REQUEST FOR PROPOSALS

Arkansas NSF EPSCoR's current Track-1 project, Data Analytics that are Robust and Trusted (DART): From Smart Curation to Socially Aware Decision Making is soliciting proposals for Seed Funding. This RFP is supported by NSF award #OIA-1946391.

Full Proposal Deadline:

June 30, 2021, no later than 5:00 PM Central Daylight Time

Proposals should be submitted via email as a single PDF email attachment sent by the PI's institutional research office by June 30, 2021, no later than 5:00 PM Central Daylight Time to arkansasepscor@gmail.com.

Program Name:

Data Analytics that are Robust and Trusted (DART) Seed Grant Program

Program Director(s):

Dr. Steve Stanley Tom Chilton **Jackson Cothren** Arkansas NSF EPSCoR Arkansas NSF EPSCoR University of Arkansas Arkansas Economic Arkansas Economic Science Director, DART Development Commission **Development Commission** 227 N Harmon Ave 1 Commerce Way, Suite 601 1 Commerce Way, Suite 601 **IBHT 304** Little Rock, AR 72202 Little Rock, AR 72202 Fayetteville, AR 72701 501-683-4408 501-682-7322 479-575-5421 JCothre@uark.edu SStanley@ArkansasEDC.com TChilton@ArkansasEDC.com

Synopsis of Program:

Arkansas is transitioning from a primarily agriculture- and manufacturing-based economy to a more diverse, data-driven economy. Our traditional agriculture and manufacturing companies must analyze tremendous amounts of data to remain competitive and our retail and transportation companies are competing in a new and fast-paced world of information. Our challenge is to provide an environment for university and industry collaboration that will sustain this new economy with cutting-edge research and a well-trained workforce that can innovate and provide competitive advantages to Arkansas industries.

The vision of DART is to improve research capability and competitiveness in Arkansas by creating an integrated statewide consortium of researchers working to establish synergistic excellence in both data analytics and data science education. The overall goals of DART are to develop the means to increase the speed and efficiency of data curation, techniques to protect privacy and impartial content, methods for harnessing the predictive power of machine learning while increasing the interpretability of the predictions, and data science curricula that are inclusive and better prepare students for a data-centric future.

DART research will systematically investigate key aspects of the following three barriers and develop novel, integrated solutions to address them:

Big data management: Before data streams and datasets can be used in the many kinds of learning
models, they are often manually curated, or at the least, curated for a specific problem. We still rely
on hosts of analysts to assess the content and quality of source data, engineer features, define and

- transform data models, annotate training data, and track data processes and movement.
- Security and privacy: Government agencies and private entities collect and integrate large amounts of data, process it in real-time, and deliver products or services based on these data to consumers and constituents. There are increasing worries that both the acquisition and subsequent application of big data analytics are not secure or well-managed. This can create a risk of privacy breaches, enable discrimination, and negatively impact diversity in our society.
- Model interpretability: Machine learning models often sacrifice interpretability for predictive power and are difficult to generalize beyond their training and test data. But interpretability and generalizability of trained models is critical in many decision-making systems and/or processes, especially when learning from multi-modal and heterogeneous big data sources. There is a continuing to need to better balance the predictive power of complex machine learning models with the strengths of statistical models to better configure deep learning models to allow humans to see the reasoning behind the predictions.

The DART Seed Grant Program invites scientists throughout Arkansas to identify emerging or transformative areas of research in alignment with DART scientific focus and support one or more of the DART goals, but does not overlap current DART projects. This identified research should strengthen ties to Arkansas business; enhance our talent pool by expanding and/or leveraging research collaborations; or provide unique educational or training opportunities.

Proposals <u>must align with</u>, but not overlap, work being conducted in one of the following project components/research themes:

- Cyberinfrastructure (CI)
- Data Life Cycle and Curation (DC)
- Learning and Prediction (LP)
- Social Media and Networks (SM)
- Social Awareness (SA)
- Education Research in Data Science (ED)

Proposals **must include**:

- A description of how the proposal is related to the DART project components/research themes.
- Collaboration with existing participants of DART, including a letter of support from a current DART participant is required.

A. Award Information

Anticipated Type of Award: Standard Grant or Cooperative Agreement

Estimated Number of Awards: 20 (4-5 awards per year pending availability of funds)

Anticipated Funding Amount: \$1,368,000

\$1,368,000 will be awarded over the next 4 years pending availability of funds. Approximately \$350,000 will be awarded in each year; total number of funded proposals will depend on availability of funds.

B. Eligibility

Who may submit proposals? Proposals may be submitted by Institutions of Higher Education (IHEs) within the jurisdiction (State of Arkansas). Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the State of Arkansas, acting on behalf of their faculty members. Involvement of Minority Serving Institutions (MSIs) as leads or partners is encouraged.

Who may serve as PI? PIs must hold an appointment in research or teaching positions at State of Arkansas IHEs. Current and previous PIs who are, or have, received DART funding are not eligible to receive seed funding; however, can serve as CoPI on proposals. Submissions from junior and non-tenure track faculty are encouraged.

Limit on number of proposals per organization: There are no restrictions or limits.

Limit on number sf proposals per PI or CoPI: A PI or a co-PI may participate in only one proposal in response to this solicitation. They may not participate in any role in any other proposal.

C. Proposal Preparation and Submission Instructions

- 1. Proposal Pagination Instructions: Each section should be paginated prior to submission.
- 2. **Proposal Font, Spacing, and Margin Requirements:** The proposal should conform to the following requirements:
 - a. Use one of the following fonts identified below:
 - Arial (not Arial Narrow), Courier New, or Palatino Linotype at a font size of 10 points or larger;
 - Times New Roman at a font size of 11 points or larger; or
 - Computer Modern family of fonts at a font size of 11 points or larger.
 - A font size of less than 10 points may be used for mathematical formulas or equations, figures, tables or diagram captions and when using a Symbol font to insert Greek letters or special characters. Other fonts not specified above, such as Cambria Math, may be used for mathematical formulas, equations, or when inserting Greek letters or special characters. PIs are cautioned, however, that the text must still be readable.
 - b. No more than six lines of text within a vertical space of one inch.
 - c. Margins, in all directions, must be at least an inch. No proposer-supplied information may appear in the margins.
 - d. Paper size must be no larger than standard letter paper size (8 1/2 by 11").
 - e. These requirements apply to all uploaded sections of a proposal, including supplementary documentation.

3. Page Formatting:

- a. Proposers are strongly encouraged to use only a standard, single-column format for the text.
- b. The guidelines specified above establish the minimum font size requirements; however, PIs are advised that readability is of paramount importance and should take precedence in selection of an appropriate font for use in the proposal. Use of a small font size makes it difficult for reviewers to read the proposal; Adherence to font size and line spacing requirements also is necessary to ensure that no proposer will have an unfair advantage, by using smaller font or line spacing to provide more text in the proposal.

Proposal Title: The title of the proposal must begin with the two-letter abbreviation of the research theme followed by a colon. The rest of the title of the proposal should describe the project in concise, informative language so that a technically literate reader can understand what the project is about. For example, a proposal being submitted to the Data Life Cycle and Curation research theme should begin with DC: followed by the title.

Personnel Listed on the Cover Sheet: Provide complete information requested on the cover sheet for the PI and up to three co-PIs (template available at the end of this document).

Project Summary (page limit: 1): The <u>one-page</u> Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. The overview includes a description of the activity that would result if the proposal were funded and a statement of objectives and methods to be employed. The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge. The statement on broader impacts should describe the potential of the proposed activity to benefit society and contribute to the achievement of specific, desired societal outcomes. The Project Summary should be written in the third person, informative to other persons working in the same or related fields, and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should not be an abstract of the proposal.

Project Description (page limit: 4): Project descriptions are limited to <u>4 pages in length</u> and must include the following clearly labeled sections:

- **Vision:** Describe the societal and/or scientific grand challenge being addressed, including its urgency, as well as a brief description of what is already known. Discuss the potential for sustaining research beyond project duration.
- Research Plan: Frame the problem in the context of the existing scientific body of knowledge. Detail research questions, hypotheses, and gaps in science, engineering and/or education knowledge that the proposal is addressing. Provide a project plan and discuss the proposed approaches that will be utilized. This section should include clearly delineated goals and objectives, as well as resources needed to accomplish stated objectives.
- Rationale: Provide a rationale explaining proposal suitability for this solicitation and explain the proposal's potential to advance knowledge in data analytics and science. Specify what creative, original, and/or potentially transformative elements will address the three data science barriers that are being investigated through DART.

Page Limitations and Inclusion of Uniform Resource Locators (URLs) within the Project Description: Brevity will assist reviewers in dealing effectively with proposals. Therefore, the Project Description may not exceed 4 pages. Visual materials, including charts, graphs, maps, photographs and other pictorial presentations are included in the 4-page limitation. PIs are cautioned that the Project Description must be self-contained and that URLs must not be used because: 1) the information could circumvent page limitations; 2) the reviewers are under no obligation to view the sites; and 3) the sites could be altered or deleted between the time of submission and the time of review.

References Cited (no page limit): Reference information is required. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. (See also Chapter II.C.2.d.(iii)(d)) If the proposer has a website address readily available, that information should be included in the citation. Inclusion of a website address is optional.

Proposers must be especially careful to follow accepted scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal. While there is no established page limitation for the references, this section must include bibliographic citations only and must not be used to provide parenthetical information outside of the 4-page Project Description.

Additional Required Documents:

- 1. **Cover Sheet (page limit: 1)**: Cover sheet should be completed with signatures from all PI, CoPI(s), and Authorized Organizational Representatives (AORs).
- 2. **Letter of Support (page limit: 1 per author)**: A letter of support from a current DART participant is required to ensure that consideration has been given to how the proposed project would be integrated with, and complementary of, DART goals and objectives (template with standard language available at the end of this document).
- 3. **Seed Grant Program Contact Sheet & Demographic Information (no page limit)**: A contact sheet should be completed for each PI/CoPI. Demographic information should also be submitted for each PI/CoPI; however, it is not required to disclose to which PI/CoPI submitted demographic information applies (template available at the end of this document).
- 4. **PI Salary Statement (no page limit)**: A statement from each investigator requesting salary support must be included that: 1) includes an NSF-formatted current and pending support document¹ and 2) disclosure of any significant overlap between the seed funding proposal and any current or pending support. If a PI or CoPI has no current or pending support and/or significant overlaps to disclose, please indicate.
- 5. **Biographical Sketch (page limit: 2):** An NSF-style biographical sketch² for each investigator should also be included with the proposal.
- 6. Facilities, Equipment, and Other Resources (page limit: 2): This section of the proposal should address the availability and adequacy of Institutional resources available to perform the effort proposed to satisfy both the Intellectual Merit and Broader Impacts review criteria. Proposers should describe only those resources that are directly applicable. The description should be narrative in nature and must not include any quantifiable financial information.
- 7. **Budget (no page limit) and Budget Justification (page limit: 2 per collaborating campus):** Each proposal must contain a budget for each year of support requested, as well as a cumulative budget for all years. The amounts for each budget line item requested must be documented and justified in the budget justification. The proposal may request funds under any of the categories listed so long as the item and amount are considered necessary, reasonable, allocable, and allowable under 2 CFR § 200, Subpart E, NSF policy³. Amounts and expenses budgeted also must be consistent with the proposing organization's policies and procedures and cost accounting practices used in accumulating and reporting costs. <u>Proposals that include a budget in excess of \$100,000 should demonstrate diverse collaborations across multiple institutions and be evidenced within the project description.</u>
- 8. **Timeline and Milestones (page limit: 1):** The one-page timeline should include milestones for completing the work described in the project description, as well as a timeline for expending requested funds.

¹ https://www.nsf.gov/bfa/dias/policy/cps.jsp

² https://www.nsf.gov/bfa/dias/policy/biosketch.jsp

³ https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_10.jsp

D. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited.

Indirect Cost (F&A) Limitations: Indirect cost (F&A) should not exceed 8% in accordance with NSF award conditions for this program.

Budget Preparation Instructions: The total proposed budget should not exceed \$150,000 and may be for durations up to 24 months. Each proposal must contain a budget for each year of support requested, as well as a cumulative budget for all years. The amounts for each budget line item requested must be documented and justified in the budget justification. The budget and budget justification should be prepared using the templates included in this document. Proposals that involve more than one campus should submit a separate budget and budget justification for each Institution, in addition to a cumulative project budget.

Eligible expenses:

- Support for research activities that can be accomplished within the proposed period of performance;
- Items that directly support the proposed seed project;
- Not more than one-month of salary support per PI or CoPI per year; and,
- Research expenses including, but not limited to: travel, training, equipment usage fees, consumables, and/or software licenses.

Ineligible expenses:

- Subawards are not permitted;
- Indirect cost (F&A) in excess of 8% are not permitted in accordance with NSF award conditions for this program;
- Awarded funds may not be used for equipment, including the purchase of computers and computing peripherals.

Proposal Submission: The proposal must be prepared as described above and be submitted as a single PDF document. The cover page must include the signature of an Authorized Organizational Representative (AOR) from the PI's Sponsored Programs Office, or equivalent. Collaborative proposals that include multiple institutions must include cover pages with required signatures from each Institution's Sponsored Programs Offices. **Proposals that do not include the signature of an AOR from the PI's sponsored programs office(s), or equivalent, will NOT be accepted.**

Proposals should be submitted via email as a single PDF email attachment sent by the PI's institutional research office by June 30, 2021, no later than 5:00 PM Central Daylight Time to arkansasepscor@gmail.com.

E. Merit Review Principles and Criteria

All proposals are evaluated through use of the two National Science Board-approved merit review criteria. The two merit criteria are listed below.

- Intellectual Merit: The Intellectual Merit criterion encompasses the potential to advance knowledge in the area of data analytics; and
- Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society
 while also contributing to the achievement of specific, desired outcomes of enhanced
 collaboration. Additionally, reviewers will be asked to place special consideration on the
 likelihood that the proposed project will contribute to the broader goals of the DART project.

The following five elements should be considered in the review for both criteria:

- 1. What is the potential for the proposed activity to:
 - a. Advance knowledge and understanding in the areas of data analytics and across different fields (Intellectual Merit),
 - b. Benefit society or advance desired societal outcomes (Broader Impacts); and
 - c. Enhance collaboration with and among DART participants (Broader Impacts)?
- 2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
- 3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
- 4. How well qualified is the individual, team, or organization to conduct the proposed activities?
- 5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Additional review criteria include the following:

- Is the assembled team of partner organizations and personnel appropriate and essential for the planned project? Are the partner organizations and participants meaningfully integrated?
- Do the proposed goals and objectives promote training and professional development? Does the team include any postdoctoral associates, early career faculty, and/or tenure-track faculty?
- Does the proposal promote student participation and collaboration among Arkansas institutions?
 Does the proposal promote diversity, equality and inclusion of underrepresented groups in STEM?

F. Review and Selection Process

Proposals submitted in response to this RFP will be reviewed by a panel that will include members of the DART External Advisory Board members, the DART Industry Advisory Board, the DART Management Team, and experts in the relevant fields from academic and research institutions outside the state. The review panel will make recommendations on each proposal which will be submitted to the Jurisdiction EPSCoR State Advisory Committee (SAC) for final determination.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. In addition, the proposer will receive an explanation of the decision to award or decline funding.

G. General Conditions of the Award / Award Administration Information

Seed Funding Awards are made in the form of a standard grant or cooperative agreement. The Arkansas EPSCoR Office reserves the right to negotiate the budget and the terms of the award.

Arkansas EPSCoR must comply with NSF EPSCoR reporting requirements. Therefore, each Principal Investigator awarded seed funding will be required to submit an annual report upon request from Arkansas EPSCoR. Compliance of report submission is expected within 30 days of the request.

The annual report should:

- Identify the numbers of women and members of other underrepresented groups in STEM fields, faculty and staff positions, and participants in the activities funded by the award.
- Include other required information such as, but not limited to demographics on all project participants, proposals submitted and funded, publications, presentations, patents, students receiving degrees, and research outcomes.

The Principal Investigator <u>or</u> a CoPI of the DART Seed Grant will be required to attend the Arkansas EPSCoR Statewide Meeting and may be asked to give a presentation about their project.

In the event of changes to contact information, the Principal Investigator must notify Arkansas EPSCoR of these changes.

All publications resulting from the award must include the following acknowledgement of NSF Support/Disclaimer: This material is based upon work supported by the National Science Foundation under Award No. OIA-1946391. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

DART Seed Grant Program Checklist

This checklist is a only a guide and does not replace any portion of the portion of the preceding RFP.

| Dο | cument | Page Limit | |
|----|---|---------------------------------|--|
| | Cover Page | 1 | |
| | Project Summary | 1 | |
| | Project Description | 4 | |
| | References Cited | No limit | |
| | Letter of Support | 1 (per author) | |
| | Seed Grant Program Contact Sheet | 1 | |
| | PI and CoPI Demographic Information | 1 | |
| | PI Salary Statement/CPS | No limit | |
| | Biographical Sketch | 2 per PI/CoPI | |
| | Facilities, Equipment, and Other Resources | 2 | |
| | Budget | No limit | |
| | Budget Justification | 2 per collaborating institution | |
| | Timeline and Milestones | 1 | |
| | Does the proposal title include a prefix that identifies the two-letter abbreviation of the research theme followed by a colon? | | |
| | | | |
| | | | |
| | Has each PI and CoPI submitted an NSF-approved biographical sketch? | | |
| | | | |
| | pending support document? | | |
| | | | |
| | Have you provided a budget for each year of support requested? | | |
| | Have you provided a cumulative budget for all years and institutions, if applicable? | | |
| | If your budget is in excess of \$100,000, have you sufficiently documented all collaborations and | | |
| | nstitutions within the project description? | | |

DART Seed Grant Program Cover/Signature Sheet

| Proposal Title: | |
|----------------------------|-------|
| Proposal Submitted To: | |
| Prepared by Department: | |
| Amount Requested: | |
| Period of Performance: | |
| Principal Investigator(s): | |
| | |
| Signatures | |
| Principal | |
| Investigator | Date: |
| Co-Principal | |
| Investigator | Date: |
| Co-Principal | |
| Investigator | Date: |
| Co-Principal | |
| Investigator | Date: |
| Institutional AOR | |
| (OSRP, or equivalent) | Date: |

DART Seed Grant Program Contact Sheet

| Principal Investigator Contact Information |
|--|
| Name: |
| Title: |
| Department: |
| Institution: |
| Address: |
| Telephone: |
| Email: |
| Co-Principal Investigator #1 Contact Information |
| Name: |
| Title: |
| Department: |
| Institution: |
| Address: |
| Telephone: |
| Email: |
| Co-Principal Investigator #2 Contact Information |
| Name: |
| Title: |
| Department: |
| Institution: |
| Address: |
| Telephone: |
| Email: |
| Co-Principal Investigator #3 Contact Information |
| Name: |
| Title: |
| Department: |
| Institution: |
| Address: |
| Telephone: |
| Email: |

DART Seed Grant Program Demographic Information

This information should be completed for each PI/CoPI. Demographic information should also be submitted for each PI/CoPI; however, it is not required to disclose to which PI/CoPI submitted demographic information applies.

| Gender | ☐ Female | □ Male | |
|-------------------|--|--------------------------------------|--|
| | ☐ Transgender Female | ☐ Transgender Female | |
| | ☐ Gender Non-Conforming / Non-Binary | | |
| | ☐ Prefer not to say | | |
| Race or Ethnicity | ☐ African American | □ Black | |
| | ☐ Chicana/Chicano | ☐ Filipina/Filipino | |
| | ☐ Hispanic | ☐ Latina/Latino | |
| | ☐ Middle Eastern or North African | | |
| | ☐ Native Alaskan | ☐ Native American | |
| | ☐ Native Hawaiian | ☐ Pacific Islander | |
| | ☐ European American | ☐ White or Caucasian | |
| | ☐ Prefer not to say | | |
| Disability | \square I have a disability | \square I do not have a disability | |
| | ☐ Prefer not to say | | |
| Veteran Status | ☐ I am a veteran | ☐ I am not a veteran | |
| | ☐ Prefer not to say | | |
| | - | | |
| | | | |
| | | | |
| Gender | \square Female | □ Male | |
| | \square Transgender Female | ☐ Transgender Female | |
| | \square Gender Non-Conforming / Non-Binary | | |
| | ☐ Prefer not to say | | |
| Race or Ethnicity | ☐ African American | □ Black | |
| | ☐ Chicana/Chicano | ☐ Filipina/Filipino | |
| | ☐ Hispanic | ☐ Latina/Latino | |
| | ☐ Middle Eastern or North African | | |
| | ☐ Native Alaskan | ☐ Native American | |
| | \square Native Hawaiian | ☐ Pacific Islander | |
| | \square European American | ☐ White or Caucasian | |
| | ☐ Prefer not to say | | |
| Disability | ☐ I have a disability | ☐ I do not have a disability | |
| - | ☐ Prefer not to say | · | |
| Veteran Status | ☐ I am a veteran | ☐ I am not a veteran | |
| | ☐ Prefer not to say | | |

| Gender | \square Female | □ Male | |
|-----------------------------------|-----------------------------------|--------------------------------------|--|
| | \square Transgender Female | ☐ Transgender Female | |
| | \square Gender Non-Conforming | ; / Non-Binary | |
| | \square Prefer not to say | | |
| Race or Ethnicity | ☐ African American | □ Black | |
| • | ☐ Chicana/Chicano | ☐ Filipina/Filipino | |
| | \square Hispanic | ☐ Latina/Latino | |
| | ☐ Middle Eastern or North African | | |
| | \square Native Alaskan | ☐ Native American | |
| | \square Native Hawaiian | ☐ Pacific Islander | |
| | ☐ European American | ☐ White or Caucasian | |
| | ☐ Prefer not to say | | |
| Disability | \square I have a disability | \square I do not have a disability | |
| | ☐ Prefer not to say | | |
| Veteran Status | ☐ I am a veteran | ☐ I am not a veteran | |
| | ☐ Prefer not to say | | |
| | • | | |
| | | | |
| | | | |
| Gender | \square Female | □ Male | |
| | \square Transgender Female | ☐ Transgender Female | |
| | \square Gender Non-Conforming | / Non-Binary | |
| | ☐ Prefer not to say | | |
| Race or Ethnicity | ☐ African American | □ Black | |
| | ☐ Chicana/Chicano | ☐ Filipina/Filipino | |
| | \square Hispanic | ☐ Latina/Latino | |
| ☐ Middle Eastern or North African | | African | |
| | \square Native Alaskan | ☐ Native American | |
| | \square Native Hawaiian | ☐ Pacific Islander | |
| | ☐ European American | ☐ White or Caucasian | |
| | ☐ Prefer not to say | | |
| Disability | \square I have a disability | \square I do not have a disability | |
| | ☐ Prefer not to say | - - | |
| Veteran Status | ☐ I am a veteran | ☐ I am not a veteran | |
| | ☐ Prefer not to say | | |

DART Seed Grant Program Letter of Support Template

If the seed grant proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by the Arkansas Department of Economic Advancement, it is my intent to collaborate as detailed in the Project Description section of the proposal in support of advancing that state of knowledge within the following research themes: [insert components/research theme(s)].