

Argonne Training Program on Extreme-Scale Computing (ATPESC)

Performance Tools and Debuggers: Introduction

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EXASCALE COMPUTING PROJECT

Outline

- What is your favorite debugger?
 - printf ?
 - You can have a better debugger on HPC environments
- How do you measure performance of your application on HPC?
 - Wall time (e.g., `$time ./a.out`)?
 - Flop-rate, bandwidth?
 - How to identify performance bottlenecks?
 - Leading profiling tools can help you optimize your code on HPC
- Seven powerful HPC tools in this track
 - Hardware vendor tools
 - Intel VTune and Advisor
 - NVIDIA Nsight System & Nsight Compute
 - AMD ROCm tools: ROC profiler & debugger
 - Cross-platform tools
 - ARM Forge: DDT(debugger) & MAP(profiler)
 - Perforce TotalView(debugger)
 - Open source community tools
 - HPCToolkit
 - TAU

Team for Tools Track



JaeHyuk Kwack
(Argonne)



Scott Parker
(Argonne)



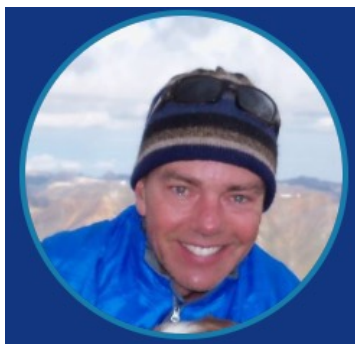
Kevin O'Leary
(Intel)



Kristopher Keipert
(NVIDIA)



Suyash Tandon
(AMD)



Beau Paisley
(ARM)



Nikolay Piskun
(PERFORCE)



John Mellor-Crummey
(Rice Univ.)



Sameer Shande
(Univ. of Oregon / Paratools)

Agenda

Track 6 – Performance Tools and Debuggers

8:30AM	Introduction of Tools Track	JaeHyuk Kwack, ANL
8:40AM	NVIDIA	Kris Keipert, NVIDIA
9:20AM	Intel	Kevin O'Leary, Intel
10:00AM	Break	
10:30AM	AMD	Suyash Tandon, AMD
11:10AM	Parallel Sessions:	
	• Main room: Hands-on (Intel, AMD)	Kevin O'Leary, Intel
		Suyash Tandon, AMD
	• Breakout room: Hands-on (NVIDIA)	Kris Keipert, NVIDIA
12:15PM	Lunch	
1:15PM	Hands-on (continued)	
1:30PM	ARM Tools	Beau Paisley, ARM
2:10PM	TotalView	Nikolay Piskun, Perforce Software
2:50PM	Parallel Sessions:	
	• Main room: Hands-on (TotalView)	Nikolay Piskun, Perforce Software
	• Breakout room: Hands-on (Arm Tools)	Beau Paisley, ARM
3:50PM	Break	

Hardware vendor tool sessions

Cross-platform tool sessions

Open source community tool sessions

3:50PM	Break	
4:10PM	HPCToolkit	John Mellor-Crummey, Rice U.
4:50PM	Tau	Sameer Shende, Paratools/U Oregon
5:30PM	Parallel Sessions:	
	• Main room: Hands-on (Tau)	Sameer Shende, Paratools/U Oregon
	• Breakout room: Hands-on (HPCToolkit)	John Mellor-Crummey, Rice U.
6:30PM	Dinner	
7:30PM	After-dinner talk: An Accidental Benchmark	Jack Dongarra, Univ. of Tenn.
8:15PM	Parallel Sessions (optional):	
	• Main Room: Hands-on (Intel, AMD, TotalView, Tau)	Kevin O'Leary, Intel Suyash Tandon, AMD Nikolay Piskun, Perforce Software Sameer Shende, Paratools/U Oregon
	• Breakout Room: Hands-on (NVIDIA, Arm, HPCToolkit)	Kris Keipert, NVIDIA Beau Paisley, ARM John Mellor-Crummey, Rice U.
9:30PM	Adjourn	

Systems for Hands-on

- System reservation for today
 - Theta: 512 nodes 8:30AM-9:30PM (-q ATPESC2022 -A ATPESC2022)
 - Cooley: 80 nodes 8:30AM-9:30PM (-q training -A ATPESC2022)
 - ThetaGPU: 8 nodes (64 gpus) 8:30AM-9:30PM (-q single-gpu -A ATPESC2022)
 - rest ~ 12 nodes (full-node) 8:30AM-9:30PM (-q training-gpu -A ATPESC2022)
- NVIDIA Cloud GPU resources
 - Sign-up: <https://developer.nvidia.com/>
- Intel DevCloud for Intel GPUs
 - Sign-up: <https://www.intel.com/content/www/us/en/developer/tools/devcloud/overview.html>
- AMD Accelerator Cloud (AAC): very limited resource available today
 - Sign-up: <https://www.amd.com/en/solutions/accelerated-computing>
- ASCENT: no reservation, but usable with the default queue (with -P TRN011)

Thanks and Enjoy!