

# Computer Science Seminar

## Visual Cloud Computing and Edge Networking: Foundations and Application Case Studies

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In the event of natural or man-made disaster incidents, providing rapid situational awareness through video/image data processing at salient incident scenes is often critical to first responders. Scalable processing of media-rich visual data and the subsequent visualization with high user Quality of Experience (QoE) demands new cloud computing and smart device management approaches. In this talk, we describe the challenges in decision making involving disaster incident-supporting visual cloud computing. Following this, we will present our solution approaches for visual data processing applications such as tracking objects in wide-area motion imagery, and large-scale facial recognition. Our solution approaches feature algorithms for intelligent fog computing at the network-edge coupled with cloud offloading to a public cloud, utilizing software-defined networking (SDN). In addition, results from our solution approaches to deal with issues of end-to-end cloud-fog communications security and energy/latency tradeoffs in cloud

offloading will be discussed. We will conclude with a discussion of our experimental results collected from simulations and a GENI cloud-fog testbed to demonstrate how our solution approaches can: (a) enhance remote user QoE, (b) reduce latency, congestion, and (c) increase throughput, security -- in realistic disaster response use cases.

**Bio:** Dr. Prasad Calyam is an assistant professor in the Electrical Engineering and Computer Science Department at the University of Missouri and a Core Faculty in the University of Missouri Informatics Institute (MUII). Before coming to the university in 2013, he was a research director at the Ohio Supercomputer Center/Ohio Academic Resources Network at Ohio State University. His research and development areas of interest include distributed and cloud computing, computer networking, networked-multimedia applications and cyber security. He has published more than 85 papers in various conference and journal venues. As the principal investigator, he has successfully led teams of graduate, undergraduate and postdoctoral fellows in numerous federal-, state- and industry-sponsored research and development projects. His research sponsors include the National Science Foundation, the Department of Energy, VMware, Dell, IBM, Verizon, Cisco, Raytheon-BBN, the MU Coulter Translational Partnership (TP) Program, Huawei Technologies, Internet2 and others. His basic research and software on multi-domain network measurement and monitoring has been commercialized as 'Narada Metrics'. He served as an editor for IEEE Communications Magazine, panelist on numerous NSF and DOE Proposal Review Panels and as Chair of two NSF-sponsored workshops. He currently serves as the Director of the NSF REU Site on Consumer Networking. He received the Cisco and VMware Research Awards in 2013, the Outstanding Junior Faculty Research Award in 2016, and the Outstanding Junior Faculty Teaching Award in 2017. He is a Senior IEEE Member.

**Date: September 11, 2017**

**Time: 10:00-10:50 am**

**209 Computer Science Building**

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