

# Argonne Training Program on Extreme-Scale Computing (ATPESC)

## Performance Tools and Debuggers

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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?
  - Flop-rate, bandwidth?
  - How to identify performance bottlenecks?
  - Leading profiling tools can help you optimize your code on HPC
- Debugging Tools in this track
  - ARM DDT (in ARM Forge)
  - Perforce TotalView
- Profiling Tools in this track
  - ARM MAP (in ARM Forge)
  - Intel VTune
  - Intel Advisor
  - CrayPat
  - HPCToolkit
  - TAU

# Team for Tools Track



JaeHyuk Kwack  
(Argonne National Laboratory)



Scott Parker  
(Argonne National Laboratory)



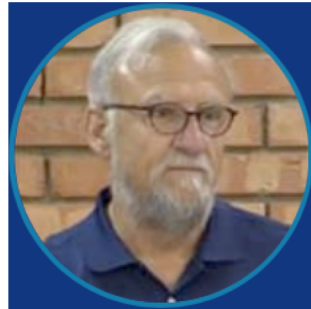
Ryan Hulguin  
(ARM)



Nikolay Piskun  
(PERFORCE)



Paulius Velesko  
(Intel)



John Levesque  
(HPE/Cray)



John Mellor-Crummey  
(Rice Univ.)



Sameer Shande  
(Univ. of Oregon / Paratools)

# Agenda

## Debugging Tool sessions before lunch

9:00 *Speaker check-in*

9:30 Introduction

[JaeHyuk Kwack](#), ANL and  
[Scott Parker](#), ANL

9:40 ARM Forge

[Ryan Hulguin](#), ARM

10:15 TotalView

[Nikolay Piskun](#), PERFORCE

10:50 Parallel Sessions:

- Break
- **ROOM B:** Hands-on: ARM
- **ROOM C:** Hands-on: TotalView

[Ryan Hulguin](#), ARM

[Nikolay Piskun](#), PERFORCE

11:45 *Lunch*

## Profiling Tool sessions before lunch

12:45 p.m. Intel VTune/Advisor

[Paulius Velesko](#), Intel

1:25 CrayPat

[John Levesque](#), HPE

2:00 Parallel Sessions:

- Break
- **ROOM B:** Hands-on: Intel VTune/Advisor
- **ROOM C:** Hands-on: CrayPat

[Paulius Velesko](#), Intel

[John Levesque](#), HPE

2:55 HPCToolkit

[John Mellor-Crummey](#), Rice  
University

3:30 TAU

[Sameer Shende](#), University of  
Oregon / Para Tools, Inc.

4:05 Parallel Sessions:

- **ROOM B:** Hands-on: HPCToolkit
- **ROOM C:** Hands-on: TAU

[John Mellor-Crummey](#), Rice  
University

[Sameer Shende](#), University of  
Oregon / Para Tools, Inc.

5:00 Adjourn

# ZoomGov sessions

- Main Room

- <https://exascaleproject.zoomgov.com/j/1608499706?pwd=NFhkdlldzZmpjSmRTWWJVdUkzTGV3Zz09>
- All presentations sessions for Arm Forge, TotalView, Intel VTune/Advisor, CrayPat, HPCToolkit, and TAU

- Room B

- <https://exascaleproject.zoomgov.com/j/1601131634?pwd=SDRSNEtKT3daQ0xqL0FSOC9rMG5yQT09>
- Hands-on sessions for Arm Forge, Intel VTune/Advisor, and HPCToolkit

- Room C

- <https://exascaleproject.zoomgov.com/j/1610856640?pwd=SHRINkpGWGY2RDFFPeUs2SmJRby9nUT09>
- Hands-on sessions for TotalView, CrayPat, and TAU

# Slack Channels

- Arm Forge (#ddt-map)

The screenshot shows the Slack interface for the #ddt-map channel. The left sidebar lists various channels, with #ddt-map selected. The main area displays the channel's history, starting with a message from Ray Loy on Wednesday, July 22nd, stating the channel's purpose for discussing Arm Tools (DDT and MAP). Subsequent messages show Ryan Hulguin being added and Ray Loy renaming the channel from "arm-ddt-map" to "ddt-map". On Friday, July 24th, Amil Sharma joined along with 14 others. The bottom of the screen shows the message input area with formatting options like bold, italic, and code.

- TotalView (#totalview)

The screenshot shows the Slack interface for the #totalview channel. The left sidebar lists various channels, with #totalview selected. The main area displays the channel's history, starting with a message from Ray Loy on Wednesday, July 22nd, stating the channel's purpose for discussing Perforce tools (TotalView etc). Subsequent messages show Yasi joining and Ray Loy renaming the channel from "perforce-totalview" to "totalview". On Friday, July 24th, Amil Sharma joined along with 13 others. The bottom of the screen shows the message input area with formatting options like bold, italic, and code.

# Slack Channels

- Intel VTune/Advisor (#vtune-advisor)

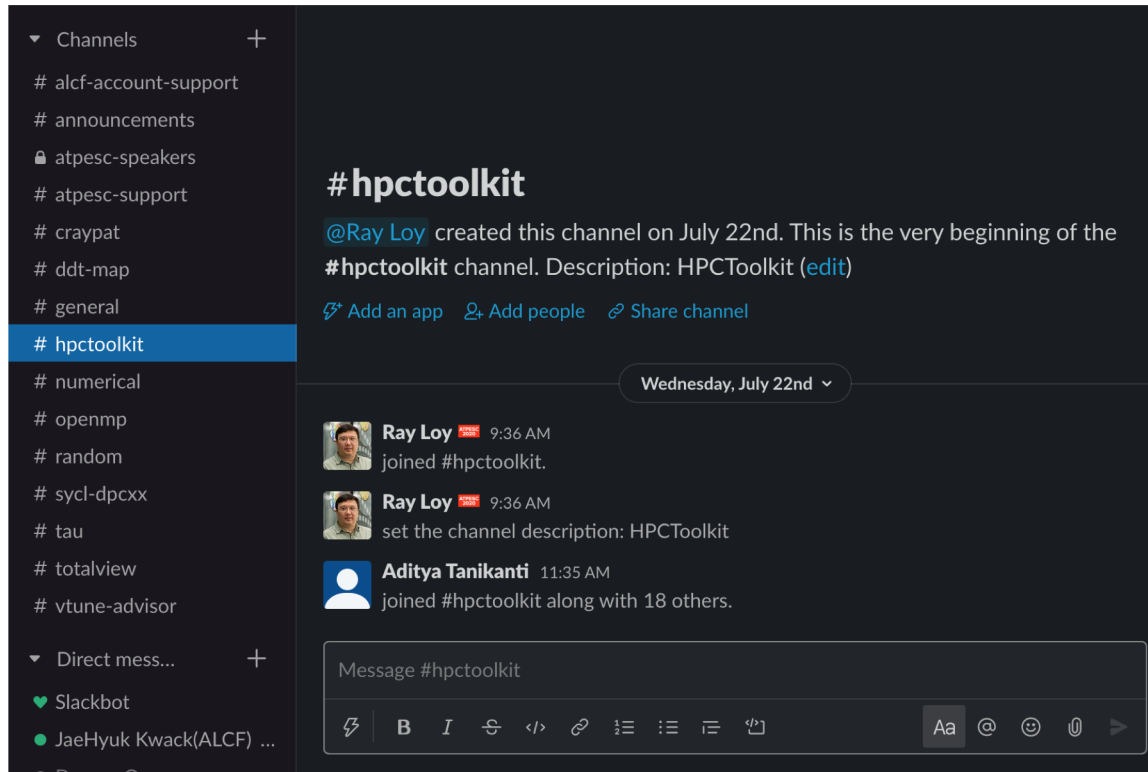
The screenshot shows the Slack interface for the #vtune-advisor channel. The left sidebar lists various channels, with #vtune-advisor highlighted. The main area displays the channel header with the name #vtune-advisor and a message from @Ray Loy stating it was created on July 22nd. Below this, a date separator for Wednesday, July 22nd is shown, followed by a message from Ray Loy indicating he joined the channel along with 5 others. Another date separator for Thursday, July 23rd is shown, followed by a message from Ray Loy stating he renamed the channel from "intel-vtune-advisor" to "vtune-advisor". A third date separator for Friday, July 24th is shown, followed by a message from Amil Sharma stating he joined the channel along with 13 others. The bottom of the interface shows a message input field and a toolbar with various formatting and action icons.

- CrayPat (#craypat)

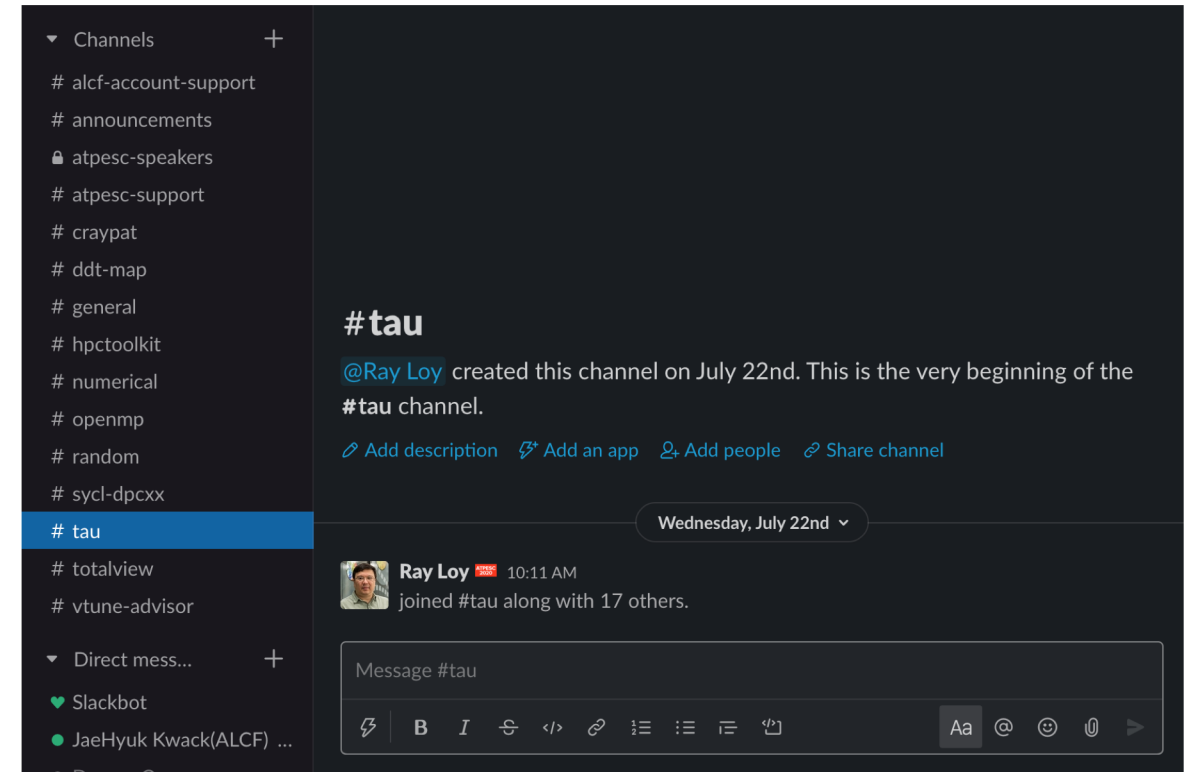
The screenshot shows the Slack interface for the #craypat channel. The left sidebar lists various channels, with #craypat highlighted. The main area displays the channel header with the name #craypat and a message from @Ray Loy stating it was created on July 22nd. Below this, a date separator for Wednesday, July 22nd is shown, followed by a message from Ray Loy indicating he joined the channel. Another message from Ray Loy states he set the channel description: "Discussion about Cray tools e.g. CrayPat". A third message from JaeHyuk Kwack(ALCF) states he was added to the channel by Ray Loy, along with 3 others. The bottom of the interface shows a message input field and a toolbar with various formatting and action icons.

# Slack Channels

- HPCToolkit (#hpctoolkit)



- TAU (#tau)





# Systems for Hands-on

- System reservation for today
  - Theta: 512 nodes from 9am – 6pm in Central (-q ATPESC2020 -A ATPESC2020)
  - Cooley: 80 nodes from 9am – 6pm in Central (-q training -A ATPESC2020)
- Intel DevCloud for Intel Gen9 GPUs
- ASCENT: no reservation, but usable with the default queue

# Thanks and Enjoy!