



for the Improvement of Mine Safety and Health, Inc.

## **4<sup>th</sup> Solicitation and Call for Concept Papers (AFC417)**

### **HOLISTIC MINING SAFETY AND HEALTH RESEARCH EFFORTS**

#### **Background**

The Alpha Foundation for the Improvement of Mine Safety and Health is a private foundation with the mission to improve mine safety and health through funding research and development projects at qualified academic institutions and other not-for-profit organizations.

This is the fourth solicitation for projects to conduct research addressing the root causes of disease, injuries, and fatalities in the mining industry and, where possible, to achieve successful implementation of practical solutions derived from the research effort. Thirty-three projects from eighteen organizations have been funded to date. Past projects have been 2-3 year efforts with total project funding levels ranging from \$291K to \$798K. Synopses of previously funded projects can be viewed at the Alpha Foundation website at [www.alpha-foundation.org](http://www.alpha-foundation.org).

Prior to the current solicitation, the Foundation focused its grant funding on single investigator research that sought to attract well-qualified experts to address a particular aspect of mining health and safety concerns. These projects have been 2-3 year studies led by a single principal investigator or co-principal investigators coupled with a relatively small project team, typically comprised of students, who were studying under the leadership of the PI, usually in the same discipline. While this approach has worked well for narrowly focused research agendas, the Foundation now seeks to address broader problems that require multidisciplinary efforts that lead to a more holistic solution.

Approximately \$8 million is budgeted for this solicitation. It is expected that 4-8 qualified projects will be funded. Projects can be of up to 4 years in duration, consistent with the research effort and scope of the problem area.

Proposed projects must be relevant to the U.S. mining industry. The scope of research opportunity includes all mining sectors including both underground and surface mining. Furthermore, the Foundation seeks to achieve a cohesive, multidisciplinary approach, incorporating a blend of engineering and health science along with behavioral science and training.

A major aim of the Foundation is to support research projects that have practical impacts on mine safety and health for workers, operators, and policymakers. For this reason, a particular emphasis is placed on the early translation and rapid dissemination of project findings. Upon completion of

the project, grantees will be required to develop a Final Technical Report that conveys the approach, findings and conclusions of the study.

## **Solicitation Focus: Holistic Solutions to Critical Mining Safety and Health Problems**

There are a host of safety and health risks that are both unique and ubiquitous in mining. Mining, by necessity, is a multidisciplinary industry, drawing on several sciences and disciplines. Modern mines encompass a complex synergy of engineering design, manageable risk assessment, and adequate training to provide a safe working environment, secure from collapses of ground and prevention of explosions, as well as a healthy work environment, which requires controlling respirable dust and other toxic substances and working to alleviate hearing loss and musculoskeletal disorders. The complex nature of modern mining coupled with more difficult mining conditions requires multidisciplinary and holistic approaches to promote solutions or advancements in several safety and health areas. Safety or health professionals working independently are not likely to achieve the full benefits that encompass a holistic solution in many problem areas.

Much of mining research has employed targeted and singularly-focused efforts to address specific aspects of a safety and health problem, often addressing the most severe elements of the problem first, and then incrementally working to make further advancements. While such linear, discrete efforts have provided the framework for implementing several health and safety components that have had significant impact on improving health and safety, they have also introduced unintended and confounding consequences that have created new problems. The interactions among risk factors and engineering design criteria indicate that a more comprehensive, “systems” approach is needed to make further advancements in many areas. The Foundation is seeking to expand the solution space and provide those advancements where a more holistic solution is attainable.

Ideally, holistic approaches to new problems should articulate a comprehensive analysis without constraints coupled with a potential solution by looking at the big picture, or the whole system, prior to focusing on the individual components. Holistic efforts to advance solutions in areas where past efforts have yet to achieve solution goals should begin with identifying intervening and interacting factors that influence design outcomes. Information from a variety of disciplines, including surveillance and epidemiology data, should be used to properly identify all factors that are impacting health and safety risks, injuries, and disease relative to this problem area. The proposed holistic approach should strive to address all of those factors, and not focus on any one element or a limited subset of the factors at the expense of, or ignoring, others. Furthermore, holistic approaches should encourage innovation that has not been previously applied to this problem area.

**Thus, the goal of this solicitation is to bring a range of disciplines together to interact and provide a better opportunity through synergistic efforts to solve challenging mine problems. The Foundation intends to create a “coalition” spirit to bring the best talent together and fund a cohesive research effort that is focused on a holistic solution approach around a common goal or specific aim. The desired outcome is to expand the solution space of a particular problem area beyond what has been accomplished with the traditional engineering/technological design practice or health-related exposure assessment studies.**

Consistent with the Foundation’s vision to “enable miners in the future to be free of work-related injury or disease by the implementation of the results of the projects funded by the Foundation”, emphasis in this solicitation will be on tangible, outcome-driven efforts, ideally with the potential to have a direct and near-term impact on mine health and safety. Fundamental research can be proposed but must introduce new components that enable a recognizable advancement toward providing outcomes that would be unattainable without this fundamental work.

## Research Focus

The Foundation has identified the following four major topical areas that encompass the Foundation’s mission:

- Health & Safety Interventions
- Mine Escape, Rescue & Training
- Safety & Health Management & Training
- Injury & Disease Exposure & Risk Factors

Additionally, it is noted that the Foundation’s mission covers all mining sectors and includes both underground and surface mining operations. It is recommended that the submitter explore these topical areas and review the priorities and associated specific aims documented on the Foundation’s website (<http://www.alpha-foundation.org>).

Previous solicitations have concentrated efforts by addressing an individual component or a designated priority within a single topical area. There are no specific priority topics that are being identified in this solicitation. The only requirement is that the chosen health and/or safety topic and proposed research approach should demonstrate the need and value for a holistic effort to study the selected problem.

Projects that will be considered for funding under this solicitation will be those that benefit from a holistic approach encompassing several elements of a problem area that contributes to a common specific aim. The ability to model and incorporate elements of engineering intervention, health exposure relationships, ergonomics, sociology, psychology, robotics, data analytics, training, management, and economics to advance solutions to pressing problems are all elements for consideration in the scope of a holistic design. A holistic approach will be demonstrated by evidence that the proposed concept is more than a collection of related research components. Rather, the proposal must demonstrate that the components are intimately interconnected and can only be understood by reference to the whole. Thus the proposal must successfully emphasize the organic or functional relation between any component and the whole concept.

The proposals will be rated according to the description of a holistic approach provided above. Those that provide the strongest justification for why a holistic approach is needed along with the most cohesive plan and relevant multidisciplinary team will receive the highest evaluation ratings.

## Team Recommendations and Coalition Interactions

To undertake a holistic approach to a problem, it is expected that a multidisciplinary project team will be required. The project team, particularly if assembled as a coalition from more than one organization, must work together as a unified research team as opposed to conducting a set of singular, independent research projects. It is anticipated that every team will include a mining expertise component, although depending on the project focus, it may not be the core or lead group.

Multidisciplinary teams within a single organization are permitted, but only if there is strong justification that the necessary internal expertise is available to fulfill the project goals, and that there is no apparent advantage to seeking more capable expertise outside the organization. In multi-organizational arrangements, a lead organization shall submit the proposal and designate a single Principal Investigator who shall be responsible for managing the project and serve as the technical liaison to the Foundation and the project team members. The proposal shall be submitted and viewed as a single project, and if chosen, awarded accordingly.

The project team is also encouraged to form external (stakeholder) partnerships to leverage assistance for gaining access to mine sites, laboratories, equipment and essential data and to provide an opportunity for self-evaluation and validation of research outcomes when appropriate. This partnership can also serve as an “advisory council” if desired, but will remain a construct of the project team and managed internally at a degree of formality chosen by the project team without any intervention or oversight by the Foundation.

Consistent with Foundation values, this program embraces diversity and inclusion across multiple dimensions such as race, ethnicity, gender, age and disadvantaged socioeconomic status.

## Eligibility Criteria and Limitations

Concept papers will be accepted only from U.S.-based academic institutions and not-for-profit organizations qualifying as exempt from taxation under the Internal Revenue Code.

In addition:

- Sub-contracting to for-profit organizations is discouraged and must be limited to equipment purchase or specialized services only. Funds cannot be used for performing research activities by for-profit organizations.
- In keeping with Foundation policy, grant funds may not be used to support clinical trials of unapproved drugs, to construct or renovate facilities, for lobbying, for political activities, or as a substitute for funds currently being used to support similar activities.

## How to Submit a Concept Paper

Specific requirements for the Concept Paper are described below.

Concept Papers must be submitted electronically, in Adobe pdf format, through the Alpha Foundation Grant Management System, which can be accessed at <https://glenmede.smartsimple.com/welcome/alpha>. The submission deadline for this solicitation is 5 pm Eastern Time on January 31, 2017. Any Concept Paper, modification, or revision received after the exact time specified is “late” and will not be considered.

**Disclaimer Notification:** The Foundation is not responsible for the content or correctness of materials supplied in response to its solicitations and generally and specifically disclaims any responsibility for the same. Proposers are expected to appropriately mark each page of their submission that contains proprietary information. The Foundation will exercise reasonable care in protecting proprietary information from unauthorized disclosure.

Questions regarding the submission of the Concept Papers can be addressed to [grants@alpha-foundation.org](mailto:grants@alpha-foundation.org).

## Concept Paper Format and Emphasis

The emphasis for the Concept Paper submission and subsequent review is on the application of a multidisciplinary effort to engage in a holistic approach to address a complex mine health and safety problem.

The proposer is advised to provide a clear problem statement, the expected added benefit from a holistic approach, a justification for the need and benefits of a multidisciplinary effort and documentation regarding why this effort can achieve an outcome with greater impact than previous efforts have provided in addressing the problem.

The following Concept Paper format is required in order to facilitate uniform reviews. All submissions shall include a cover page followed by ***not more than 10 pages*** of documentation (with no smaller than 11-pt font) that address the designated topics. In addition to the 10-page concept paper, up to two pages documenting biographical sketches of any key personnel shall also be included. Note that ***failure to follow the format can result in the concept paper being disqualified.***

### COVER PAGE

#### CONCEPT PAPER FOR ALPHA FOUNDATION SOLICITATION AFC417

**Title:** Descriptive title of proposed work.

**Submitting Organization:** Name and address of organization.

**Other Participating Organizations:** Provide listing of other key organizations participating in this study.

**Principal Investigator:** Name and contact information (phone and email)

**Administrative Contact:** Name and contact information (phone and email)

**Estimated Cost:** Estimate of total project cost.

**Period of Performance:** Estimate time required to complete the research (months).

## CONCEPT PAPER

**Specific Problem Statement:** Provide a statement of the problem that is being addressed. Identify if the problem area is unique to a specific mining sector or is universal

**Topical Area Relevance:** Identify which one or several of the four primary Foundation topical areas apply to the project topic: 1) Health and Safety Intervention; 2) Mine Escape, Rescue, and Training; 3) Safety & Health Management and Training; or 4) Injury and Disease Exposure and Risk Factors. Using the Foundation website as a guide, identify how the targeted priority areas are related to the problem area.

**Background:** Provide a concise description of the background to the problem including what is known about its causes, the scale of the problem and its importance. Discuss the barriers that have prevented effective solutions to the problem.

**Justification for Holistic Approach:** Explain why this problem should be addressed by a holistic approach and the benefits of pursuing this approach.

**Specific Aims of Proposed Research and Proposed Outcome:** Explain what elements of the problem are being targeted for the research effort and the manner in which a full holistic solution is being pursued. Describe the proposed outcome of a successful completion of the research effort and the impact this will have advancing mine safety and health.

**Research Approach:** Provide an overview of the research strategy and discuss how the solution elements are integrated to provide a holistic approach to the problem. The research approach should include a statement of the research goal along with a list of the research objectives to be addressed. If a full proposal is requested, then a detailed execution plan will be expected at that time. For the Concept Paper, the emphasis should be on the research design and on what data or information will be collected to fulfill the project goals and research objectives and whether there are any barriers regarding access to this data.

**Description of Multidisciplinary Effort and Summary of Organizational Roles:** Identify the different disciplines that will be used in the project and how the expertise from each will contribute to achieving a successful outcome. Describe the organizational structure that will be used to manage the project, with particular emphasis when more than one organization is involved. Include a clear summary of the responsibilities of each individual or group (discipline) in the execution of the research approach.

**Partnerships:** Identify partnerships needed to fulfill the research objectives and whether commitments have been obtained with these essential partners. Also identify industry collaborations that are planned to be included to strengthen the proposed holistic approach.

**Timeline and Costs:** Provide a first order estimate of the project cost and the time required to complete the project. This estimate should include the total estimated project cost, the cost associated with each organization, and the timeline and estimate for each research objective. If the concept paper is selected for full proposal submission, then a detailed cost plan and timeline will be required. Note that the approved overhead rate for Foundation supported research is 20% of eligible direct expenditures.

**For Profit Effort:** Identify any for-profit effort and provide a short justification for why it is needed with recognition that only fee for services or equipment purchases are permitted.

## Concept Paper Review and Full Proposal Invitation

The Concept Papers submitted in response to this solicitation will be ranked based on convincing and appropriate documentation to support a holistic solution to a mining health and safety topic. *Full Proposals* will be requested based on these rankings, portfolio considerations, and funding availability for this solicitation. Details for full proposal submission will be provided separately to selected applicants and will include specific requirements and timeline for the full proposal submission. It is anticipated that notifications of those invited to submit a full proposal will occur on or before March 31, 2017.