

CREATE Year 9/FY2013 Call for White Papers

CREATE, the DHS-sponsored Center of Excellence at the University of Southern California, seeks 2-3 page White Papers on research projects in risk analysis, economics, and operations research in risk management. Awards of up to \$100,000 per award are expected. The anticipated period of performance is 10/1/12 to 9/30/13. White Papers must conform to the format provided below, and are due by **5pm PST February 17 to CREATE@USC.edu**.

CREATE's mission is to use research, education and outreach to help the nation deter, prevent and mitigate attacks and provide resilience. CREATE's mission now includes cyber threats and greater examination of natural disasters and major accidents. CREATE seeks innovative projects with high potential for research transition of results to homeland security practitioners. Proposed research projects must address one of the three interrelated themes described below. Preferred projects will use and expand direct liaisons with homeland security agencies and user groups. A project's ultimate success will be the creation of intellectual products that help the homeland security enterprise effectively and efficiently improve the nation's security. Proposers are referred to the CREATE website, <http://create.usc.edu>, for current and past projects so as to make their submissions as relevant, complementary, and integrated as possible.

1. Risk Analysis - Management of Risks from Intelligent, Adaptive Adversaries: extend game theory, risk analysis, terrorist preference modeling and decision analysis to account for the strategic nature of terrorist decision-making with regard to countermeasures; the integration of intelligence and data mining; cyber terrorism; risk perception and communication, including behavioral effects, transmission of fear, and the social amplification of risks.
2. Economic Consequences and Costs: develop tools to assess consequences of terrorism, natural disasters and major accidents, especially their direct and indirect economic impacts, explore options for building resilience and business continuity, measuring non-market valuations, and the use of behavioral economics to examine the impact of how individuals respond to threats and hazards, including the role for alternative risk mitigation strategies.
3. Operations Research in Risk Management: investigate and apply new analytical approaches to assess the benefits of risk management programs across all hazards, threats and target domains and inform policy decisions; use complex system analysis to examine the effect of feedback mechanisms, such as the adaptive adversary and deterrence effects, etc.

Projects deemed suitable will be notified by March 16, 2012 and invited to submit 5-page *Extended White Papers* due April 27, 2012. Selected *Extended White Papers* will be invited to be presented to CREATE's Scientific Advisory Board on June 4-5, 2012. Successful *Extended White Papers* will be notified by June 30 and invited to submit *Full Proposals*. Instructions for the *Extended White Papers* and the *Full Proposals* will be included with the invitations. Formal proposals are not requested at this time, as only selected projects will be invited to submit *Full Proposals*. A panel of internal reviewers will evaluate all projects. The criteria for evaluation during all stages of the application process are: relevance (25%), scientific quality (25%), feasibility (25%), appropriateness of budget (15%), and qualifications of investigators (10%). CREATE will review the *Full Proposals* for completeness and budgetary feasibility, and recommend a funding rank order based on COE mission relevance. CREATE will forward the ranked proposals to DHS which will evaluate the proposals based on DHS mission relevance and availability of funds and make the final decision.

Project Title (Risk-Based Allocation of BioSecurity Resources)

1-2 sentence summary description (e.g., This project will develop methods for using the output of threat assessment models to optimally allocate resources to counter bioterrorism.)

Project Technical Description (items 1 through 13 not to exceed 3 pages, exclusive of bios)

Keywords: Bioterrorism, budgeting, risk modeling, mathematical programming

1. **Theme Area:** Identify applicable theme
2. **Principal Investigator:** Your Name
3. **Institution:** Your Institution
4. **Co-Investigators:** Other contributors' names and institutions.

5. Brief Description: (1-paragraph description)

The purpose of this research is to improve methods for risk-based allocation of resources to counterterrorism measures. This work builds on efforts to develop threat assessments for such areas as biological weapons attacks by using those threat assessments as inputs to models designed to help DHS optimally allocate investments intended to counter bioterrorism. In addition, we will address the problem of allocating state grants for emergency responders. The purpose of this work is to provide sound analytical guidance to decision makers regarding the most effective way to obtain maximum impact from a given funding level.

6. Objectives: (Clear expression of purpose and goals.)

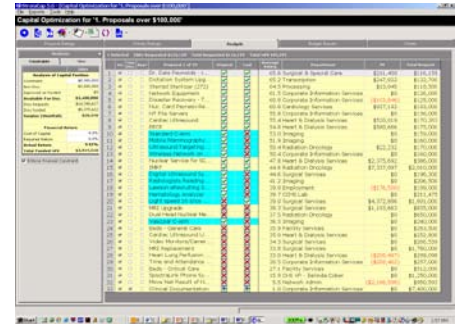
This research will: (a) develop one or more comprehensive methodologies for risk-based resource allocation among discrete counterterrorism measures; (b) perform feasibility testing of these methods through application to actual data on bioterrorism threat reduction measures; (c) develop one or more comprehensive methodologies for allocation funding where the decisions are selection of continuous funding levels rather than discrete counter measures; (d) perform feasibility testing of these methods through application to the problem of allocating state grants for emergency responders; (e) summarize and evaluate the conceptual and practical soundness of alternative risk-based resource allocation strategies, including comparing the methods developed to allocations developed by other methods and approaches.

7. Interfaces to CREATE Projects: (How will your project integrate with other Center projects).

This work will maintain a close interface with CREATE's PortSec risk analysis and economics project in evaluating the security resource allocations.

8. Previous or current work relevant to the proposed project.

We are working with the Infrastructure Protection division of the DHS to use their RAMCAP methodology for prioritizing risks, and with the California Office of Homeland Security to implement a pilot study to prioritize California sites in terms of risks and risk reductions. We also plan to collaborate with Lawrence Livermore National Laboratories' HOPS program to provide risk assessments.



Representative Figure

9. Major Products and Customers: (What are the major products of this effort, and who are the primary clients that are interested in the results.)

Project deliverables will consist of a report that will: (a) develop one or more comprehensive methodologies for risk-based resource allocation among discrete counterterrorism measures; (b) perform feasibility testing of these methods through application to actual data on bioterrorism threat reduction measures; and (c) develop one or more comprehensive methodologies for allocation funding where the decisions are selection of continuous funding levels rather than discrete counter measures. Customers: DHS – IP; DHS – ORD; California OHS

Products will include: Risk assessment methodology for prioritizing projects and programs and to gauge the cost/effectiveness of investments in risk reductions; research publications and reports.

10. Technical Approach: (Describe technical approach to achieve research objectives.)

The methods developed will build on previous research on decision analysis methods for resource allocation and the use of mathematical programming for optimal resource allocation. Consequence assessment models and risk reduction assessments will be based on a mix of methodologies including probabilistic risk analysis, economic analysis, and qualitative assessments by experts, as appropriate. Methods for combining these assessments will be grounded in the theory and methods of multiattribute utility and value models. The overall resource allocation framework uses mathematical programming including linear, nonlinear, and integer programming.

(continue, expand as necessary, within page limit guidelines)

11. References:

12. Major Milestones and Dates: (Key progress management steps and schedule)

1. Develop risk and consequence measures to reflect the impact of terrorism events and a multidimensional risk index that combines these diverse risk and consequence measures based on policy makers' judgments about the relative severity of consequences -- March 2012.
2. Incorporate the risk reduction measures into a risk allocation model that takes into account both the effectiveness of various alternatives and their cost -- June 2012.
3. Conduct case study for bioterrorism risk reduction -- August 2012.
4. Explore extensions of model to account for continuous expenditure levels -- September 2012.

13. Budget: (1-2 paragraph narrative to accompany project cost).

This one-year project will be conducted for \$50,000. This will cover one month of salary for the PI and one graduate assistant. The budget would allow for one trip to attend a meeting at USC, one trip to DC, and one trip to a conference to present results. The budget would also allow for a limited materials and supply budget for project-related expenses.

14. Brief Bios (PI and up to two Co-PI's): One page maximum for each.

**Additional Requirement for Currently Funded CREATE Projects
(Not Counted in Page Count Limit Described Above)
Please provide a 1-2 page Progress Report according to the format below.**

1. Research Accomplishments

[Summarize research results in 1-2 paragraphs. If you have multiple sub-projects, please provide 1-2 paragraphs for each sub-project]

2. Applied Relevance

[Summarize applied relevance (utility to DHS or other government agencies) of each sub-project -- 1-2 paragraphs per sub-project]

3. Collaborative Projects

[Describe any collaborations with other CREATE projects, collaborative projects with other DHS Centers of Excellence, Minority Serving Institutions, local law enforcement, other NSF grants, etc. -- not more than 1-2 paragraphs]

4. Research Products

List a) publications, b) presentations, and, c) software tools, models and products developed during the reporting period.]

5. Education and Outreach Products

[Number of students supported and students involved in projects, list conferences sponsored or co-sponsored, list participation in committee work, identify substantive contacts with DHS and other Federal agencies, meetings with government entities and non-CREATE organizations, etc.]

6. Current Expenditures

[How are your expenditures coming along? Are you on schedule to completely use your budget by 9/30/2012?]