

# **CXL (and Friends) Meetup**

## **Sunday, July 20, 2025**

### **Royal Sonesta Hotel Scioto Ballroom**

#### **3-5 p.m.**



#### **3:00: Welcome: Elizabeth Leake, Texas A&M University**

Elizabeth Leake is a project manager of advanced cyberinfrastructure IV at Texas A&M University. She founded STEM-Trek, a global, grassroots nonprofit organization that supports travel, mentoring and professional development opportunities for science, technology, engineering and mathematics scholars from underrepresented groups and regions. Prior to founding STEM-Trek, Leake served as a high-performance external relations specialist and storyteller. In 2019, Leake formed the Isango project - with the goal of developing a composable, portable and affordable supercomputer in a suitcase (FPGAs, GPUs and CPUs). She hopes to make the platform available to K-20 schools and development teams who build custom computing solutions. Prototypes were showcased at PEARC22 and 24. With help from Kurt Keville (below) and others, she continues to explore ways to make cyberinfrastructure available to many.



#### **3:05: Troy Benjergdes, 7 Elements, LLC.**

Title: A theory of thermodynamics and CXL

Abstract: Traditional computer science uses  $O(n)$  notation to provide a theoretical framework to analyze the complexity of an algorithm. If we apply total energy consumption (joules, MMBTU, or megawatt-hours, take your pick) as the definition of algorithmic complexity, would we get a different system architecture than we do with dense matrix multiply MachoFLOPS? CXL attached memory and other out-of-core computation techniques can be used to leverage a much smaller number of state of the art tensor matrix accelerators with very expensive dedicated memory to compute once, write once to CXL attached memory, and read it back many times at much lower energy cost than recomputing the data.



#### **3:30: Mohammad Sada, San Diego Supercomputer Center**

Title: The National Research Platform: Nautilus Kubernetes Cluster

Abstract: The National Research Platform (NRP) is an internationally distributed, dual-stack Kubernetes cluster designed to advance research in cyberinfrastructure, high-performance computing (HPC), and artificial intelligence (AI). This talk highlights NRP's capabilities for network and systems experimentation, including support for programmable SmartNICs, high-speed provisioning via

Layer 2/3 AutoGOLE and SENSE orchestration, and seamless interoperability with federated testbeds. The platform also offers access to diverse hardware resources and novel architectures..



**4:00: Gil Speyer and Doug Jennewein, Arizona State University**

Title: Posits Solve the "Light Leak" Problem in Computer Graphics



Authors: Arman Singh, Gil Speyer and John Gustafson | The "light leak" problem occurs in computer graphics when a ray is incorrectly assessed as not intersecting a polygon due to a floating-point rounding error. Even with increased precision, these errors cannot be avoided without changing to a better numerical representation. In this work, we demonstrate the use of one such alternative, the `\textit{posit}` format, to address the light leak problem. Posit format supports correctly rounded dot products, which are essential to computer

graphics. A Python code, developed to run with either representation in software, demonstrates the advantage of posits. Further work will investigate hardware implementations.



**4:30: Petar Radojković, Barcelona Supercomputing Center**

Title : CXL update.

Petar Radojkovic is a memory systems team leader at Barcelona Supercomputing Center. He explores various aspects of the memory systems for high-performance computing. He participated in various European HPC projects, and he was leading projects with major memory manufacturers Micron Technologies and Samsung Electronics.



**5:00: Kurt Keville, Somerville Dynamics**

Closing remarks - Isango update. Discussion.

Kurt works in University Research Computing and Systems Design. His MIT thesis work was on energy-efficient supercomputing and to that end, he has investigated research enabling and accelerating technologies that can unlock new programming paradigms for grand challenge problems. Kurt works on the Isango cluster model, which is a notional Tactical Datacenter design with strong focus on energy efficiency and composability.