



PI/CO-PI Management -
Proposal Functions | HOME ▶

[NSF Home](#) | [News](#) | [Site Map](#) | [PAPPG](#) | [Contact Us](#) | [FastLane Help](#)
[Change Password](#) | [Logout](#)

Letters of Intent | MAIN ▶

Organization: SUNY at Buffalo

[Create New LOI from Program Solicitation](#)

[Edit/View LOI](#)

[Return to Edit LOI list](#)

Program Solicitation Information:

LOI Due Date: 01/08/2019

Program Solicitation ID: [NSF 19-512](#)

Program Solicitation Title: CISE Community Research Infrastructure

Project Information:

LOI ID: L02606368

*** Project Title:** CCRI: Medium: Enabling Pocket-Scale Data Management Research

*** Synopsis:** *(max 2,500 chars)* The world's 2 billion smartphones are a large part of the computing experience. A common requirement is persisting structured data, a task frequently performed by an embedded database like SQLite. Database performance can be a bottleneck, creating a poor user experience and causing unnecessary battery drain. Thus there are numerous opportunities for research on pocket-scale data management, or 'PocketData'. However PocketData research can be significantly more challenging than classical big-data research: (1) Smartphone hardware and operating systems self-regulate in unpredictable ways, making it difficult to obtain consistent, reproducible measurements. (2) Data accesses on a smartphone may be triggered in response to a variety of events, making it difficult to synthesize realistic workloads. (3) While small differences in hardware or operating system can lead to significant changes in system performance, it is not reasonable to expect researchers to obtain dozens of smartphones for testing purposes. This proposal aims to lower the barriers to entry for PocketData through three pieces of infrastructure: (1) We will develop a modular toolkit for PocketData performance measurement to enable consistent, reproducible results. (2) We will establish a benchmark for PocketData systems based on real-world traces gathered during the planning phase of this proposal. (3) We will deploy a testbed platform for smartphone researchers for consistent, reproducible, low-cost performance evaluation.

Other Comments: (max 2,500 chars) The project team unites experts with a complementary skill set: (1) PI Kennedy will contribute expertise in databases, query compilers, and data structures. (2) PI Ziarek will contribute experience in compilers, program analysis, and embedded devices. (3) PI Kul will contribute expertise in data engineering, workload and behavior modeling, as well as extensive experience working with the \PocketData dataset. We have budgeted for a postdoc at UB, as well as two graduate students, one at UB, and one at DSU. Our budget also supports effort for all three investigators, who will jointly advise the graduate students. The budget includes support for travel and publicity allowing us to continue to build external support (See community involvement below). We have also budgeted for a smartphone testbed (Goal 3) consisting of a command-and-control server, 10 smartphone devices initially, and an additional set of 20 devices in years 2 and 3. Software will be disseminated through public software repositories such as GitHub, and will be used to host benchmarking results, a blog/wiki discussing best practices for evaluation, and the interface to the smartphone testbed. COMMUNITY INVOLVEMENT: As part of our planning grant (Award #1629791), PI Kennedy moderated a well-attended panel at ICDE 2017 entitled 'Small Data.' In addition to building interest in the community, two panel members: D. Richard Hipp and Eugene Wu are already using the preliminary results from the planning proposal.

Organizational Attribute: Academic Institutions (colleges, universities)

Keywords and Project Type (max 255 chars) CCRI: Medium; databases, smartphones, reproducibility

Other PIs and Senior Personnel (max 255 chars) Co-PI Lukasz Ziarek; PI (DSU) Gokhan Kul

Collaborating Organizations (max 255 chars)

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Cross Directorate LOI/Multi-Disciplinary LOI:

Primary Division: Div Of Information & Intelligent Systems

Secondary Division: Division Of Computer and Network Systems

Tertiary Division: Div Of Information & Intelligent Systems

Other Senior Project Personnel:

2 Personnel found

Personnel Name

Kul, Gokhan

Ziarek, Lukasz

(Min of 0 required for this LOI, Max of 4)

Participating Organizations:

2 Organizations found

Organization Name

Delaware State University

SUNY at Buffalo

(Min of 0 required for this LOI, Max of 6)

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