Message from the Director

We hope you have had as productive of an autumn as the VACCINE team has. Here at Purdue, our semester has ended and we had graduation on Sunday. Congratulations to VACCINE’s newest Ph.D. – Dr. Shehzad Afzal! Our team has been quite busy over the past few months and a few highlights are below. We are working on many great new opportunities and ways to help our communities and nation. Your partnership with us continues to enable our researchers to not only make research advances but also impact daily lives!

We are thankful to have had the opportunity for our SMART tool to aid in search and rescue during the four hurricanes that made landfall late this summer and early this autumn, as well as wider use by new partner agencies. We continue to engage with our long-standing partners on important problems and are extending our partnerships to tackle new, important problems and areas, including: evaluating strategic goals with metrics and team performance; tackling the opioid epidemic; and addressing the sustainability of our water and food production systems and the impact on our communities and states.

Thank you for your continued support and we look forward to working together in 2018.

David & the VACCINE Team
SuccessVis Launched

In the eight years that VACCINE has been in existence, 350 college students have been funded, 988 papers have been published, and 31 related curricula have been offered. In addition, over 200 Jefferson High School Students in Lafayette, IN have participated in the program. Working with both local law enforcement and state police over numerous states, Homeland Security, the Coast Guard, FEMA, The US Air Force Academy Faculty Training Workshop, first responders, and numerous universities, VACCINE has worked to advance how law enforcement and first responders are able to utilize and manage data. [http://voxel.ecn.purdue.edu/successvis/](http://voxel.ecn.purdue.edu/successvis/)

FEMA Highlights Benefits of VACCINE & SMART

The Higher Education Program Newsletter, distributed by FEMA, focused its November 3, 2018 edition on VACCINE.

VACCINE began surveying collaboration with FEMA to develop and deploy social media analytics software and training to first responders, for emergency and disaster use. The efforts specifically focus on the Social Media Analytics and Reporting Toolkit (SMART), which allows tens of thousands of social media posts to be sorted and analyzed via this map based social media

DHS's First Responder Group Awards Grant to VACCINE

With the funds provided by the DHS’s First Responder Group grant, the Purdue University based team will scale SMART for deployment and accessibility to every first responder and emergency manager in the United States. This endeavor is led by Professor David Ebert and Davista Technologies.

In addition, Dr Louis
The development of the SMART platform over the past four years was only the beginning of understanding and maximizing the capabilities of social media in emergency and disaster response. VACCINE's core team at Purdue continues to work with first responder groups, including FEMA, to ensure that these programs are understood by the first responders using them, so they may continue to benefit and increase public safety.

Social media can be a valuable source of information to emergency managers, and SMART and VACCINE provide the tools to sort through all the data. Without guidance and operation stability, these new systems can turn into a distraction, rather than a valuable aid. VACCINE is dedicated to bringing tools to first responders so that they can better understand and use the information social media brings to better understanding the on-the-ground situations occurring during an emergency.

Tackling the Opioid Crisis Through Data Analytics

On September 12, 2017, Engineers at Purdue University, met with Jim McClelland, Executive Director for Drug Prevention, Treatment, and Enforcement for the state of Indiana. McClelland stated, “Our approach is going to be increasingly data-driven….as soon as possible, we want to get to a position where we can start using predictive analytics to help us get ahead of some aspects of this problem.”

For over six years, researchers from VACCINE have partnered with the Lafayette Indiana Police Department (LPD), to design iVALET (Mobile, Visual Analytics Law Enforcement Toolkit), and are now incorporating that tool to fight local and state opioid abuse and overdoses. iValet processes huge amounts of data, to visualize crime statistics and predict where and when an incident could happen.

Data comes from a variety sources, including hospitals, ambulance service, and police. It is challenging to law enforcement to not only collect but to sort through the data. Professor David Ebert says, “We’ve started talking with them about how we can get tools to help them. We’ve been talking to a lot of different agencies about that. It’s a way to take things we’ve done in the past, and look at what data across the state, what data across agencies need to be brought together to help get people the information, so they can be effective and improve the situation.”

SMART Training for a Dozen New Agencies in the Western United States

The VACCINE team was able to train a dozen new law enforcement agencies, primarily among Western States, in the use of SMART. Thanks again to Sergeant Ralph Garcia, currently of MiraCosta College and a 30 year veteran of San Diego PD, for helping inform other law enforcement agencies of VACCINE’s tools.

Indiana Department of Homeland Security

Erin Rowe and Chuck Emsweller from the Indiana Department of Homeland Security
Jigsaw - VIS - Test of Time Award

Most significant contribution in the past 10 years

During the 2017 IEEE VIS conference, several “Test of Time” awards were given out. The VAST 2007 project “Jigsaw: Supporting Investigative Analysis through Interactive Visualization” was honored with the “10 Year Test of Time Award”. Jigsaw is a visual analytics system, developed by the Georgia Institute of Technology and authored by Jon Stasko, Carsten Gorg, Zhicheng Liu, and Kanyupriya Singhal. The IEEE Conference Committee felt Jigsaw stood the test of time, with the highest contribution impact during this decade. Since 2007, Jigsaw software has been used by analysts, investigators, and researchers in fields such as visualization, text analysis, law enforcement, journalism, and finance. According to Google Scholar, this 2007 paper has received more than 400 citations, showing the tremendous impact it has made in its field.

Security revisited the VACCINE lab in October to better understand how SMART can be used to support statewide emergency and disaster response. As a result of the meeting, VACCINE created ten new SMART accounts for IDHS. We look forward to future engagement with Indiana Department of Homeland Security.

Welcoming the New Crime Prevention Specialist With LPD

VACCINE would like to welcome the new Lafayette Police Department Crime Prevention Specialist, Ian O'Shields. We look forward to working with you in your new role.

Big Data Congress 2017

Keynote Speech by Prof. David Ebert

The 5th Annual Big Data Congress 2017, was held November 6-8, 2017 in Halifax, Nova Scotia. The keynote address was given by Dr. David Ebert, of Purdue University. The subject of the keynote was “Human-Computer Collaborative Decision Making, Through Visual Analytics”, focusing on how visual analytics can improve the decision-making process in business.

The Big Data Congress was aimed at business leaders from around the world, including India, Britain, Europe, China, Canada, and the United States. It is North America’s largest business-focused data technology conference. The conference allows leaders in academia, business, and government, an opportunity to connect and share ideas, software, and knowledge with one
Abstract: To solve the world’s challenges requires not only advancing computer science and big data analytics but requires new analysis and decision-making environments that effectively couple human decision-making with advanced, guided analytics in a human-computer collaborative discourse and decision-making (HCCD). Our HCCD approach builds upon visual analytics and focuses on empowering the decision maker through interactive visual analytic environments where non-digital human expertise and experience can be combined with state-of-the-art analytical techniques. When we combine this approach with real-world application-driven research, not only does the pace of scientific innovation accelerate, but impactful change occurs. I’ll describe how we applied these techniques to sustainability, agriculture, public safety, and disaster management.
**House of Sweden**

On October 4, 2017, VACCINE’s Dr. Chittayong Surakitbanharn participated in a panel discussion at the “Future Incident Scene and Future First Responder” seminar at the Embassy of Sweden, in Washington DC. Other Panelists included Dr. Carl-Oscar Jonson (Center for Teaching and Research in Disaster Medicine and Traumatology), Prof. Roger Barker (North Carolina State University), and Raúl Ochoterena (Swedish Research Institute). All panelists and speakers were welcomed by Karin Olofsdotter, Ambassador of Sweden to the United States. Moderators of the event were Dr. Dan Cotter (DHS) and Dr. Christian Uhr (Lund University). The Keynote Speaker was W. Craig Fugate, President Barack Obama’s FEMA Administrator from May 2009 to January 2017.

**Technical Advances and Innovation:**

*More Efficient, Effective, and Safer on Scene Response*

Core foci:

- Technological advances for a more efficient on-scene command.
- Focus on opportunities and challenges following the era of modern sensors, drones, high-tech displays and international cooperation.

**Professor Patrikakis Charalampos Visits from Piraeus University of Applied Sciences for the Trillion Project & Erasmus Program**

Professor Patrikakis Charalampos (Babis) visited Purdue the week of 11/27. Professor Charalampos came to Purdue from PUAS as part of the Erasmus+ program and also the Trillion Project.

Babis is the Scientific Coordinator and Dissemination Manager of the Trillion Project, which proposes a platform to create collaboration between citizens and law enforcement agencies. Social scientists, technology experts, and law-enforcement agencies across Europe are collaborating to create this technology.

Trillion will conduct advanced data mining and classification through social networks and direct reporting of incidents via mobile applications while balancing complete data gathering with a respect to privacy, along with other national and EU regulations.
doing so, law enforcement agencies will be able to detect incidents more efficiently and respond to such incidents in real time. The platform will use geolocation technologies, including those related to shopping malls, cinema complexes, and stadiums.

Professor Charalampos visited Purdue University to observe how the VACCINE lab utilizes and develops its visual analytics program and interact with Prof. David Ebert and Dr. Chittayong (Jao Surakitbanharn, members Purdue’s Electrical and Computer Engineering. In addition, he spent time with members of Purdue Mechanical Engineering, Civil Engineering, Communications, and the Forest and Natural Resources.

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**Finally - Congratulations to Dr. Shezad Afzal**

We would like to congratulate the latest VACCINE graduate, Dr. Shehzad Afzal. He successfully defended his thesis, “Text-based Spatial and Temporal Visualizations and their Applications in Visual Analytics” on November 30th. He will continue working with VACCINE as a developer for Davista LLC, a startup founded by VACCINE graduate Dr. Abish Malik and Professor David Ebert.

**Congrats!**