



The 6th Annual

# Parallel Applications Workshop Alternatives to MPI+X

Monday, November 13, 2023  
9:00 am - 5:30 pm (MST)  
Room 702  
Hybrid Event

Held in conjunction with SC23  
The International Conference for High Performance Computing, Networking, Storage, and Analysis





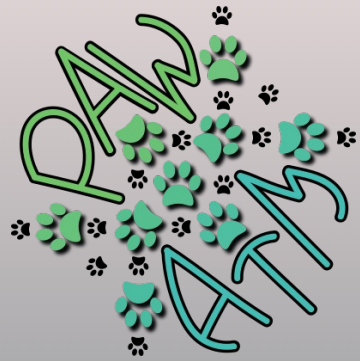
## Parallel Applications Workshop Alternatives to MPI+X

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Monday



# Organization

- Workshop Chair
  - Karla V. Morris Wright - Sandia National Laboratories
- Organizing Committee
  - Engin Kayraklioglu - Hewlett Packard Enterprise
  - Irene Moulitsas - Cranfield University
  - Elliott Slaughter - SLAC National Accelerator Laboratory
- Program Committee Chairs
  - Bill Long - Hewlett Packard Enterprise
  - Daniele Lezzi - Barcelona Supercomputing Center
- Advisory Committee
  - Bradford L. Chamberlain - Hewlett Packard Enterprise
  - Damian W. I. Rouson - Lawrence Berkeley National Laboratory
  - Katherine A. Yelick - Lawrence Berkeley National Laboratory



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# Program Committee

- Dan Bonachea
- Jan Ciesko
- Iacopo Colonnelli
- Mario Di Renzo
- Salvatore Filippone
- Magne Haverlaen
- Peter Hawkins
- Engin Kayraklioglu
- Jannis Klierenberg
- Daniele Lezzi
- Bill Long
- Francesc Lordan
- Lee Margetts
- Fabrizio Marozzo
- Josh Milthorpe
- Henry Monge Camacho
- Karla Vanessa Morris Wright
- Irene Moulitsas
- Elliott Slaughter
- Kenjiro Taura
- Miwako Tsuji
- Lawrence Berkeley National Laboratory
- Sandia National Laboratories
- University of Turin
- University of Salento and Stanford University
- Università di Roma Tor Vergata
- University of Bergen
- Google
- Hewlett Packard Enterprise
- RWTH Aachen University
- Barcelona Supercomputing Center
- Hewlett Packard Enterprise
- Barcelona Supercomputing Center
- University of Manchester
- University of Calabria
- Australian National University
- Oak Ridge National Laboratory
- Sandia National Laboratories
- Cranfield University
- SLAC National Accelerator Laboratory
- University of Tokyo
- RIKEN



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# Artifact Evaluation Committee

- Chair
  - Irene Moulitsas - Cranfield University
- Members
  - Scott Baden - University of California San Diego
  - Desmond Bisandu - Cranfield University
  - Valentin Churavy - Massachusetts Institute of Technology
  - Fabio Durastante - University of Pisa
  - Yakup Koray Budanaz - Technical University of Munich
  - Boyu Kuang - Cranfield University
  - Soren Rasmussen - NCAR
  - Anjiang Wei - Stanford University



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# Program

- 9:00 - Welcome and Introduction
- 9:32 - **Survey of Technologies for Developers of Parallel Applications**
- 10:00 - Break (30 minutes)
- 10:30 - **Session 1**
- 12:30 - Lunch (90 minutes)
  
- 2:00 - **Distinguished Talk**  
Ethan Gutmann - National Center for Atmospheric Research  
*"Trials, Tribulations and Joys of Developing with  
Alternative Parallel Frameworks"*
- 3:30 - Break (30 minutes)
- 3:30 - **Session 3**
- 3:54 - **Panel Discussion**
- 5:30 - PAW-ATM Concludes



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# Survey of Technologies for Developers of Parallel Applications

**9:02 - 10:00**

- 9:02 - Barbara Chapman, Hewlett Packard Enterprise
- 9:12 - Justin Wozniak, Argonne National Laboratory
- 9:22 - Johannes Blaschke, Lawrence Berkeley National Laboratory
- 9:32 - Rohan Yadav, NVIDIA
- 9:42 - Q&A

**Please take a moment to give us feedback!**

<https://tinyurl.com/PAW-ATM2023-feedback>  
(goes to official SC23 Site)



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# Session 1

10:30 - 12:30

- 10:30 - *Implementing Scalable Matrix-Vector Products for the Exact Diagonalization Methods in Quantum*  
**Tom Westerhout** and Bradford L. Chamberlain
- 10:54 - *High-Performance Programming and Execution of a Coral Biodiversity Mapping Algorithm Using Chapel*  
**Scott Bachman**, Rebecca Green, Anna Bakker, Helen Fox, Sam Purkis, and Ben Harshbarger
- 11:18 - *Design and Analysis of the Network Software Stack of an Asynchronous Many-Task System -- The LCI Parcelport of HPX*  
**Jiakun Yan**, Hartmut Kaiser, and Marc Snir
- 11:42 - *shmem4py: High-Performance One-Sided Communication for Python Applications*  
**Marcin Rogowski**, Jeff R. Hammond, David E. Keyes, and Lisandro Dalcin
- 12:06 - *Pure: Evolving Message Passing to Better Leverage Shared Memory Within Nodes*  
**James Psota**, and Armando Solar-Lezama



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# Distinguished Talk

2:00 - 3:00

2:00 - *Trials, Tribulations and Joys of Developing with Alternative Parallel Frameworks*

**Ethan Gutmann**, National Center for Atmospheric Research

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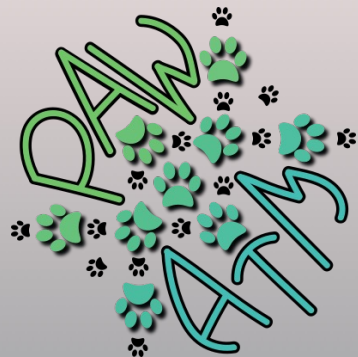
# Session 3

3:30 - 3:54

3:30 - *symPACK: A GPU-Capable Fan-Out Sparse Cholesky Solver*  
**Julian Bellavita**, Mathias Jacquelin, Esmond Ng, Dan Bonachea,  
Johnny Corbino, and Paul H Hargrove

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# Panel

3:54 - 5:30

- Panel Moderator
  - Michelle Strout - Hewlett Packard Enterprise
- Panelists
  - Ewa Deelman - University of Southern California
  - Jonathan Graham - Los Alamos National Laboratory
  - Ethan Gutmann - National Center for Atmospheric Research
  - Laxmikant Kale - University of Illinois Urbana-Champaign
  - George Karypis - University of Minnesota

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# PAW-ATM Journey

