**Department of Homeland Security (DHS) Science and Technology Directorate: Data Analytics Engine-Research Opportunities 2017-2018**

The DHS Science and Technology Directorate (S&T) develops programs for missions throughout DHS and the larger Homeland Security Enterprise which includes public and private sector partners.  S&T's Homeland Security Advanced Research Projects Agency (HSARPA) has identified data analytic opportunities for research in various operational contexts.

The Data Analytics Engine (DA-E) within HSARPA provides subject matter expertise and technical capabilities in data storage, security, computation, analysis, and visualization for DHS missions.  DA-E has a state-of-the-art data analytics laboratory with significant storage capacity onsite and Gov and commercial cloud capabilities.  The DA-E serves as a centralized resource where end-users, technology experts, and other stakeholders can characterize problems, examine new technology, and test methods and hypotheses.



**South Big Data HUB Program to Empower Partnership with Industry (PEPI) Fellows Program (short and long-term projects)**: Students and career professionals may propose to work with DA-E on topics of mutual interest through the South Big Data Hub PEPI program.  Start dates are negotiable.  Some projects are on-going and support may be available for a longer-term.  The minimum commitment is 12 weeks.

**Eligibility and Responsibilities:** Undergraduate students (rising junior and senior), graduate students, post-docs, and faculty in Data Science and related fields are encouraged to apply for PEPI Fellowships.  DA-E seeks individuals who are inquisitive, communicate effectively, and enjoy working in a highly collaborative environment.  DA-E team members, including Fellows, have the opportunity to share knowledge, impact mission, and interact with DHS stakeholders and leadership.  Applicants must pass DHS background check (suitability).

**Stipend and Expenses**: Fellows will be provided with a stipend and travel support  Stipends for full-time Fellows are $5,000/month The actual amount of awards for PEPI Fellows will vary based on the number of days or weeks for the proposed project.

**Types of Challenges:** DA-E is interested in a wide range of advanced algorithmic and analytic applications for static as well as streaming data sets. Privacy-protecting analytics is of particular importance. Illustrative challenges include:

• **Human Trafficking** – Examining social media to aid in the fight against human trafficking. Social media data present unique challenges in: **Non-Text Data** - requires significant time for human review, especially if images/video is in a foreign language; **Automating Search -** control for "noise" while enforcing privacy requirements; **Scalability** - adapting architectures to new and changing data sources.

• **Real-time Analytics for Multi-party, Metro-scale Networks (RAMMMNets)** – Data associated with the Internet-of-Things presents challenges to the analytic environments that inform human decision making. Current approaches to information analytics are insufficient for key data streaming from a variety of networks likely owned by multiple entities. For example, supporting future decision making in disaster response missions will require rapid access to a spectrum of live and static information sources, e.g., government, industry and non-profit. Decision makers at multiple levels will have limited time frames to use appropriate information to support active response efforts: analytic results will be based on constantly changing data sets; some data points may become stale due to network latency; and attestation services may be unavailable for some devices and result in data that may be untrusted.

• **Other Topics** – Fellows may propose other research topics for consideration. PEPI Fellows may request feedback on proposed research topics before the May 1st deadline.

**Infrastructure:** DA-E lab infrastructure consists of industry standard servers and network gear, custom appliances built on premise, and commercial and private cloud capabilities. Software consists of open source, commercial, and GOTS (Government-off-the-Shelf) tools. Examples include Hadoop, Spark, Aster Data, R, MySQL, Oracle, MongoDB, and various business intelligence, geospatial, and language processing applications.

**Manager:** Stephen Dennis, DA-E Director, Washington D.C.

**Location:** PEPI program fellows will work in Washington D.C. and spend a portion of their time meeting with DHS stakeholders.

**Applications/Inquires**: PEPI proposals must be submitted online by 5pm May 1st via the South Big Data Hub. Applicants for PEPI Fellowships may also contact Stephen Dennis at SandTBigData@hq.dhs.gov to discuss proposed projects prior to May1st.