering methods. We are interested in investigating new types of probes, devices or systems for actively probing or passively gathering information from the environment using probes, devices, or systems that are designed and developed for the purpose, and also in collecting data from sensors and systems that already exist, and assembling that data in a way that provides greater insight or more effective use of the information.

D.1.13 Pattern Recognition

Pattern recognition aims to classify data (patterns) based on either *a priori* knowledge or on statistical information extracted from the patterns. The patterns to be classified are usually groups of measurements or observations, defining points in an appropriate multidimensional space. New and innovative breakthroughs in pattern recognition would be immediately applicable to information analysis. The field calls for approaches that address complicated high-dimensional pattern spaces with relatively small amounts of data, potentially using expert knowledge of the application domain. These techniques could help lead to the unambiguous recognition of objects and activities associated with recognition of rare objects or events.

D.1.14 Programming Languages

The goal of research in the area of programming languages should be to optimize acceptability and productivity gains, without significantly compromising correctness and ultimate program efficiency. Potential areas of research may include the debugging process and the system administration process, as well as the programming process. Improvements relevant to parallel computing architectures are of particular interest. We are interested not only in new or

improved versions of system programming languages such as C or Java, but also in research devoted to scripting languages such as Perl and Tcl.

D.1.15 Reasoning with Uncertainty

Probabilistic reasoning is a means of representing and reasoning with uncertain knowledge exploiting ignorance and vagueness. Many research approaches and methods have been investigated in this area, including Bayesian statistics, Bayes nets, Markov networks and decisions processes, self organizing feature maps, abductive reasoning, belief nets, dynamic and temporal probabilities models, influence diagrams, ad hoc uncertainty measures, temporal probabilistic models, decision theory, and truth maintenance systems. We are looking for methods that provide a rigorous foundation for reasoning with uncertainty in an extensible, scalable way, with demonstrated utility beyond point demonstrations.

D.1.16 Smart Surveillance Systems

The increasing need for sophisticated surveillance systems and the move to digital surveillance infrastructure has transformed surveillance into a large scale data analysis and management challenge. We are interested in smart surveillance systems that use automatic image understanding techniques to extract information from the surveillance data. In addition to proposals that consider the information extraction aspect of the challenge, we will also consider those that address the use of extracted information in the context of search, retrieval, data management and investigation.

D.1.17 Software Engineering

The process of software development and evolution is an ambitious undertaking involving complex, incomplete, sometimes inconsistent and often fuzzy factors. Variables concerning design, quality, reliability, stakeholder interests and objectives, moving targets, and constraints, such as budget and timeline, must all be considered throughout a dynamic life cycle. The challenge is to provide sound methodological support for enabling good decisions about processes and products, risks and bottlenecks, as well as for selection of tools, methods and techniques. A need also exists to certify critical software systems to ensure their dependability, relying on evaluation of the software development process, as well as the properties of the system. Research topics in the area of software engineering will identify and develop innovative means of meeting the challenge.

D.1.18 Computational Epidemiology

Epidemic models of infectious diseases date back to Daniel Bernoulli's mathematical analysis of smallpox in 1760 and have been developed extensively since the early 1900s. Mathematical modeling, with the help of modern computational tools, has provided new insights on such important issues as drug resistance, rate of spread of infection, epidemic trends, and effects of treatment and vaccination. We are interested in computational methods to model the spread of disease, to facilitate early detection of diseases resulting from acts of bioterrorism or deployment of biological weapons, and to investigate the interaction of pathogens and their hosts in epidemic situations.

E CS STUDY PANEL PARTICIPANT PROPOSAL

E.1 CONTENT

The CSSG proposal will consist of five parts: A cover page, a statement of research interests, a curriculum vitae, a cost cover page and a budget. The following table outlines the proposal format and page limitations.

Table 1 - Summary of CS Study Panel Proposal contents

SECTION	TOPICS
Cover Page	<ul style="list-style-type: none"> • The Research Announcement title and number; • The name of the proposer; • U.S. security clearance, if any; • Institution name and location; • Technical point of contact for the proposal, including telephone numbers and email address; • Contracting point of contact for the proposal, including email address; • Period of performance (12 months); and • Total proposed cost.
Statement of Research Interests (6 Page Limit)	<ul style="list-style-type: none"> • An overview of the PI's research area(s) of interest and history of the ideas; • Potential relevance of this research area to DoD computer science applications; • Potential for novel idea(s) that would lead to fundamental advances rather than incremental work; • References and pointers to relevant publications; and • Collaborations and other activities.
Curriculum Vitae (No Page Limit)	<ul style="list-style-type: none"> • Academic/Professional Vitae; • Doctoral thesis, advisors, and thesis topic; • Post Doc activities and advisors; • List of all sponsored research as PI or research participant, including Agency, Program Manager, funding amount (in the case of DARPA funding, name the DARPA Office and Program Manager); • List of publications, with hyperlinks to abstracts or papers.
Cost Cover Page	<ul style="list-style-type: none"> • The Research Announcement title and number;

	<ul style="list-style-type: none"> • Institution name and location; • Specification of type of organization submitting the proposal (e.g., Historically Black College or University or Minority Institution); • Specification of the award instrument as a Grant; • Technical point of contact for the proposal, including telephone numbers and email address; • Contracting point of contact for the proposal, including email address; • Period of performance (12 months); • Date the proposal was prepared; • Total proposed cost; • Institution Data Universal Numbering System (DUNS) code, Tax Identification Number (TIN) and Commercial and Government Entity (CAGE); and • Mailing address for the above DUNS/TIN/CAGE organization as found on the Central Contractor Registration (CCR).
<p>Budget (No Page Limit)</p>	<ul style="list-style-type: none"> • Budget justification; • Costs for equipment/hardware, software, and/or computer services, if applicable; • Participant salary estimates; • Travel expenses (estimated as \$12K total for budget purposes); • Administration support costs; and • Any other anticipated expenses.

The acceptable formats for submission of these documents are Word, PDF, and/or Excel. Documents submitted in other formats may not be reviewed. The Statement of Research Interests should include a succinct description of the active areas of research of the candidate and a description of accomplishments to date. The statement should provide information as to the reason the ideas being pursued are innovative and important and why the ideas are not simply improvements and enhancements to existing methods. The statement should discuss briefly the potential impact of the ideas for Defense applications and also for non-Defense applications. The statement should name collaborations and ongoing research group activities related to the research direction. Finally, while published papers are not to be included in the statement, hyperlinks to representative and relevant publications may be included.

The curriculum vitae is an account of one's career and qualifications. The vitae may be in the format of the principal investigator's choice.

Proposers are required to submit a first year budget for Phase 1 as part of their formal proposal. This budget will fund the candidate's participation on the CS Study Panel including salary, travel, and related research activities. A typical cost proposal, fully burdened (i.e., including all costs including benefits and overhead), will not exceed \$100,000 and may support the following:

- Two or three summer months' salary for the participant.
- Travel funds to attend Phase 1 CS Study Panel meetings, to include two meetings at IDA, one in the spring and one in the fall, and travel to the starting point and return travel from the terminal point for each of two summer trips. We estimate that travel costs for the participant in the CS Study Panel will be \$12,000 during the first year of the program.
- Summer trip session costs, such as per diem expenses for meals and incidentals.
- Research Assistant support and Administrative support

At the end of Phase 1, each first-year participant on the CS Study Panel may submit a research proposal for Phase 2 funding, with the participant as the PI. The research proposal will be accompanied by a cost proposal. A typical research program, for a period of time to be from 12 to 24 months, might support the following:

- Summer salary for the PI.
- Travel funds and summer trip session costs for continued participation on the CS Study Panel. (The number of trips for Phase 2 will be discussed during Phase 1 to facilitate estimation of total travel costs for Phase 2.)
- A postdoctoral research fellow, funded as a full-time employee.
- One or two senior graduate research assistants, funded for full-time research during the summer months and part-time research during the academic year.
- Part-time support for programmer and data visualization assistance to the project.
- Administrative support, such as a work study, to assist the PI in administering the research program.

Fully burdened, the cost for Phase 2 will not exceed \$500,000.

Subsequent increments for the research project, subject to matching fund requirements, will fund proportionate shares of substantially the same research project structure.

At all stages, DARPA funding is subject to availability of funds for the CSSG program within DARPA.

Proposers applying for the 2008 CSSG may submit their proposals to the grants.gov website (<http://www.grants.gov/>) by using the "Apply for Grants" function or by going directly to the DARPA/DSO Submission website (<http://www.sainc.com/dsobaa/>) and choosing "submit a full proposal" under RA "07-43, 2008 CSSG." Proposers who are eligible to submit a Phase 2 or Phase 3 proposal will go directly to the DARPA/DSO Submission website (<http://www.sainc.com/dsobaa/>). Proposals received after the due date will not be considered. All proposals shall be submitted by the institution's Office of Sponsored Research or similar office in accordance with each institution's applicable guidelines/policy.

F CS STUDY PANEL PROPOSAL EVALUATION

F.1 GENERAL CONSIDERATIONS

It is the policy of DARPA to treat all proposals as competitive information and to disclose the contents only for the purposes of evaluation. The Government will use selected support contractor personnel to assist in administrative functions only and they will sign appropriate NDA and COI statements.

F.2 EVALUATION COMMITTEE

Expert Government personnel will read, review and evaluate proposals with regard to the criteria outlined in F.4 and offer recommendations for CS Study Panel participant selection.

The Evaluation Committee can only offer recommendations for proposal selection. Contracting officers are the only individuals who are legally authorized to contractually bind or otherwise commit the Government.

F.3 CS STUDY PANEL DIVERSITY

Although there is no set-aside for a specific numbers of Panel members to represent particular groups, DARPA hopes to achieve a diverse Panel, distributed geographically, distributed in terms of research topics and research ideas, and distributed in terms of minority representation. Historically Black Colleges and Universities (HBCUs)/Minority Institutions (MIs) are specifically encouraged to submit proposals.

F.4 CRITERIA FOR SELECTION

A candidate for the CS Study Panel should be a junior faculty member at a U.S. institution of higher learning both pre-tenure and no more that 7 years beyond receiving a doctoral degree. Multiple candidates may apply from any institution.

Proposals from candidates who meet the initial criteria requirements will be evaluated against the criteria outlined below, in relative order of importance:

- Overall scientific and technical merit of the candidate's research interests, the novelty of the ideas, and the likelihood that the candidate will generate new ideas. An understanding of potential beyond the state of the art must be demonstrated.
- Potential impact of the research interest on Defense applications. Candidates must demonstrate the potential of successful research to radically change military capability or improve national security with a clear statement of the goals of their ideas and a quantitative comparison with existing technology.
- Candidate's experiences and demonstrated research accomplishments and leadership abilities. Candidates must demonstrate that they have the necessary background and experience to perform meaningful research.

Proposers selected based upon the above evaluation criteria will then be investigated to receive a U.S. SECRET security clearance. Only those proposers who receive a U.S. SECRET security clearance will be eligible to begin grant negotiations with a contracting officer.

At approximately 9 months of participation in the CS Study Panel, a participant may submit a proposal for a CS Research Project for Phase 2 funding. The following evaluation criteria will be used to evaluate project proposals submitted by Phase 1 participants.

- Overall scientific and technical merit of the candidate's proposed research project, to include the innovativeness of the proposed approach. An understanding of potential beyond the state of the art must be demonstrated.
- Potential impact of the proposed research project on Defense applications. Candidates must demonstrate the potential of successful research to radically change military capability or improve national security with a clear statement of the goals of their ideas and a quantitative comparison with existing technology.
- Capabilities and Facilities.

If a participant is selected for a Phase 2 CS Research Project award, an additional proposal may be submitted for Phase 3 funding. The following evaluation criteria will be used to evaluate Phase 3 project proposals submitted by Phase 2 project participants.

- Overall scientific and technical merit of the candidate's proposed continuation of the research project, to include the innovativeness of the proposed approach and demonstrated progress in achieving Phase 2 project goals.
- Potential impact of the proposed research project on Defense applications. Candidates must demonstrate the potential of successful research to radically change military capability or improve national security with a clear statement of the goals of their ideas and a quantitative comparison with existing technology.
- Capabilities and Facilities.

G SECURITY

All research work at the institution will be of a fundamental nature and shall be unclassified. Data and technical information shall typically be publicly released and unrestricted; however, any data or technical information imported to the institution from the Government or DoD contractors shall be subject to export controls, including, but not limited to, the provisions of the International Traffic in Arms Regulation (22 CFR pt. 121 et seq.), the DoD Industrial Security Regulation (DoD 5220.22-R) and the Department of Commerce Export Regulation (15 CFR pt. 770 et seq.), and shall be handled by the PI and research personnel in a manner that prevents unlicensed export.

Participants on the CS Study Panel will require a U.S. DoD SECRET security clearance. Candidates selected for participation that do not already hold such a clearance will apply through IDA. Potential candidates are welcome to confidentially discuss their eligibility with IDA.

The host institution is not required to hold a facility security clearance. The participant in the CSSG program will not deal with classified data or information at the host institution.