Request for Proposals

SAFER-SIM University Transportation Center

Promoting Safety

Center Objective:

SAFER-SIM is a multidisciplinary Center that focuses on innovative approaches using simulation to promote traffic safety, ranging from microsimulation to human-in-the-loop simulation. SAFER-SIM sponsors research using simulation to study traffic safety, promotes outreach activities in STEM areas, and aids workforce development efforts in transportation safety.

Center Themes:

SAFER-SIM promotes the study of how road users, roadway infrastructure, and new vehicle technologies interact and interface with each other using microsimulation and state-of-the-art driving, bicycling, pedestrian simulators. Our platforms can be used to not only understand present needs, but also to evaluate and develop futuristic technologies. SAFER-SIM projects will use simulation technology to address the following safety topics:

- Automated vehicles technology
- Connected vehicles technology
- Vulnerable road users
- Roadway infrastructure design
- Distributed simulation technology

Project Requirements:

- Transportation safety theme
- Use of simulation technology (i.e. driving, pedestrian, or bicycling human-in-the-loop simulation, microscopic traffic simulation, advanced visualization techniques, cognitive modeling)
- Student involvement
- PI is a faculty member or full-time research staff
- 50% matching funds from non-Federal sources

Proposals are due December 15, 2019

Award Decisions will be made by March 31, 2020

Project to begin Summer or Fall Term 2020

In addition to **research** projects, proposals are welcome for **course development** and STEM **outreach activities** involving simulation and a transportation safety theme. Please contact the SAFER-SIM representative from your University for more information. More details and proposal forms can be found at
https://safersim.wufoo.com/forms/zlisie01dsrusw/

Instructions for Research Proposals

Proposers submit a three-page project proposal (details below). This proposal will be reviewed by the Associate Director of the respective University to assess whether the project meets the goals and themes of the Center, the budget is appropriate, and whether matching funds are available. If these criteria are met, the proposal document is circulated among the other consortium universities for review by other faculty, staff, and advisory board members using the criteria listed below. Funding decisions will be made by the director and associate directors based on the review recommendations, feasibility, availability of matching funds, and relevance to Center themes. Project budgets are generally in the range of $50,000 to $80,000. The number of projects funded will depend on the level of funding requested of the top tier of proposals.

Project information will be entered in fields on the submission website. This information will not be shared with reviewers.

1. Project Title
2. Name, institution, email, and Open Researcher and Contributor ID (ORCID) for each principal investigator
3. Proposed project costs for each institution involved in project and total project budget
4. Anticipated matching funds amounts and sources - must be at least 50% of proposed project costs
5. Project start and end dates (period of performance is generally 12 – 18 months)

Proposal Document (to be uploaded through submission website and is the portion of that will be shared with reviewers)

1. Proposal Body (up to 3 pages)
    a. Project Title
    b. Problem Statement discussing the importance of problem to transportation safety and relevance to SAFER-SIM theme and topic areas
    c. Collaborative and Interdisciplinary Features
    d. Research Plan describing research questions, independent variables, dependent measures, experimental design, protocol or procedure
    e. Data Analysis Plan for dependent measures
    f. Technology Transfer activities including identification of and interaction with stakeholders, expected outputs (any new or improved process, practice, methodology, technology, software, training aid or other tangible product resulting from research and development tasks) and outcomes which are the short and long term results/impacts of your outputs
    g. Student Involvement (articulation of how graduate and undergraduate students will work with a faculty or research staff mentor to achieve goals of the project)
2. Collaboration Plan (1 page, multi-site collaborative projects only, does not count toward page count)
    a. Describe project coordination strategies, such as regularly scheduled meetings, project conference calls, collaboration on periodic progress reports and single final report for project
3. Budget (1 page, does not count toward page count)
    a. Start and end dates for project (period of performance)
    b. Budget table indicating proposed costs and matching costs
    c. Narrative description of sources of matching funds

Proposal Format

The proposal must be submitted as a PDF and should have normal margins (1" on all sides), 12 point font, and 1.15 line spacing.

Submission Process

Proposers will complete the project information form on the submission website that asks for personally identifiable information relating to the proposal. As noted above, this information will be separate from the proposal to allow for a blind review. Proposers will attach the PDF of their proposal to the submission page.

The submission website can be found at the following location:

https://safersim.wufoo.com/forms/zlisie01dsrusw/

Evaluation Criteria

- Projects that address SAFER-SIM themes
- Projects that have high potential to advance knowledge and understanding of transportation safety
- Projects that have a well-conceived and feasible plan of research
    o Experimental conditions clearly linked to research questions
    o Independent and dependent measures are reasonable and relevant
    o Data analysis methods are appropriate for experimental design and data to be collected
- Projects providing at least 25% graduate or undergraduate research assistantships
- Interdisciplinary projects involving students and faculty from multiple departments and colleges
- Clarity of technology transfer plans beyond academic publishing
- Projects that involve collaboration with other SAFER-SIM consortium members

Important Dates

Proposal Due Date – December 15, 2019

Award Decisions Announced – March 31, 2020

Projects Begin Spring or Fall Term 2020

Additional Information

The Fixing America's Surface Transportation Act (FAST Act; P. L. 114-94, December 4, 2015) authorized the Secretary of Transportation to make grants to eligible non-profit institutions of higher education to establish and operate University Transportation Centers (UTCs or Centers). The SAFER-SIM UTC supports the FAST Act research priority of Promoting Safety, which includes:

- Vehicle and system automation across surface modes;
- Energy and hazardous material transport;
- Safety planning for all users
    o Pedestrians and bicyclists
    o Vehicular users
    o Integrated systems planning;
- Application of transportation safety data and safety management systems;
- Human factors and risk factor analysis;
- Transportation worker safety

- Construction zones
- Emergency responders; and
- Trespass and vandalism.

Proposers are also encouraged to consult the Transportation Research Board's Research Needs database for topics identified as high priority by TRB standing technical committees http://rns.trb.org/. TRB also maintains a list of research in progress by University Transportation Centers, state DOTs and other institutions. Proposers are encouraged to consult this list to assure that their idea does not duplicate a project in progress or can explain in the proposal how their idea is related to on-going research. http://rip.trb.org/

Examples of Research Ideas Relating to SAFER-SIM Themes

Automated vehicles technology	assessing road users' responses to automated vehicles, augmented reality, and in-vehicle safety systems
Connected vehicles technology	assessing user responses to connected vehicles technology (e.g., V2V, V2P, I2B)
Vulnerable road users	examining risk factors for pedestrian and bicyclist collisions with vehicles, including high-risk groups (e.g., transportation workers, children, and the elderly)
Roadway infrastructure design	assessing how safely drivers, bicyclists, and pedestrians interact with roadway infrastructure designs
Distributed simulation technology	assessing real-time traffic conflicts between drivers, bicyclists, and pedestrians through connected simulators

Reporting and Data Availability Requirements

If proposal is funded, PI(s) must assure compliance with SAFER-SIM reporting procedures and comply with the US DOT Public Access Plan.

Periodic Reporting Requirements:
- Semi-annual progress report throughout the performance period of the project
- Matching fund sources documentation
- Description of technology transfer activities including research papers, conference presentations, integration of research into courses, and involvement of local and state DOTs during and following the performance period of the project

Project Deliverables
Each SAFER-SIM funded project is required to provide four deliverables at the end of the project's performance period:
1) Final technical report (due on project end date)
2) Two-page summary (due on project end date)
3) Webinar presentation of results (to be scheduled shortly following project end date)
4) Compliance with US DOT Public Access Plan (within 60 days of project end date)

Principal investigators are required to submit a two-page summary and final technical report on or before your project end date for each funded project. Collaborative projects will submit one technical report. The summary

and final report should both be Microsoft Word documents using the templates that will be provided. The final report should be written as a technical report and contains enough detail for other researchers to fully understand the background, methodology, and results of your project. The two-page summary has a different purpose. It should focus on the outcome and outputs of the project and provide end users, such as government agencies or private companies, with guidance on how the results of the study could be implemented or used in their work. As your project end date approaches, we will work with you to set up a date for your project webinar. The webinar is one hour in total length. The presentation portion should be 40-45 minutes followed by 15-20 minutes of questions and discussion. Compliance with the US DOT Public Access Plan for research data is also required. Information about SAFER-SIM's approved data management plan is included below.

There will be a review process for reports and summaries. After we have received your summary and final report, we will strive to complete the review in one week. We will then send you reviewed copies for revisions. At that time, you will have one week to return your revisions to us.

Education and Outreach projects will not be required to submit a technical report, yet a two-page summary and webinar are still expected. If data is collected, compliance with the US DOT Public Access Plan is required.

Matching Funds Requirement
Each project funded by a UTC is required to obtain matching funds from non-federal sources. The amount of matching funds required for a SAFER-SIM (Tier 1 UTC) is 50 percent – for every $1 funded by the grant, the proposer must provide $0.50 in matching funds. Matching funds must be from non-federal sources and may take the form of departmental fellowships or tuition funding using nonfederal funds, faculty release time, documented in-kind support from private companies or institutions, matched funding from related research projects not funded federally. Each project will need to comply with their own University's procedure to document these matching funds and report this to the SAFER-SIM administration.

Open Researcher and Contributor ID (ORCID)

Principal investigators and authors are required by the SAFER-SIM federal grant to have an ORCID (Open Researcher and Contributor ID). ORCID provides unique identifiers for researchers and scholars and automatic linkages to research objects. All report, article, and paper authors must have an ORCID. If researchers are added to the project after initiation, they must also obtain ORCID. Registration is free and takes 5 minutes:

https://orcid.org/

An ORCID is required by the federal grant for all PIs, report, article, and conference paper authors.

Other reporting requirements

UTC-funded faculty and departments will also be asked to contribute to other Federal reporting requirements including the number of:

- Transportation-related courses offered taught by faculty and/or teaching assistants who are associated with the UTC
- Transportation-related advanced degree programs that utilize grant funds to support graduate students
- Students supported by this grant during the reporting period
- Degrees awarded to students supported by this grant
- and total dollar value research projects selected for funding using UTC grant funds (Federal and/or Recipient Share) that you consider to be applied research and advanced research

US DOT Public Access Plan Compliance

SAFER-SIM funded projects must comply with the requirements of the US DOT Public Access Plan, which establishes objectives to ensure public access to Publications and Digital Data Sets arising from DOT managed research and development programs. The approved Data Management Plan for SAFER-SIM is below.

Data description

The SAFER-SIM UTC will require each principal investigator to submit detailed data descriptions for their individual research projects per this plan as outlined in the guidance. Individual data management plans will:

1. Name the data, data collection project, or data producing program.
2. Describe of the purpose of the research.
3. Describe the data that will be generated in terms of nature and scale (e.g., numerical data, image data, text sequences, video, audio, database, modeling data, source code, etc.).
4. Describe methods for creating the data (e.g., simulated; observed; experimental; software; physical collections; sensors; satellite; enforcement activities; researcher-generated databases, tables, and/or spreadsheets; instrument generated digital data output such as images and video; etc.)
5. Discuss of the period of time data will be collected and frequency of update.
6. If using existing data, describe of the relationship between the data you are collecting and existing data.
7. List potential users of the data.
8. Discuss the potential value of the data have over the long-term for not only SAFER-SIM, but also for the public.
9. If you request permission not to make data publicly accessible, explain rationale for lack of public access.
10. Indicate the party responsible for managing the data.
11. Describe how you will check for adherence to this data management plan.

Data format and metadata standards

Data gathered from transportation-related research varies and includes, but is not limited to the following: response times, gap choices, speed, time-to-collision, travel times, vehicle miles traveled, crashes, signal timings, video logs, land-use, infrastructure sensors, traveler behavior, driver behavior, and trip generation. The data is typically found in the formats listed below:

- MS Excel (.xls)
- Video files (.xml, .csv, .mpg, .avi, .mov, .wmv)
- MS Excel Macro (.xml)
- Comma Separated Values (.csv)
- Portable Document Format (.pdf)
- Joint Photographic Experts Group (.jpg)

Researchers will be required to report the formats used when gathering data and they must list if they are open or proprietary. If using proprietary data, the SAFER-SIM Center will require the lead researcher to provide a rationale. It is expected that researchers will include in their reports how that data has varied, if any, from its original format.

Data gathered from SAFER-SIM funded projects must adhere to the standards used in the transportation industry. Metadata will be included with each dataset that describes the context, content, and structure of the data. One metadata schema that may be used to describe the data includes, but is not limited to, the National Transportation Library's Dublin Core Metadata Guidelines (https://ntl.bts.gov/tools/metadata). Researchers may use a nonstandard schema when necessary but must document rationale in final report. Metadata will be managed and stored similarly to collected data, either in a separate file or included in the dataset. Principal investigators will manage metadata before, during, and after data collection. Metadata will be stored in the SAFER-SIM Harvard Dataverse repository with all other data.

Tools or software required to read or view the data will be described in the project technical report. The SAFER-SIM Center expects that the data generated by funded projects is of good quality, and because of the interdisciplinary nature of transportation engineering, these standards will vary. The principal investigator of each individual project is responsible for ensuring the data is accurate and complete.

All principal investigators for individual projects will be required to:

1. Have final datasets that are not proprietary in a standard data format of the field, such as csv.
2. If principal investigators are using proprietary data formats, they will be required to discuss their rationale.
3. Include metadata describing the context, content, and structure of the final version of data shared to the public.
4. Describe how they will document the alternative formats they are using and why.
5. List what documentation they will be creating in order to make the data understandable by other researchers.
6. Indicate what metadata schema they are using to describe the data. If the metadata schema is not one standard for their field, and discuss their rationale for using that scheme.
7. Describe how the metadata be managed and stored.
8. Indicate what tools or software is required to read or view the data.
9. Describe their quality control measures.

Policies for access and sharing

The principal investigator is responsible for how the data is managed and secured during the experimental process. Once the project is completed, the data will be publicly available via the SAFER-SIM repository in the Harvard Dataverse (https://dataverse.harvard.edu/dataverse/safersim). SAFER-SIM researchers are required to upload their data within 60 days of their project end date. Because some transportation-related research requires the use of human subjects, permission from the Institutional Review Board (IRB) where the research originated will be obtained prior to publishing onto the public sites for data sharing.

Principal investigators will be required to address any access restrictions in the project data management plan they submit to the SAFER-SIM Center. For individual project data management plans, principal investigators will address issues and outline the efforts they will take to provide informed consent statements to participants, the steps they will take the protect privacy and confidentiality prior to archiving their data, and any additional concerns (e.g., embargo periods for their data). If necessary, they will describe any division of responsibilities for stewarding and protecting the data among other project staff. If principal investigators will not be able to de-identify the data in a manner that protects privacy and confidentiality while maintaining the utility of the dataset, faculty will describe the necessary restrictions on access and use. If an individual research project

includes human subject research, researchers will be required to go through University of Iowa IRB or their home institutions IRB, if they have one.

Principal investigators will be required to address the following:

1. Describe what data will be shared, how data files will be shared, and how others will access them.
2. Indicate whether the data contain private or confidential information. If so
    a. Discuss how you will guard against disclosure of identities and/or confidential business information
    b. List what processes you will follow to provide informed consent to participants.
    c. State the party responsible for protecting the data.
3. Describe what, if any, privacy, ethical, or confidentiality concerns are raised due to data sharing.
4. If applicable, describe how you will de-identify your data before sharing. If not:
    a. Identify what restrictions on access and use you will place on the data.
    b. Discuss additional steps, if any, you will use to protect privacy and confidentiality.

Policies for re-use, redistribution, derivatives

University of Iowa or the home institution of the principal investigators holds the intellectual property rights for all data generated by SAFER-SIM funded projects. The data is also subject to the General Provisions of Grants for 2016 University Transportation Centers, Item #16 (Patents and Copyrights), pages 11-15. All data gathered and collected, which are provided publicly, are the property of the PI. The PI will indicate in the final report, which, if any rights are to be transferred to the data archive. The PI must also indicate in the final report how the data will be licensed for reuse and redistribution.

If using proprietary data, principal investigators will be required to cite the data source and license under which they used the data in their project data management plans.

In general, principal investigators will address the following in their project data management plans:

1. Name who has the right to manage the data.
2. Indicate who holds the intellectual property rights to the data.
3. List any copyrights to the data. If so, indicate who owns them.
4. Discuss any rights be transferred to a data archive.
5. Describe how your data will be licensed for reuse, redistribution, and derivative products.

Plans for archiving and preservation

Principal investigators or their delegate will responsibly manage data before, during, and after data collection. Principal investigators will ensure data management meets their Institutional Review Board's standards. The SAFER-SIM UTC will archive all data on Harvard's Dataverse, https://dataverse.harvard.edu/dataverse/safersim, which is an approved site of the USDOT. Principal investigators will have 60 days following the end date of their project to archive their data on Dataverse. Principal investigators will maintain the data until it is uploaded to Dataverse. Principal investigators will describe how data will be protected from accidental or malicious modification or deletion prior to receipt by the archive.

Dataverse is an approved data repository by USDOT (https://ntl.bts.gov/publicaccess/repositories.html). Harvard University Information Technology (HUIT) in collaboration with Harvard Library, and the Institute for Quantitative Social Science (IQSS) hosts Harvard's Dataverse repository and maintains a full backup of all data

and directories. This means that there is always a full, recent off-site copy of the Dataverse repository. Dataverse's policy for digital archiving is part of the institution's general mission to preserve all of its archival collections and to ensure their availability for current and future use. More specifically, this policy for preserving our digital data collections is meant to ensure continued access to born digital and digitized data, to ensure their authenticity, and to maintain data quality using the best digital archival practices. The repository backs up all of the application/system files and databases nightly. It is stored off-site for 45 days. All research data files in the repository are replicated every 4 hours to a second off-site storage array. Data content of the Dataverse into the DRS Storage Infrastructure, which makes use of storage management software to create a tape copy of data to be stored for the long term at the Harvard Depository. Dataverse preservation policy can be found here: http://best-practices.dataverse.org/harvard-policies/harvard-preservation-policy.html

Once a dataset is published, the repository guarantees archival and long term access to that dataset with a DOI persistent identifier provided by the California Digital Library's (CDL) EZID service (DataCite member). In order to ensure long term accessibility of the dataset in the Harvard Dataverse, once a dataset is published it cannot be unpublished and can only be deaccessioned under extreme circumstances, such as a legal requirement to destroy that dataset.

Technology Transfer Goals and Performance Measures [updated, please read]

All research projects are required to have a technology transfer component, such as the preparation of a manuscript submitted to a refereed journal, a conference for a paper session or poster presentation, or a workshop offered through a LTAP or local section or student chapter of a professional organization. Links to reports, summaries, and webinar videos will appear in the center's bi-weekly newsletter and be distributed on the center's website, Facebook page, or YouTube channel.

SAFER-SIM will track and report the following performance metrics:

Outputs – Any new or improved process, practice, technology, software, training aid, or other tangible product resulting from research activities.

Output Performance Measures

- SAFER-SIM webinars*
- Tours of facilities*
- Registrations for webinars*
- Website traffic*
- Views of archived webinar content*
- Patents filed*
- Press releases for SAFER-SIM related research*
- DOT requests for presentations or proposals related to SAFER-SIM*
- Media requests
- Practitioner attendance at events*
- Number of improved or new simulation technologies, software, methods, or processes

* Performance metrics included in the grant application and reported in the Program Progress Performance Report and UTC Specific Performance Indicators for SAFER-SIM.

Outcomes – Any changes made to the transportation system or its regulatory, legislative, or policy framework, resulting from research outputs. Examples include the full-scale adoption of a new technology technique, or practice, or the passing of a new policy, regulation, rulemaking, or legislation.

Outcome Performance Measures

- Number of improved or new technologies, software, methods, or processes adopted
- Stakeholders who adopt, implement or deploy SAFER-SIM research findings or technologies through policy, practice, regulation, rulemaking or legislation
- Number of projects that reach adoption, implementation or deployment

Impacts – The impact of research outcomes on the transportation system, or society in general, such as reduced fatalities, decreased capital or operating costs, community impacts, or environmental benefits.

Impact Performance Measures

- Reductions in crashes from implemented policy, practice, regulation, rulemaking or legislation
- Reductions in congestion and traffic conflicts implemented policy, practice, regulation, rulemaking or legislation

Tracking and Reporting

SAFER-SIM established a tracking and performance reporting system that has been in place since the inception of our first UTC grant. The system requires SAFER-SIM principal investigators and associate directors at each site complete a progress report on SAFER-SIM performance metrics twice per year in advance of the preparation of the grant semi-annual progress reports. The progress reports at both the project and institution level include all performance measures. The progress report form and instructions has been expanded to explicitly state the technology transfer goals and performance metrics described above.   The progress reports are required for all projects from the beginning of their individual performance period through the end of the overall grant performance period. This allows tracking of metrics even after the project is consider "complete" with the submission of project deliverables. The SAFER-SIM director, technology transfer coordinator, and administrative team will compile the reported metrics and incorporate them in the each semi-annual as required by the amended Grant Deliverables and Reporting Requirements for 2016 University Transportation Centers. Additionally, the grant administrative team tracks several performance measures on an ongoing basis, such as electronic enrollments in videoconferences and webinars, and information provided by online video and email management services, and website traffic.

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