

行政院及所屬各機關出國報告
(出國類別：出席國際會議)

參加「**2017**年高性能計算、網路、儲存和分析國際會議」出國報告

服務機關：財政部財政資訊中心

姓名職稱：顏科長大淵

派赴國家：美國

出國期間：106年11月10日至106年11月19日

報告日期：107年2月12日

摘要

隨著科技不斷的演進，尤其近幾年雲端運算、大數據及人工智慧快速的興起，帶動了產業型態的改變，人工智慧(AI)、機器學習(Machine Learning)及深度學習(Deep Learning)也成為當紅炸子雞，科技大廠包括蘋果、Google、臉書都積極投入並布局，甚至大陸如阿里巴巴、騰訊、百度等大公司也在這一波資訊科技的浪潮下，投入大量的研發人才並站穩腳步，而 SC 大會 (又名 Super Computing, 全稱為 International Conference for High Performance Computing, Networking, Storage and Analysis)，是國際公認高性能計算領域頂級學術會議，所有會議上的論文都經過嚴格篩選才能脫穎而出，此外每年全球 Top500 超級計算機榜單也是通過 SC 大會進行發布，同時與超級運算相關的各大廠商、學研單位也會在該會議上進行參展，展示其最新的產品與研究成果，所以 SC 會議向來都是高性能計算領域執牛耳地位的專家學者所參與的盛會，今年更有來自 117 個國家和超過 10000 人與會，同時吸引了 350 家廠商參展，均創下大會歷年最高紀錄，而人工智慧的研究及應用，也成為了這一次大會上最具代表性的主題，相關研究領域包含了氣象、醫療、天文、物理、化學、生物、金融、科技等應用，參與 SC 大會不僅是一次學習之旅，可以聆聽眾大師精闢的演講及論文發表，也可以和眾多同好一起交流學習並開拓視野，對日後個人從事資訊系統規劃、資料分析應用方面都大有幫助。

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壹、目的

一、會議緣起

SC 大會(又名 Super Computing, 全稱為 International Conference for High Performance Computing, Networking, Storage and Analysis)是由 ACM(Association for Computing Machinery) 和 IEEE 計算機協會創建並主辦的年度活動，SC 大會每年都會藉由提供教學(Tutorial)、專題演講(Invited Talk)、專題研討會(Workshop)、研究論文發表(Paper)、小組會議(Panel)、展覽(Exhibits)、頒獎(Award)、學生論文競賽(Student Paper)等項目，致力於展示目前國際上高性能運算(High Performance Computing, 簡稱 HPC)社區在高性能計算，網絡，存儲和分析等領域創新技術、發展趨勢、重要議題及產品，因此該會議成為目前全球最大的超級運算會議。

二、會議地點及安排

SC 大會基本上會在美國中西部的幾個大城市之間輪流舉行，今年會議來到了科羅拉多州的首府丹佛市，會場在市中心的 Colorado Convention Center，這個會場以著名的建築雕像 Blue Bear 而聞名，會議中心總共有三層，地下一樓兩個大廳用來舉辦 Invited talk，一樓有幾十個會議廳用來準備給 tutorial, workshop 以及 paper 等 Technical program 使用，整個二樓用來給 350 家企業及研究機構參展使用，會議總共舉行 6 天，前 2 天是以 Tutorial 和 Workshop 為主，中間 3 天則陸續安排了 Invited talk, Paper, Exhibition, Panel，最後一天則為 Workshop，以下就會議的安排進行簡單介紹：

技術計畫(Technical Program)

每年 SC 大會都會在超級運算領域提供領先的技術方案，而不管是 tutorial, workshop, invited talk, paper, panel 等，每項內容都經過最專業評審程序，而被挑選出來的都代表著一

種榮耀，代表著研究內容受到超級運算領域專家的認可，同時該項也是整個大會最核心的項目，國際上超級運算領域著名的專家學者都會出現在這個大會上，因此在這項目能自己推出新的研究或是幫助教授作研究，都可以提高在 HPC 領域能見度，當然在職場上也會有一定的優勢。

Exhibits(展覽)

超級運算 2017(簡稱 SC17)會展是超級運算會議歷史上規模最大的一次，由擁有綠色能源、人工智慧、機器學習、航太科學、先進製造業和其它依賴高性能計算行業的工具開發商和研究機構領導，展覽的總面積為 15.5 萬平方英尺，總共有 350 家企業和研究機構參展，包括來自美國以外的 26 個國家，使得參加 SC17 真正成為一個全球性的體驗。

頒獎(Award)

每年 SC 大會不僅展示高性能計算領域最優秀、最耀眼的明星，也展示新起之秀和那些給人們留下深刻印象的研究人員，SC 獎項提供這些優秀研究人員被認可的一種方式，每年大會上頒發的獎項包含最佳論文(Best Paper)、最佳學生論文(Best Student Paper)、最佳海報(Best Poster)及時間檢驗獎(Test of Time Award)等。

Students@SC

SC17 會議的任務是通過專業發展計畫，提供向導師學習的機會及在 SC 技術會議交流，使得在本科生(電腦科學)、大學生和研究生階段建立強大而多樣的 HPC 學生社區，通過鼓勵一個以 HPC 為中心的強大學生社區，而活動內容包含學生群體競賽(The Student Cluster Competition)、學生自願者(Student Volunteers)、體驗本科生的 HPC(Experiencing HPC for Undergraduates)、Mentor-Protégé Program 及學生畢業後工作機會博覽會(Student-Postdoc Job & Opportunity Fair)等活動。

三、參加目的

隨著資訊科技的演進，從早期的 Main frame 架構，逐步演進為 Client Server 架構，到現今的雲端運算、大數據及人工智慧來臨的時代，本中心目前保管全國的財稅資料，而且近年推動電子發票成效有目共睹，因而本中心累積巨量的電子發票資料，如何善用並分析這些資料，找出資料的潛在價值，支援部次長決策參考，為本中心所肩負的重大使命之一，本次會議主題面向十分龐雜，但今年會議的主角無疑是人工智慧、機器學習及深度學習等相關主題的研究及成果，未來本中心也將深耕這塊領域，如近年推動與相關學校簽訂合作備忘錄，透過本中心所保管巨量資料，進行稅務相關主題研究，今年更開始進行智慧查帳主題的研究，本報告將聚焦在此次會議所聆聽或收集有關人工智慧的應用，作為相關業務精進之參考。

貳、過程

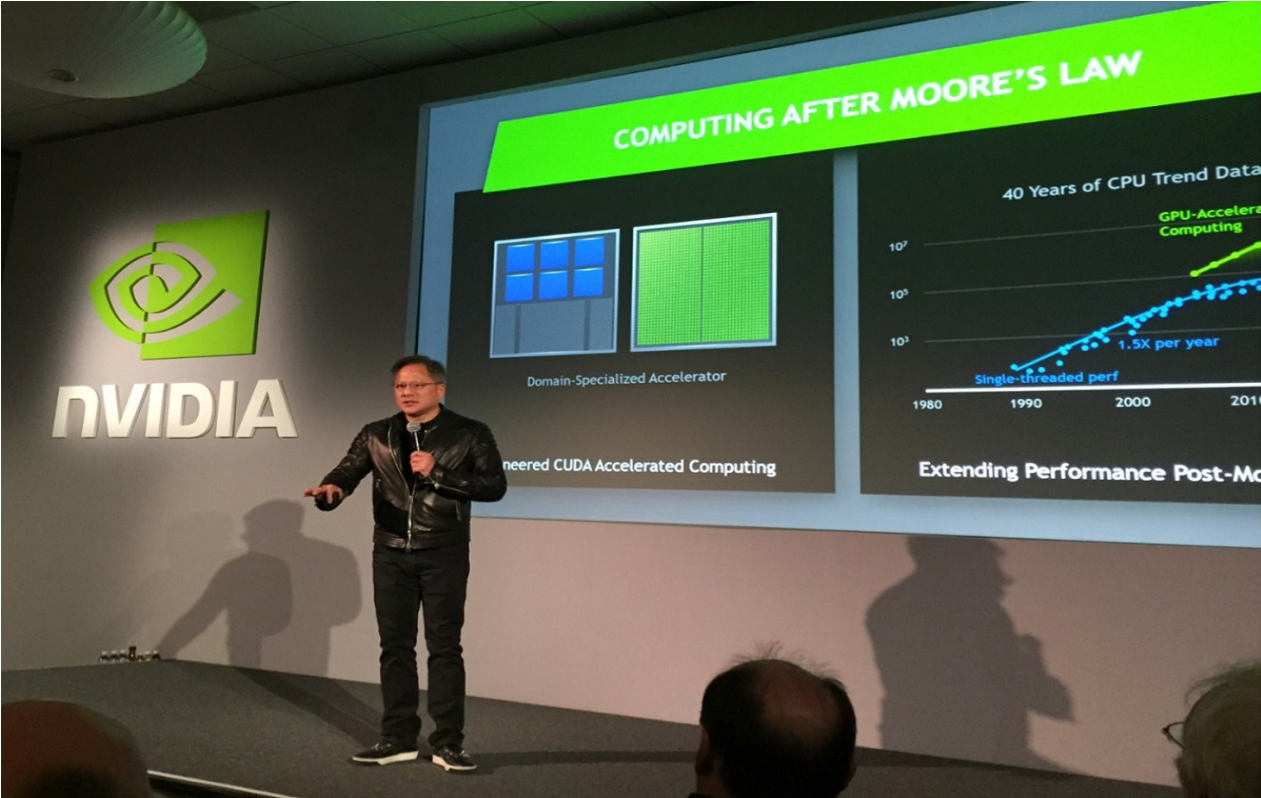
從今年 SC17 上一系列的專題演講、專題研討會、論文發表中，可以感受到人們對高速計算的需求是永無止境的，以下僅就 2 則與會內容進行分享。

首先，今年超級運算大會上最大的亮點，無疑是 14 日的大會主題演講：「生命，宇宙與計算」，來自世界最大電波望遠鏡(Radio telescope)專案 SKA 總監 Philip Diamond 教授和 SKA 的地區中心專案科學家 Rosie Bolton 博士，向與會聽眾介紹了超級運算是如何幫助 SKA 項目探索宇宙的起源，以及宇宙大爆炸之後的宇宙是如何演化的，毫無疑問，SKA 是這個時代全球最具雄心的科技研究項目之一，參與研究的成千上萬的天線將產生大量的數據，從而對超級運算和高速網路連接產生巨大的需求，可以說超級運算在 SKA 項目中無疑發揮著相當關鍵的作用。



其次，從這次會議也可以預測機器學習及深度學習正成為未來十年超級運算領域最為重要的發展之一，來自 Nvidia 創始人兼 CEO 黃仁勳在 SC17 演講就表示，隨著人工智慧的

快速發展，更深更大的演算法模型、更複雜的架構正在成為趨勢，在這種情況之下，如果高速計算不能相應增長，整個人工智慧的學習過程將變得無比漫長，今年 SC17 上傳遞了這樣一個很明確的信息，那就是全球超級運算及和其密切相關的人工智慧領域，對高速計算均有著更高的追求。



參、心得及建議事項

一、心得

自從 Alpha Go 在 2016 年 3 月以 4 比 1 擊敗韓國圍棋高手李世乭之後，Alpha Go 所使用的深度學習技術引起了各界的關注，人工智慧的相關應用及研究在最近幾年更是爆發性成長，如無人車駕駛、人臉識別、智慧客服、語音助理、智慧理財、智慧醫療等，而 Nvidia 公司原本投入行動裝置宣告失敗後，該公司黃仁勳執行長看到人工智慧尤其是深度學習領域需要大量的矩陣計算，因為需要處理高維度及大量的數據，以現行中央處理器(簡稱 CPU)架構處理計算將相當緩慢，時間耗費過久，而繪圖晶片(簡稱 GPU)因為設計架構和 CPU 不同，GPU 的處理器可以設計數百個，因此特別適合數學計算，黃執行長毅然投入人工智慧晶片研發，並研發統一計算架構 (Compute Unified Device Architecture, CUDA) 技術整合至繪圖晶片中，如今從事人工智慧及深度學習研究公司，幾乎都採用 Nvidia 的 GPU，因此 Nvidia 的股價由黑翻紅，在這次大會上，人工智慧、機器學習及深度學習之研究幾乎成為會議主角，不管是專題演講、研討會、論文發表或展館上各國將最新發表的高性能計算電腦，隨時都可以看到 Nvidia 身影，另外在程式語言開發人工智慧應用部分，Python 語言已經變成人工智慧開發之領頭羊，不管是 Google 研發深度學習 Tensorflow 套件，或是 Facebook 研發的深度學習 Pytorch 套件，除了以開放原始碼提供更多加入人工智慧研究外，並且都以 Python 開發或提供 Python 支援，參加這次大會，印象最深刻是除了整個會議中心真得很大，整個大會在議程的設計上除了有教學、專題演講、研討會、小型會議讓各國的參加人員能互動交流學習外，另提供學生競賽的舞台，鼓勵學生從事創新與研究，甚至還提供學生畢業前的就業媒合，讓廠商與學生彼此了解需求，達到真正的學用合一，當然還有類似世貿中心電腦展之軟硬體展覽，不同的是這邊展場規模及空間遠比我們的世貿中心大之外，展場中有提供點心和飲料供來賓使用，也是與我們不一樣的地方，

我國政府在去(106)年宣告為人工智慧元年，並由科技部主導並成立 AI 創新研究中心，深耕人工智慧技術與應用創新，藉由人工智慧基礎技術、智慧醫療、金融科技與製造等場域實證，推動人工智慧產業化，並孕育下世代關鍵科技與人才，這些措施可以讓我們的學生可以快速與世界接軌並隨時保持競爭力，另外中研院從今(107)年也開始規劃人工智慧學校，並花費將近 2000 萬元購買 GPU 晶片，除了培訓人員熟悉機器學習、深度學習相關技術與實作外，培訓結束後並投入市場，甚至規劃假日班供主管人員充電，台灣向來不缺技術，甚至是世界上高階 IT 及 IC 製造與服務業之重鎮，台灣缺的是軟體實證的場域，也受限於市場的規模過小，導致我們的軟體產業不如硬體產業，因此如何提升我國的軟體產業與薪資水平，留下人才願意為台灣服務，也是當下政府需努力與解決的課題。

二、建議事項

政府自民國 87 年起，大力推動資訊委外政策，規定各政府機關重大新興資訊業務，以採資訊業務整體委外作業為原則，然而政府業務自動化，卻隨著科技演進而急速發展，以致資訊部門負荷沉重，政府機關資訊人員角色轉為以辦理委外採購行政與專案管理之工作為主，逐漸失去技術主控性，委外風險節節高升，尤其是本中心保管全國財稅資料，該資料極具敏感性，資訊安全為最重要課題，本中心若有過多委外項目，資訊安全及個人資料洩露的風險也相對提高，有鑑於此，本中心在陳泉錫主任主導下，於 105 年 10 月成立系統設計及訓練科，以建立技術自主，強化編制內人員的資訊能力與研究能力，以減少外包業務比例，並同時成立數位鑑識團隊，強化本中心數位鑑識能力，對財政部所屬機關（構）進行資安檢查，若遇資安問題，可以做初步診斷或保全數位證據，提升鑑識能量。

另外國家發展委員會為整個政府資訊政策推動的龍頭，為培養同仁資訊處理能力，該會將資訊處理職系所需資訊職能劃分系統設計、資料分析、機房管理等 3 個面向，每年定

期辦理相關課程的教育訓練，本中心身處全國唯一的 3 級資訊機關，同仁資訊技能培養的面向廣度及深度，應該要比其它的資訊單位更加自我要求，以目前資訊技術發展的現況，從早期的 MainFrame 架構逐步演化 Client Server 架構到現今的雲端運算、大數據及人工智慧時代，本中心除了在專案管理上需更加精益求精外，如制定資訊委外採購作業規範(RFP) 範本、系統發展標準外，在資訊安全、平台規劃、系統設計、品質管制、資料分析、維運管理等面向也需多方培養人才，尤其在資訊經費逐年遞減，而所提供資訊服務逐年增加趨勢下，同仁除在委外思考的面向外，部分資訊系統甚至可改由本中心同仁自行開發維護，尤其是資料分析這塊領域，結合更多數學、統計、計算機科學等三方面知識，搭配業務領域的 Know How，這部分很難委外辦理，尤其是近年人工智慧的快速發展，它是架構在資料分析上面，本中心保管大量的稅務資料，近年本中心推動使用電子發票，所累積的電子發票資料快速上升，如何有效分析應用資料並將分析結果提供長官作為決策參考，因此，資料分析人才的養成尤為重要，本中心除需強化資料分析人才的培養外，可結合最近與部分學校簽訂共同備忘錄，以主題方式共同研究，吸取學研界最新的技術，達到互惠共享的目標。

肆、附錄

一、會議議程

106年11月12日(星期日)

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|---------------|----------|---|---|-------------------------|
| 8:30am - 12pm | Tutorial | Compression of Scientific Data | Franck Cappello Peter Lindstrom | 401 |
| 8:30am - 12pm | Tutorial | Essential HPC Finance Practice: Total Cost of Ownership (TCO), Internal Funding, and Cost-Recovery Models | Andrew Jones Owen G. M. Thomas | 301 |
| 8:30am - 12pm | Tutorial | Migratable Objects and Task-Based Parallel Programming with Charm++ | Laxmikant Kale Michael Robson Ronak Buch JaeminChoi | 210-212 |
| 8:30am - 12pm | Tutorial | Performance Tuning of Scientific Codes with the Roofline Model | Tuomas S. Koskela Aleksandar Ilic Zakhar A. Matveev Samuel W. Williams Philippe Thierry | 201 |
| 8:30am - 5pm | Tutorial | Advanced Manycore Programming (KNL) | Jerome Vienne SiLiu Victor Eijkhout Feng Chen | 302 |
| 8:30am - 5pm | Tutorial | Advanced OpenMP: Performance and 4.5 Features | Christian Terboven Michael Klemm Ruud van der Pas Eric J. Stotzer Bronis R. de Supinski | 404 |
| 8:30am - 5pm | Tutorial | Cloud Computing for Science and Engineering | Ian Foster DennisGannon VaniMandava | 203 |
| 8:30am - 5pm | Tutorial | Deep Learning for Science in the Cloud | Cassie Kozyrkov Kevin D. Kissell | 205 |
| 8:30am - 5pm | Tutorial | Fault-Tolerance for High Performance and Distributed Computing: Theory and Practice | George Bosilca Aurélien Bouteiller Thomas Héroult Yves Robert | 406 |
| 8:30am - 5pm | Tutorial | Hands-On Practical Hybrid Parallel Application Performance Engineering | Christian Feld Markus Geimer Sameer Shende Ronny Tschütter Brian Wylie | 405 |
| 8:30am - 5pm | Tutorial | Large Scale Visualization with ParaView | Kenneth Moreland W. Alan Scott David E. DeMarle | 403 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|---------------|-------------|---|--|-------------|
| | | | JoeInsley John Patchett Jon Woodring | |
| 8:30am - 5pm | Tutorial | Linear Algebra Libraries for High-Performance Computing: Scientific Computing with Multicore and Accelerators | Jakub Kurzak Jack Dongarra Michael Heroux James Demmel | 407 |
| 8:30am - 5pm | Tutorial | Node-Level Performance Engineering | Georg Hager Gerhard Wellein | 402 |
| 8:30am - 5pm | Tutorial | OpenMP Common Core: A “Hands-On” Exploration | Timothy Mattson Alice Koniges Yun (Helen) He Barbara Chapman | 303 |
| 8:30am - 5pm | Tutorial | Parallel Computing 101 | Quentin F. Stout Christiane Jablonowski | 207 |
| 9am - 10am | Students@SC | Welcome to Students@SC Students@SC17 Welcome and Opening Session | Bruce Loftis | 703 |
| 9am - 12:30pm | Workshop | 4th International Workshop on HPC User Support Tools (HUST-17) | Ralph C. Bording Todd Gamblin | 601 |
| 9am - 12:30pm | Workshop | Correctness 2017: First International Workshop on Software Correctness for HPC Applications | Cindy Rubio-Gonzalez Ignacio Laguna | 501 |
| 9am - 12:30pm | Workshop | MCHPC2017: Workshop on Memory Centric Programming for HPC | Ron Brightwell Yonghong Yan | 702 |
| 9am - 5:30pm | Workshop | 7th Workshop on Python for High-Performance and Scientific Computing | Andreas Schreiber William Scullin Bill Spitz Rollin Thomas | 502-503-504 |
| 9am - 5:30pm | Workshop | DataCloud 2017: The Eighth International Workshop on Data-Intensive Computing in the Clouds | | 507 |
| 9am - 5:30pm | Workshop | ESPM2 2017: Third International Workshop on Extreme Scale Programming Models and Middleware | Karl W. Schulz Dhabaleswar K. (DK) Panda Hari Subramoni | 505 |
| 9am - 5:30pm | Workshop | Eighth Annual Workshop for the Energy Efficient HPC Working Group (EE HPC WG) | Michael Patterson Torsten Wilde Natalie Bates Anna Maria Bailey David Martinez David Grant James H. Laros James Rogers Ramkumar Nagappan Michael J. Ellsworth | 704-706 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|----------------|-------------|---|--|-------------------------|
| | | | ... | |
| 9am - 5:30pm | Workshop | ISAV 2017: In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization | Gunther Weber Matthew Wolf Patrick O'Leary Wes Bethel Earl Duque Nicola Ferrier | 605 |
| 9am - 5:30pm | Workshop | Innovating the Network for Data Intensive Science (INDIS) | Cees de Laat PaolaGrosso MalathiVeeraghavan MaryHester | 607 |
| 9am - 5:30pm | Workshop | Medical Image Analysis and Visualization | Anthony Costa Patricia Kovatch Chris Johnson Lalitha Shankar RonKikinis RossWhitaker AlanTannenbaum | 708 |
| 9am - 5:30pm | Workshop | Women in HPC: Diversifying the HPC Workforce | Toni Collis | 710 |
| 9am - 5:30pm | Workshop | Workshop for Open Source Supercomputing | Farzad Fatollahi-Fard David Donofrio John D. Leidel Anastasia Butko | 506 |
| 9am - 5:30pm | Workshop | Workshop on Exascale MPI (ExaMPI) | Ryan Grant PatrickBridges AnthonySkjellum PurushothamBangalore RonBrightwell PavanBalaji MasamichiTakagi GeoffroyVallee | 603 |
| 9am - 5:30pm | Workshop | Workshop on Extreme-Scale Programming Tools (ESPT) | William Jalby Allen D. Malony JuditJimenez MartinSchulz | 712 |
| 10:30am - 12pm | Students@SC | Student Résumé Workshop | Scott Michael | 703 |
| 1:30pm - 3pm | Students@SC | Future Trends in HPC | David Hancock Rangan Sukumar | 703 |
| 1:30pm - 5pm | Tutorial | Big Data Meets HPC: Exploiting HPC Technologies for Accelerating Big Data Processing and Management | Dhabaleswar K. (DK)Panda Xiaoyi Lu | 201 |
| 1:30pm - 5pm | Tutorial | Extracting Value from HPC: Business Cases, Planning, and Investment | Andrew Jones Owen G. M. Thomas | 301 |
| 1:30pm - 5pm | Tutorial | Power-Aware High Performance Computing: Challenges and Opportunities | Dieter Kranzmueller David Lowenthal Barry Rountree | 210-212 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|--------------|----------|---|--|---------------------|
| | | for Application and System Developers | Martin Schulz | |
| 1:30pm - 5pm | Tutorial | The Legion Programming Model | Alex Aiken | 401 |
| 2pm - 5:30pm | Workshop | Computational Reproducibility at Exascale 2017 (CRE2017) | Michael Mascagni Walid Keyrouz Miriam Leeser | 702 |
| 2pm - 5:30pm | Workshop | Fourth SC Workshop on Best Practices for HPC Training | Scott Lathrop Jay Alameda Carl Albing Nia Alexandrov Maxim Belkin Dana Brunson Richard Coffey Fernanda Foertter Richard Gerber Bilel Hadri ... | 601 |
| 2pm - 5:30pm | Workshop | The 2017 International Workshop on Software Engineering for High Performance Computing in Computational and Data-Enabled Science and Engineering (SE-CoDeSE 2017) | Neil Chue Hong Jeffrey Carver Daniel S. Katz Selim Ciraci | 501 |

106年11月13日(星期一)

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-----------------|----------------------|--|--|-------------------------|
| 8:30am - 8:40am | Early Career Program | Forming Connections Program Overview I: Connecting Sideways, with Ourselves and Our Peers | | 711 |
| 8:30am - 10am | Students@SC | Student Résumé Workshop | Scott Michael | 703 |
| 8:30am - 12pm | Tutorial | Better Scientific Software | David E. Bernholdt Anshu Dubey Michael A. Heroux Alicia Klinvex | 303 |
| 8:30am - 12pm | Tutorial | Expressing Heterogeneous Parallelism in C++ with Intel Threading Building Blocks | Michael Voss James Reinders Pablo Reble Rafael Asenjo | 201 |
| 8:30am - 12pm | Tutorial | Getting Started with the Burst Buffer: Using DataWarp Technology | George S. Markomanolis Deborah Bard | 207 |
| 8:30am - 12pm | Tutorial | HPC Acquisition and Commissioning | Andrew Jones Owen G. M. Thomas W. Terry Hewitt | 301 |
| 8:30am - 12pm | Tutorial | HPC via HTTP: Portable, Scalable Computing Using App Containers and the Agave API | Rion Dooley Kathy Traxler Steven Brandt John Fonner | 203 |
| 8:30am - 12pm | Tutorial | In Situ Analysis and Visualization with SENSEI | E. Wes Bethel Andrew C. Bauer Brad Whitlock Matthew Wolf Burlen Loring Silvio Rizzi | 406 |
| 8:30am - 12pm | Tutorial | InfiniBand, Omni-Path, and High-Speed Ethernet for Dummies | Dhableswar K. (DK) Panda Hari Subramoni | 205 |
| 8:30am - 12pm | Tutorial | Mastering Tasking with OpenMP | Christian Terboven Michael Klemm Sergi Mateo Bellido Xavier Teruel Bronis R. de Supinski | 210-212 |
| 8:30am - 5pm | Tutorial | Advanced MPI Programming | Pavan Balaji William Gropp Torsten Hoefler Rajeev Thakur | 404 |
| 8:30am - 5pm | Tutorial | Application Porting and Optimization on GPU-Accelerated POWER Architectures | Dirk Pleiter Andreas Herten Archana Ravindar Jiri Kraus | 405 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-----------------|----------------------|--|--|---------------------|
| | | | ChristophHagleitner Bronson Messer | |
| 8:30am - 5pm | Tutorial | How To Analyze the Performance of Parallel Codes 101 | Martin Schulz JamesGalarowicz Donald Maghrak David Montoya Jennifer Green | 402 |
| 8:30am - 5pm | Tutorial | Managing HPC Software Complexity with Spack | Todd Gamblin Gregory Becker MassimilianoCulpo Gregory L.Lee MatthewLeGendre MarioMelara Adam J.Stewart | 407 |
| 8:30am - 5pm | Tutorial | Parallel I/O in Practice | Rob Latham RobRoss BrentWelch KatieAntypas | 403 |
| 8:30am - 5pm | Tutorial | Scalable Parallel Programming Using OpenACC for Multicore, GPUs, and Manycore | Michael Wolfe | 302 |
| 8:40am - 9:20am | Early Career Program | Forming Connections Peer Networking I: Connecting Sideways, with Ourselves and Our Peers | | 711 |
| 9am - 5:30pm | Workshop | 2nd International Workshop on Post Moore's Era Supercomputing (PMES) | Jeffrey S. Vetter Satoshi Matsuoka | 605 |
| 9am - 5:30pm | Workshop | 8th Workshop on Latest Advances in Scalable Algorithms for Large-Scale Systems | Vassil Alexandrov | 607 |
| 9am - 5:30pm | Workshop | ATIP Workshop on International Exascale and Next-Generation Computing Programs | David Kahaner | 708 |
| 9am - 5:30pm | Workshop | Energy Efficient Supercomputing (E2SC) | Kevin Barker KirkCameron DavidLowenthal DimitriosNikolopoulos Adolfy Hoisie SudhakarYalamanchili | 506 |
| 9am - 5:30pm | Workshop | Fourth Workshop on Accelerator Programming Using Directives (WACCPD) | Sunita Chandrasekaran Guido Juckeland | 712 |
| 9am - 5:30pm | Workshop | HPC Systems Professionals Workshop | Randy Herban Isaax Traxler Jenett Tillotson William Scullin Paul Peltz DavidClifton | 603 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-------------------|----------------------|--|--|---|
| | | | Alex Younts | |
| 9am - 5:30pm | Workshop | IA³ 2017 - 7th Workshop on Irregular Applications: Architectures and Algorithms | John Feo Antonino Tumeo Vito Giovanni Castellana | 507 |
| 9am - 5:30pm | Workshop | Introduction - WORKS 2017 (12th Workshop on Workflows in Support of Large-Scale Science) | | 501 |
| 9am - 5:30pm | Workshop | Joint International Workshop on Parallel Data Storage and Data Intensive Scalable Computing Systems (PDSW-DISCS) | Dean Hildebrand | 601 |
| 9am - 5:30pm | Workshop | LLVM-HPC2017: Fourth Workshop on the LLVM Compiler Infrastructure in HPC | Hal Finkel | 710 |
| 9am - 5:30pm | Workshop | Machine Learning in HPC Environments | Steven R. Young | 502-503-504 |
| 9am - 5:30pm | Workshop | PAW 2017: The 2nd Annual PGAS Applications Workshop | Karla Morris | 702 |
| 9am - 5:30pm | Workshop | The 8th International Workshop on Performance Modeling, Benchmarking, and Simulation of High Performance Computer Systems (PMBS17) | Stephen Jarvis Simon Hammond Steven A. Wright | 704-706 |
| 9am - 5:30pm | Workshop | Workshop on Education for High Performance Computing (EduHPC) | | 505 |
| 9:20am - 10am | Early Career Program | Forming Connections I: Connecting Sideways with Ourselves and Our Peers | Understanding and Appreciating our Professional Strengths and Weaknesses | 711 |
| 10:30am - 10:42am | Early Career Program | Career Management | Thinking Strategically | Andrew Lumsdaine 711 |
| 10:30am - 12pm | Students@SC | Career Panel | Careers in HPC | Elizabeth Jessup Verónica Vergara 703 |
| 10:42am - 10:54am | Early Career Program | Career Management | Forming Strong Networks and Collaborations | Dorian Arnold 711 |
| 10:54am - 11:06am | Early Career Program | Career Management | Performance, Advancement, and Promotions | Barney Maccabe 711 |
| 11:06am - 11:18am | Early Career Program | Career Management | Time Management | Jeanine Cook 711 |
| 11:18am - 12pm | Early Career Program | Career Management | Career Management Panel with Dorian | 711 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-----------------|----------------------|--|--|---------------------------------------|
| | | Arnold (Emory University) , Jeanine Cook (Sandia National Labs) , Andrew Lumsdaine (Pacific Northwest National Lab and University of Washington) and Barney Maccabe (Oak Ridge National Lab) | | |
| 12pm - 1:30pm | Early Career Program | Luncheon | | Four Seasons Ballroom |
| 1:30pm - 1:42pm | Early Career Program | Research Execution Funding Agencies | Kirk Cameron | 711 |
| 1:30pm - 3pm | Students@SC | Professional Persona Workshop Building Your Professional Persona | Patty Lopez | 703 |
| 1:30pm - 5pm | Tutorial | Automating Research Data Management with Globus | Vas Vasiliadis Steve Tuecke | 210-212 |
| 1:30pm - 5pm | Tutorial | Container Computing for HPC and Scientific Workflows | Lisa Gerhardt Shane Canon | 207 |
| 1:30pm - 5pm | Tutorial | Data Center Design and Planning for HPC Folks | Sharan Kalwani Michael Thomas Bernie Woytek | 301 |
| 1:30pm - 5pm | Tutorial | InfiniBand, Omni-Path, and High-Speed Ethernet: Advanced Features, Challenges in Designing, HEC Systems and Usage | Dhableswar K. (DK) Panda HariSubramoni | 205 |
| 1:30pm - 5pm | Tutorial | Interactive HPC: Using C++ and HPX Inside Jupyterhub to Write Performant Portable Parallel Code | Hartmut Kaiser Steven R. Brandt Kevin A. Huck Alice Koniges Bryce A. Lelbach | 201 |
| 1:30pm - 5pm | Tutorial | Kokkos: Enabling Manycore Performance Portability for C++ Applications and Domain Specific Libraries/Languages | H. Carter Edwards Christian Trott Fernanda Foertter | 406 |
| 1:30pm - 5pm | Tutorial | Programming Your GPU with OpenMP: A Hands-On Introduction | Timothy Mattson Simon McIntosh-Smith | 203 |
| 1:30pm - 5pm | Tutorial | Scalable HPC Visualization and Data Analysis Using VisIt | Cyrus Harrison Kevin Griffin David Pugmire Robert Sisneros | 303 |
| 1:42pm - 1:54pm | Early Career Program | Research Execution Writing Effective Proposals | Mary Hall | 711 |
| 1:54pm - | Early Career | Research Execution Research Methods | Mike Heroux | 711 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION | |
|-----------------|-----------------------------|--|---|---------------------------------|---------------------------------------|
| 2:06pm | Program | | | | |
| 2pm - 3pm | Students@SC | Experiencing HPC for Undergraduates: Opening Reception | Experiencing HPC for Undergraduates Opening Reception | 701 | |
| 2:06pm - 2:18pm | Early Career Program | Research Execution | Publishing | Torsten Hoefler | 711 |
| 2:18pm - 3pm | Early Career Program | Research Execution | Research Execution Panel with Kirk Cameron (Virginia Tech), Mary Hall (University of Utah), Mike Heroux (Sandia National Labs) and Torsten Hoefler (ETH Zürich) | 711 | |
| 3pm - 5pm | Students@SC | Experiencing HPC for Undergraduates: Orientation | Experiencing HPC for Undergraduates Orientation | Erik Saule | 701 |
| 3:30pm - 5pm | Early Career Program | Connections II: Connecting with Mentors | Speed Mentoring | | Food Court - Lobby B |
| 3:30pm - 5pm | Students@SC | Mentor-Protégé | | | Four Seasons Ballroom |
| 4:45pm - 5:30pm | Navigating SC17 | Navigating SC17 | | | 705-707 |
| 5:30pm - 6:30pm | HPC Connects Plenary | HPC Connects Plenary: The Century of the City | Charlie Catlett Pete Beckman Debra Lam Michael Mattmiller | | Mile High Ballroom |
| 7pm - 9pm | Reception | Gala Opening Reception | | | Exhibit Halls A, B, E and F |
| 7:30pm - 8pm | Student Cluster Competition | Student Cluster Competition Kick-Off | Student Cluster Competition | | Booth 796 - Exhibit Floor |
| 8pm - 9pm | Student Cluster Competition | Student Cluster Competition | | | Booth 796 - Exhibit Floor |

106年11月14日(星期二)

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-------------------|--|--|--|---------------------------------------|
| 7:30am - 8:15am | Navigating SC17 | Navigating SC17 | | 705-707 |
| 8:30am - 10am | Keynote & Plenary Talk | SC17 Keynote Address Life, the Universe and Computing: The Story of the SKA Telescope | Philip Diamond Rosie Bolton | Mile High Ballroom |
| 8:30am - 5pm | ACM Student Research Competition Poster | ACM Student Research Competition SC17 Research Posters | | Four Seasons Ballroom |
| 8:30am - 5pm | ACM Student Research Competition Poster | Research Posters SC17 Research Posters | | Four Seasons Ballroom |
| 8:30am - 5pm | Poster, Scientific Visualization & Data Analytics Showcase | Scientific Visualization and Data Analytics Showcase Posters | Vetria Byrd | Mile High Prefunction |
| 10am - 5:15pm | Doctoral Showcase | Exhibition of Doctoral Showcase Posters | | Four Seasons Ballroom |
| 10am - 6pm | Emerging Technologies | Emerging Technologies Showcase (Day 1) | Felix Wolf Franck Cappello | 401 |
| 10am - 6pm | Exhibits | Exhibits | | Exhibit Halls A, B, E and F |
| 10am - 6pm | Student Cluster Competition | Student Cluster Competition | | Booth 796 - Exhibit Floor |
| 10:30am - 10:48am | Doctoral Showcase | Doctoral Showcase Session 1 Designing and Building Efficient HPC Cloud with Modern Networking Technologies on Heterogeneous HPC Clusters | Jie Zhang | 210-212 |
| 10:30am - 11am | Paper | Cutting Edge File Systems LocoFS: A Loosely-Coupled Metadata Service for Distributed File Systems | Sivang Li YouyouLu Jiwu Shu YangHu Tao Li | 405-406-407 |
| 10:30am - 11am | Paper | Deep Learning Deep Learning at 15PF: Supervised and Semi-Supervised | Thorsten Kurth JianZhang NadathurSathish Evan Racah Ioannis Mitliagkas | 402-403-404 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-------------------|---------------------|--|---|--|------------------------------------|
| | | Classification for Scientific Data | | Md MostofaPatwary TareqMalas NarayananSundaram WahidBhimji Mikhail E.Smorkalov ... | |
| 10:30am - 11am | Paper | HPC Application Development Tools | Egeria: A Framework for Auto-Construction of HPC Advising Tools through Multi-Layered Natural Language Processing | Hui Guan XipengShen Hamid Krim | 301-302-303 |
| 10:30am - 11am | HPC Impact Showcase | HPC Impact Showcase: Healthcare and Manufacturing | Impact of the DOE and NCI Partnership on Precision Oncology | Rick Stevens | 501-502 |
| 10:30am - 11:15am | Invited Talk | Invited Talks 1 | The U.S. D.O.E. Exascale Computing Project - Goals and Challenges | Paul Messina | Mile High Ballroom |
| 10:30am - 12pm | Students@SC | Experiencing HPC for Undergraduates: Introduction to HPC Research | | Manish Parashar John Shalf MartinSchulz ChrisJohnson | 701 |
| 10:30am - 12pm | Panel | How Serious Are We About the Convergence Between HPC and Big Data? | | Hatem Ltaief SadafAlam KatieAntypas BarryBolding DavidKeyes BastianKoller SteveOberlin MarkSeager | 201-203 |
| 10:48am - 11:06am | Doctoral Showcase | Doctoral Showcase Session 1 | Runtime Solutions to Apply Non-Volatile Memories in Future Computer Systems | Hoda Aghaei Khouzani | 210-212 |
| 11am - 11:30am | Paper | Cutting Edge File Systems | TagIt: An Integrated Indexing and Search Service for File Systems | Hvogi Sim YoungjaeKim Sudharshan S.Vazhkudai Geoffroy R. Vallee Seung-Hwan Lim Ali R.Butt | 405-406-407 |
| 11am - 11:30am | Paper | Deep Learning | Understanding Error Propagation | Guanpeng Li SivaHari | 402-403-404 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-------------------|----------------------------|---|---|---|------------------------------------|
| | | | in Deep Learning Neural Network (DNN) Accelerators and Applications | Michael Sullivan Timothy Tsai Karthik Pattabiraman Joel Emer Stephen Keckler | |
| 11am - 11:30am | Paper Best Paper Finalists | HPC Application Development Tools | DataRaceBench: A Benchmark Suite for Systematic Evaluation of Data Race Detection Tools | Chunhua Liao Pei-Hung Lin Joshua Asplund Markus Schordan Ian Karlin | 301-302-303 |
| 11am - 11:30am | HPC Impact Showcase | HPC Impact Showcase: Healthcare and Manufacturing | Using HPC to Impact US Manufacturing through the HPC4Mfg Program | Lori Diachin | 501-502 |
| 11:06am - 11:24am | Doctoral Showcase | Doctoral Showcase Session 1 | Reducing Communication Costs in the Parallel Algebraic Multigrid | Amanda J. Bienz | 210-212 |
| 11:15am - 12pm | Invited Talk | Invited Talks 1 | Taking the Nanoscale to the Exascale | Theresa Lynn Windus | Mile High Ballroom |
| 11:24am - 11:42am | Doctoral Showcase | Doctoral Showcase Session 1 | Modeling and Comparison of Large-Scale Interconnect Designs | Md Atiqul Mollah | 210-212 |
| 11:30am - 12pm | Paper | Cutting Edge File Systems | A Configurable Rule-Based Classful Token Bucket Filter Network Request Scheduler for the Lustre File System | Yingjin Qian Xi Li Shuichi Ihara Lingfang Zeng Jürgen Kaiser Tim Stüb André Brinkmann | 405-406-407 |
| 11:30am - 12pm | Paper | Deep Learning | Scaling Deep Learning on GPU and Knights Landing Clusters | Yang You Aydin Buluc James Demmel | 402-403-404 |
| 11:30am - 12pm | Paper | HPC Application Development Tools | Optimizing the Query Performance of Block Index Through Data Analysis and I/O Modeling | Tzuhsien Wu Jerry Chou Hao Shyng Bin Dong Scott Klasky Kesheng Wu | 301-302-303 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|------------------|---------------------|---|---|-----------------------------|
| 11:30am - 12pm | HPC Impact Showcase | HPC Impact Showcase: Healthcare and Manufacturing Development of High Performance Rubber Materials for Tires Using K Computer | Masato Naito | 501-502 |
| 11:42am - 12pm | Doctoral Showcase | Doctoral Showcase Session 1 Computing Architectures Exploiting Optical Interconnect and Optical Memory Technologies | Pavlos Maniotis | 210-212 |
| 12:15pm - 1:15pm | Birds of a Feather | Americas HPC Collaboration | Carlos Jaime Barrios Hernandez Phillipe Navaux Mark Dietrich Nancy Wilkins-Diehr | 507 |
| 12:15pm - 1:15pm | Birds of a Feather | Batched, Reproducible, and Reduced Precision BLAS | Piotr Luszczek Jack Dongarra Cris Cecka Timothy Costa Sivasankaran Rajamanickam Azzam Haidar Mawussi Zounon | 402-403-404 |
| 12:15pm - 1:15pm | Birds of a Feather | Ceph Applications in HPC Environments | Benjamin Lynch Douglas Fuller | 701 |
| 12:15pm - 1:15pm | Birds of a Feather | Exascale Challenges and Opportunities | James Ang Douglas Kothe | 301-302-303 |
| 12:15pm - 1:15pm | Birds of a Feather | Fortran Is 60 Years Old - Has It Changed for the Better? | John Levesque | 704-706 |
| 12:15pm - 1:15pm | Birds of a Feather | Impacting Cancer with HPC: Opportunities and Challenges | Eric Stahlberg Patricia Kovatch Thomas Steinke Sean Hanlon | 205-207 |
| 12:15pm - 1:15pm | Birds of a Feather | Interactivity in Supercomputing | Peter Messmer Fernanda Foertter Sadaf Alam | 503-504 |
| 12:15pm - 1:15pm | Birds of a Feather | LLVM in HPC: Uses and Desires | Jim Cownie Hal Finkel | 601 |
| 12:15pm - 1:15pm | Birds of a Feather | Omni-Path User Group (OPUG) Meeting | J. Ray Scott Philip Murphy | 702 |
| 12:15pm - 1:15pm | Birds of a Feather | PBS Pro Open Source Project Community BoF | Bill Nitzberg Greg Matthews Andrew Wellington | 703 |
| 12:15pm - 1:15pm | Birds of a Feather | Regression Testing and Monitoring Tools | Bilel Hadri Reuben Budiardja Guilherme Peretti-Pezzi | 710-712 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|------------------|------------------------------|---|--|------------------------------------|
| 12:15pm - 1:15pm | Birds of a Feather | Resilient Programming Environments | George Bosilca Keita Teranishi | 405-406-407 |
| 12:15pm - 1:15pm | Birds of a Feather | SIGHPC Annual Member Meeting | | 201-203 |
| 12:15pm - 1:15pm | Birds of a Feather | SKA: The Ultimate Big Data Project | Happy Sithole Nicolás Erdödy | 501-502 |
| 12:15pm - 1:15pm | Birds of a Feather | Software Engineers: Careers in Research | Neil Chue Hong Daniel Katz Jay JayBillings Alys Brett Jeffrey Carver Catherine Jones Lauren Michael David Perez-Suarez Andrew Turner | 603 |
| 12:15pm - 1:15pm | Birds of a Feather | Total Cost of Ownership and HPC System Procurement | Gert Svensson Eric Boyer James Rogers James Laros Natalie Bates Jason Hick Steve Martin | 605 |
| 1:30pm - 1:52pm | Doctoral Showcase | Doctoral Showcase Session 2 Mitigating Variability in HPC Systems and Applications for Performance and Power Efficiency | Bilge Acun | 210-212 |
| 1:30pm - 2pm | Exhibitor Forum | Communications and Software OpenCAPI: High Performance, Host-Agnostic, Coherent Accelerator Interface | Jeff Stuecheli Steve Fields | 503-504 |
| 1:30pm - 2pm | Exhibitor Forum | Systems Post-K Supercomputer with Fujitsu's Original CPU. Powered by ARM ISA | Toshiyuki Shimizu | 501-502 |
| 1:30pm - 3pm | Invited Talk Test of Time | Test of Time Award Special Lecture Why Iteration Space Tiling? | Michael Wolfe | Mile High Ballroom |
| 1:30pm - 3pm | Panel | The ARM Software Ecosystem: Are We There Yet? | Chris J. Newburn David Abdurachmanov Larry Kaplan Simon McIntosh-Smith Matt McLean Shinji Sumimoto | 201-203 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-----------------|-------------------|---|---|--|-----------------------------|
| | | | | Eric Van Hensbergen Verónica Vergara Larrea | |
| 1:52pm - 2:14pm | Doctoral Showcase | Doctoral Showcase Session 2 | Nornir: A Power-Aware Runtime Support for Parallel Applications | Daniele De Sensi | 210-212 |
| 2pm - 2:30pm | Exhibitor Forum | Communications and Software | OpenMP: Enabling HPC for Twenty Years | Michael Klemm | 503-504 |
| 2pm - 2:30pm | Exhibitor Forum | Systems | Project Aurora – Unveiling NEC’s Brand New Vector Supercomputer | Shintaro MOMOSE | 501-502 |
| 2:14pm - 2:36pm | Doctoral Showcase | Doctoral Showcase Session 2 | Using Runtime Energy Optimizations to Improve Energy Efficiency in High Performance Computing | SriduttBhalachandra | 210-212 |
| 2:30pm - 3pm | Exhibitor Forum | Communications and Software | Understanding Gen-Z Technology – A High Performance Interconnect for the Data-Centric Future | Michael Krause | 503-504 |
| 2:30pm - 3pm | Exhibitor Forum | Systems | Innovative Alternate Architectures for Exascale Computing: ThunderX2 and Beyond | Shah Varun | 501-502 |
| 2:36pm - 2:58pm | Doctoral Showcase | Doctoral Showcase Session 2 | Bounded Asynchrony and Nested Parallelism for Scalable Graph Processing | Adam Fidel | 210-212 |
| 3:30pm - 3:48pm | Doctoral Showcase | Doctoral Showcase Session 3 | Productivity and Software Development Effort Estimation in HPC | Sandra Wienke | 210-212 |
| 3:30pm - 4pm | Paper | Compilation | Sympiler: | Kazem Cheshmi Shoaib Kamil | 402-403-404 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-----------------|--|---|--|--|------------------------------------|
| | | Techniques | Transforming Sparse Matrix Codes by Decoupling Symbolic Analysis | Michelle Mills Strout Marvam Mehri Dehnavi | |
| 3:30pm - 4pm | Exhibitor Forum | Data Analytics | Exploiting HPC for Big Data, Analytics and AI | Rangan Sukumar | 501-502 |
| 3:30pm - 4pm | Paper | Distributed Computing and Clouds | Efficient Process Mapping in Geo-Distributed Cloud Data Centers | Amelie Chi Zhou Yifan Gong Bingsheng He Jidong Zhai | 405-406-407 |
| 3:30pm - 4pm | Paper Best Student Paper Finalists | Multiphysics | A Framework for Scalable Biophysics-Based Image Analysis | Amir Gholami Andreas Mang Klaudius Scheufele Christos Davatzikos Miriam Mehl George Biros | 301-302-303 |
| 3:30pm - 4pm | Exhibitor Forum | Programming Tools | Compiler-Assisted Software Testing for Heterogeneous Computing Systems | Michael Wolfe | 503-504 |
| 3:30pm - 4:15pm | Invited Talk | Invited Talks 2 | Thirty Years of the Gordon Bell Prize | Gordon Bell | Mile High Ballroom |
| 3:30pm - 5pm | Panel | Reproducibility and Uncertainty in High Performance Computing | | Victoria Stodden Bruce Childers Matthew Krafczyk Miriam Leeser Michela Taufer Andreas Schreiber | 201-203 |
| 3:48pm - 4:06pm | Doctoral Showcase | Doctoral Showcase Session 3 | Performance Prediction Modeling of GPU Applications | Marcos Amarís | 210-212 |
| 4pm - 4:30pm | Paper | Compilation Techniques | Control Replication: Compiling Implicit Parallelism to Efficient SPMD with Logical Regions | Elliott Slaughter Wonchan Lee Sean Treichler Wen Zhang Michael Bauer Galen Shipman Patrick McCormick Alex Aiken | 402-403-404 |
| 4pm - 4:30pm | Exhibitor Forum | Data Analytics | From HPC-as-a-Service to Deep Learning-as-a-Service | Patrice Calegari | 501-502 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-----------------|-------------------|--|---|---|------------------------------------|
| 4pm - 4:30pm | Paper | Distributed Computing and Clouds | Topology-Aware GPU Scheduling for Learning Workloads in Cloud Environments | Marcelo Carneiro do Amaral Jorda Polo David Carrera Seetharami Seelam Malgorzata Steinder | 405-406-407 |
| 4pm - 4:30pm | Paper | Multiphysics | Galactos: Computing the 3-pt Anisotropic Correlation for 2 Billion Galaxies | Brian Friesen Md. Mostofa Ali Patwary Brian Austin Nadathur Satish Zachary Slepian Narayanan Sundaram Deborah Bard Daniel Eisenstein Jack Deslippe Pradeep Dubey ... | 301-302-303 |
| 4pm - 4:30pm | Exhibitor Forum | Programming Tools | Approaches to Debugging Mixed-Language HPC Apps | Jasmit Singh | 503-504 |
| 4:06pm - 4:24pm | Doctoral Showcase | Doctoral Showcase Session 3 | Speeding Up GPU Graph Processing Using Structural Graph Properties | Merijn Elwin Verstraaten | 210-212 |
| 4:15pm - 5pm | Invited Talk | Invited Talks 2 | TOP500 - Past, Present, Future | Erich Strohmaier Jack Dongarra Horst Simon Martin Meuer | Mile High Ballroom |
| 4:24pm - 4:42pm | Doctoral Showcase | Doctoral Showcase Session 3 | A Heterogeneous HPC Platform for Ill-Structured Spatial Join Processing | Danial Aghajarian | 210-212 |
| 4:30pm - 5pm | Paper | Compilation Techniques | Optimizing Geometric Multigrid Method Computation Using a DSL Approach | Vinay Vasista Kumudha Narasimhan Siddharth Bhat Uday Bondhugula | 402-403-404 |
| 4:30pm - 5pm | Exhibitor Forum | Data Analytics | Genomic Computations at Scale with Serverless, and Docker Swarm | Dmitri Zimine | 501-502 |
| 4:30pm - 5pm | Paper | Distributed Computing and | Probabilistic Guarantees of | Rich Wolski John Brevik | 405-406-407 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-----------------|----------------------------|---|--|---------------------------------------|
| | | Clouds Execution Duration for Amazon Spot Instances | Ryan Chard Kyle Chard | |
| 4:30pm - 5pm | Paper Best Paper Finalists | Multiphysics Extreme Scale Multi-Physics Simulations of the Tsunamigenic 2004 Sumatra Megathrust Earthquake | Carsten Uphoff SebastianRettenberger Michael Bader Stephanie Wollherr Thomas Ulrich Elizabeth H.Madden Alice-Agnes Gabriel | 301-302-303 |
| 4:30pm - 5pm | Exhibitor Forum | Programming Tools Khronos SYCL: Tomorrow's Heterogeneous C++ and C Today | Michael Wong | 503-504 |
| 4:42pm - 5pm | Doctoral Showcase | Doctoral Showcase Session 3 Hierarchical Sparse Graph Computations on Multicore Platforms | Humayun Kabir | 210-212 |
| 5:15pm - 6:45pm | Birds of a Feather | Accelerating Big Data Processing and Machine/Deep Learning Middleware on Modern HPC Clusters | Gilad Shainer GilBloch DhabaleswarPanda Xiaoyi Lu | 702 |
| 5:15pm - 7pm | Birds of a Feather | Containers in HPC | Richard Canon Jeffrey Sica Gregory Kurtzer Reid Priedhorsky Andrew Younge Abdulrahman Azab Tim Randles | 201-203 |
| 5:15pm - 7pm | Birds of a Feather | Cross-Layer Allocation and Management of Hardware Resources in Shared Memory Nodes | Emmanuel Jeannot Pete Beckman Brice Goglin | 607 |
| 5:15pm - 7pm | Doctoral Showcase | Doctoral Showcase Posters Reception | | Four Seasons Ballroom |
| 5:15pm - 7pm | Birds of a Feather | European Exascale Projects and Their Global Contributions | Jean-PierrePanziera MarcinOstasz Jean-Philippe Nominé François Bodin | 501-502 |
| 5:15pm - 7pm | Birds of a Feather | Fabric APIs - libfabric User Perspective and C++ Standardization | Jeffrey Squyres Sean Hefty ChrisTaylor | 503-504 |
| 5:15pm - 7pm | Birds of a Feather | HPC Carpentry - Practical, Hands-On HPC Training | Andrew Turner Christina Koch Tracy Teal RobertFreeman Jr ChrisBording | 301-302-303 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION | |
|--------------|---|---|---|--|---------------------------------------|
| | | | MartinCallaghan | | |
| 5:15pm - 7pm | Birds of a Feather | HPC Graph Toolkits and the GraphBLAS Forum | Antonino Tumeo MahanteshHalappanavar AlexPothen MichaelWolf FabrizioPetrini Aydin Buluc Timothy Mattson | 402-403-404 | |
| 5:15pm - 7pm | Birds of a Feather | Improving Numerical Computation with Practical Tools and Novel Computer Arithmetic | John Gustafson Michael Lam | 704-706 | |
| 5:15pm - 7pm | Birds of a Feather | Memory-Centric Architectures for the Cloud and HPC | SudhakarYalamanchili PeterKogge | 507 | |
| 5:15pm - 7pm | Birds of a Feather | OpenACC API User Experience, Vendor Reaction, Relevance, and Roadmap | Duncan Poole SunitaChandrasekaran Fernanda Foertter Guido Juckeland | 210-212 | |
| 5:15pm - 7pm | ACM Student Research Competition, Poster, Reception | Poster Reception | Kengo Nakajima | Four Seasons Ballroom | |
| 5:15pm - 7pm | Birds of a Feather | PowerAPI, GEOPM and Redfish: Open Interfaces for Power/Energy Measurement and Control | Ryan Grant Jonathan Eastep Jeff Autor NicolasDube VitaliMorozov ToddRosedahl SteveMartin JamesLaros, III StephenOliver RamkumarNagappan ... | 710-712 | |
| 5:15pm - 7pm | Birds of a Feather | Reconfigurable Computing in Exascale | Sven Karlsson David Donofrio John Leidel Hans-Christian Hoppe Marie-ChristineSawley KazutomoYoshii KentaroSano FranckCappello | 405-406-407 | |
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | Comprehensive Visualization of Large-Scale Simulation Data Linked to Respiratory Flow Computations on HPC Systems | AndreasLintermann SonjaHabbinga Jens Henrik Goebbert | Mile High Prefunction |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|--------------|--|--|---|---|---------------------------------------|
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | First Light in the Renaissance Simulation Visualization: Formation of the Very First Galaxies in the Universe | Donna J. Cox Robert M. Patterson Stuart A. Levy Jeffrey D. Carpenter AJ Christensen Kalina M. Borkiewicz Brian W. O'Shea John H. Wise Hao Xu Michael L. Norman | Mile High Prefunction |
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | Milky Way Analogue Isolated Disk Galaxy | Donna J. Cox Robert M. Patterson Stuart A. Levy Jeffrey D. Carpenter AJ Christensen Kalina M. Borkiewicz Nathan J. Goldbaum Mark R. Krumholz John C. Forbes | Mile High Prefunction |
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | Physical Signatures of Cancer Metastasis | Anne Dara Bowen Abdul N. Malmi-Kakkada Ayat Mohammed | Mile High Prefunction |
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | Simulation and Visual Representation of Tropical Cyclone-Ocean Interactions | David Bock Hui Lui Ryan L. Sriver | Mile High Prefunction |
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | Visualization of Decision-Making Support (DMS) Information for Responding to a Typhoon-Induced Disaster | Dongmin Jang Jin-Hee Yuk Junghyun Park Jooneun An Minsu Joh | Mile High Prefunction |
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | Visualizations of a High-Resolution Global-Regional Nested, Ice-Sea-Wave Coupled Ocean Model System | Kangyou Zhong Danva Xu Changsheng Chen Yutong Lu Wenjie Dong Jiang Li | Mile High Prefunction |
| 5:15pm - 7pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Reception | Visualizing Silicene Growth Through Island Migration and Coalescence | Joseph A. Insley Mathew J. Cherukara Badri Narayanan Henry Chan Subramanian Sankaranarayanan | Mile High Prefunction |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|--------------|--------------------|---|---|------------------------------------|
| 5:15pm - 7pm | Birds of a Feather | Software Engineering and Reuse in Computational Science and Engineering | David Bernholdt Maxim Belkin AlysBrett Jeffrey Carver Neil Chue Hong Mike Folk GerardGorman WilliamGropp MichaelHeroux DanielKatz ... | 601 |
| 5:15pm - 7pm | Birds of a Feather | Special Interest Group on HPC in Resource Constrained Environments (SIGHPC-RCE) | Hensley Omorodion Elizabeth Leake | 703 |
| 5:15pm - 7pm | Birds of a Feather | TOP500 Supercomputers | Erich Strohmaier Jack Dongarra Horst Simon MartinMeuer | Mile High Ballroom |
| 5:15pm - 7pm | Birds of a Feather | The ARM User Experience: Testbeds and Deployment at HPC Centers | Jack Wells Mitsuhisa Sato Filippo Mantovani Simon McIntosh-Smith | 701 |
| 5:15pm - 7pm | Birds of a Feather | Tracking and Analyzing Job-level Activity Using Open XDMoD, XALT and OGRT | Robert McLay Georg Rath Thomas Furlani Robert DeLeon | 205-207 |
| 5:15pm - 7pm | Birds of a Feather | Usability, Scalability and Productivity on Many-Core Processors: Intel Xeon Phi | Hai Ah Nam Douglas Doerfler Estela Suarez | 603 |

106年11月15日(星期三)

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-------------------|--|--|---|---|
| 8:30am - 9:15am | Awards Presentation | ACM and IEEE-CS Award Presentations | Fernbach Award Presentation: Particles, HPC, and the Ukulele Syndrome | Steve Plimpton Mile High Ballroom |
| 8:30am - 5pm | ACM Student Research Competition Poster | ACM Student Research Competition | SC17 Research Posters | Four Seasons Ballroom |
| 8:30am - 5pm | ACM Student Research Competition Poster | Research Posters | SC17 Research Posters | Four Seasons Ballroom |
| 8:30am - 5pm | Poster, Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Posters | Vetria Byrd | Mile High Prefunction |
| 9:15am - 10am | Awards Presentation | ACM and IEEE-CS Award Presentations | Kennedy Award Presentation: The Real Revolution ... from the Latency to the Throughput Age | Jesus Labarta Mile High Ballroom |
| 10am - 3pm | Student Job/Opportunity Fair Students@SC | Student/Postdoc Job Fair | | 702-704-706 |
| 10am - 4:30pm | Student Cluster Competition | Student Cluster Competition | | Booth 796 - Exhibit Floor |
| 10am - 5:15pm | Doctoral Showcase | Exhibition of Doctoral Showcase Posters | | Four Seasons Ballroom |
| 10am - 6pm | Emerging Technologies | Emerging Technologies Showcase (Day 2) | Felix Wolf Franck Cappello | 401 |
| 10am - 6pm | Exhibits | Exhibits | | Exhibit Halls A, B, E and F |
| 10:30am - 10:45am | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase | Comprehensive Visualization of Large-Scale Simulation Data Linked to Respiratory Flow Computations on HPC Systems | AndreasLintermann SonjaHabbinga Jens Henrik Goebbert 210-212 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-------------------|---------------------|--|---|---|------------------------------------|
| 10:30am - 11am | Paper | GPUs and Communication | GPU Triggered Networking for Intra-Kernel Communications | Michael LeBeane KhaledHamidouche BradBenton MauricioBreternitz Steven K. Reinhardt Lizy K.John | 402-403-404 |
| 10:30am - 11am | HPC Impact Showcase | HPC Impact Showcase: Computational Modeling | Making HPC Consumable: Helping Wet-Lab Chemists Access the Power of Computational Methods | Kirk Jordan | 503-504 |
| 10:30am - 11am | HPC Impact Showcase | HPC Impact Showcase: Energy and Climate | HPC Powers Wind Energy | Earl P.N. Duque | 501-502 |
| 10:30am - 11am | Paper | Hierarchical Memory Usage | Understanding Object-Level Memory Access Patterns Across the Spectrum | Xu Ji Chao Wang Nosayba El-Sayed Xiaosong Ma Youngjae Kim Sudharshan S.Vazhkudai WeiXue DanielSanchez | 301-302-303 |
| 10:30am - 11am | Paper | Reliability, Fault Tolerance, and Resilience | Experimental and Analytical Study of Xeon Phi Reliability | Daniel Oliveira Laercio Pilla NathanDeBardleben Sean Blanchard Heather Quimm Israel Koren Philippe Navaux Paolo Rech | 405-406-407 |
| 10:30am - 11:15am | Invited Talk | Invited Talks 3 | Harp-DAAL: A Next Generation Platform for High Performance Machine Learning on HPC-Cloud | Judy Qiu | Mile High Ballroom |
| 10:30am - 12pm | Panel | Best Practices for Architecting Performance and Capacity in the Burst Buffer Era | | Addison Snell Pamela Hill ChrisZimmer Dirk Pleiter Sadaf R. Alam James Coomer | 201-203 |
| 10:30am - 12pm | Students@SC | Experiencing HPC for Undergraduates: Graduate Student Perspective | | Danilo Carastan-Santos AmirGholami AmaleeWilson YasodhadeviNachimuthu KellonBelfon | 701 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|----------------|--|--|--|---|-----------------------------|
| | | | | KlaudiusScheufele | |
| 10:45am - 11am | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase | Milky Way Analogue Isolated Disk Galaxy | Donna J. Cox Robert M. Patterson Stuart A. Levy Jeffrey D. Carpenter AJ Christensen Kalina M. Borkiewicz Nathan J. Goldbaum Mark R. Krumholz John C. Forbes | 210-212 |
| 11am - 11:15am | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase | Simulation and Visual Representation of Tropical Cyclone-Ocean Interactions | David Bock Hui Lui Ryan L. Sriver | 210-212 |
| 11am - 11:30am | Paper | GPUs and Communication | Gravel: Fine-Grain GPU-Initiated Network Messages | Marc S. Orr ShuaiChe Bradford M. Beckmann Mark Oskin Steven K. Reinhardt David A. Wood | 402-403-404 |
| 11am - 11:30am | HPC Impact Showcase | HPC Impact Showcase: Computational Modeling | Gaining Insights into the Properties of Materials Using Atomistic Simulations on Large-Scale HPC Platforms | Danny Perez | 503-504 |
| 11am - 11:30am | HPC Impact Showcase | HPC Impact Showcase: Energy and Climate | Supercomputing for Everyone: Meeting the Growing Needs of Businesses | Elie Hachem Romain Klein | 501-502 |
| 11am - 11:30am | Paper Best Paper Finalists | Hierarchical Memory Usage | Exploring and Analyzing the Real Impact of Modern On-Package Memory on HPC Scientific Kernels | Ang Li Weifeng Liu Mads R. B. Kristensen Brian Vinter Hao Wang Kaixi Hou Andres Marquez Shuaiwen Leon Song | 301-302-303 |
| 11am - 11:30am | Paper | Reliability, Fault Tolerance, and Resilience | REFINE: Realistic Fault Injection via Compiler-Based Instrumentation for Accuracy, Portability and Speed | Giorgis Georgakoudis Ignacio Laguna Dimitrios S. Nikolopoulos Martin Schulz | 405-406-407 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-------------------|--|--|---|---|------------------------------------|
| 11:15am - 11:30am | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase | First Light in the Renaissance Simulation Visualization: Formation of the Very First Galaxies in the Universe | Donna J. Cox Robert M. Patterson Stuart A. Levy Jeffrey D. Carpenter AJ Christensen Kalina M. Borkiewicz Brian W. O'Shea John H. Wise Hao Xu Michael L. Norman | 210-212 |
| 11:15am - 12pm | Invited Talk | Invited Talks 3 | Citius, Altius, Fortius! | Hans-Joachim Bungartz | Mile High Ballroom |
| 11:30am - 11:45am | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase | Visualizing Silicene Growth Through Island Migration and Coalescence | Joseph A. Insley Mathew J. Cherukara Badri Narayanan Henry Chan Subramanian Sankaranarayanan | 210-212 |
| 11:30am - 12pm | Paper | GPUs and Communication | Toward Standardized Near-Data Processing with Unrestricted Data Placement for GPUs | Gwangsun Kim Niladrish Chatterjee Mike O'Connor Kevin Hsieh | 402-403-404 |
| 11:30am - 12pm | Paper | Hierarchical Memory Usage | Large-Scale Adaptive Mesh Simulations Through Non-Volatile Byte-Addressable Memory | Bao Nguyen Hua Tan Xuechen Zhang | 301-302-303 |
| 11:30am - 12pm | Paper | Reliability, Fault Tolerance, and Resilience | Correcting Soft Errors Online in Fast Fourier Transform | Xin Liang Jieyang Chen Dingwen Tao Sihuan Li Panruo Wu Hongbo Li Kaiming Ouyang Yuanlai Liu Fengguang Song Zizhong Chen | 405-406-407 |
| 11:45am - 12pm | Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase | Physical Signatures of Cancer Metastasis | Anne Dara Bowen Abdul N. Malmi-Kakkada Ayat Mohammed | 210-212 |
| 12:15pm - 1:15pm | Birds of a Feather | 15th Graph500 List | | Richard Murphy David Bader Peter Kogge Andrew Lumsdaine | 605 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|------------------|--------------------|--|--|-----------------------------|
| 12:15pm - 1:15pm | Birds of a Feather | Characterizing Faults, Errors, and Failures in Extreme-Scale Systems | ChristianEngelmann Stephen McNally | 503-504 |
| 12:15pm - 1:15pm | Birds of a Feather | Contemporary Design of Supercomputer Experiments | Dmitry Duplyakin Jed Brown StefanWild PrasannaBalaprakash PaulConstantine JeffreyHokanson FelixWolf | 710-712 |
| 12:15pm - 1:15pm | Birds of a Feather | Distributed and Heterogeneous Programming in C++ for HPC | Hal Finkel MichaelWong | 405-406-407 |
| 12:15pm - 1:15pm | Birds of a Feather | IEEE CS TCHPC Meeting | | 201-203 |
| 12:15pm - 1:15pm | Birds of a Feather | Modeling and Simulation of Communication in HPC Systems | Misbah Mubarak Nikhil Jain Jeremiah Wilke | 402-403-404 |
| 12:15pm - 1:15pm | Birds of a Feather | OpenHPC Community BoF | Karl Schulz DavidBrayford DerekSimmel ThomasSterling ScottSuchyta NirmalaSundararajan | 507 |
| 12:15pm - 1:15pm | Birds of a Feather | Practical Reproducibility by Managing Experiments Like Software | Ivo Jimenez CarlosMaltzahn JayLofstead MichaelHeroux KateKeahey | 601 |
| 12:15pm - 1:15pm | Birds of a Feather | Second Annual Meeting of the SIGHPC - Big Data Chapter | Stratos Efstathiadis Suzanne McIntosh | 603 |
| 12:15pm - 1:15pm | Birds of a Feather | Small Business and the Exascale Computing Project | Richard Lethin Barbara Helland Lucy Nowell JackWells RichardCarlson AshleyBarker | 607 |
| 12:15pm - 1:15pm | Birds of a Feather | State of the Practice: Energy and Power Aware Job Scheduling and Resource Management (EPA-ISR) | Natalie Bates Toshio Endo CarloCavazzoni BilelHadri TorstenWilde MilosPuzovic FrancisBelot ToshihiroHanawa JosipLoncaric KeijiYamamoto ... | 501-502 |
| 12:15pm - 1:15pm | Birds of a Feather | The Future of NSF Advanced Cyberinfrastructure | Edward Walker Alejandro Suarez | 205-207 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|------------------|---|---|---|--|-----------------------------|
| 12:15pm - 1:15pm | Birds of a Feather | The HDF5 Dataverse | | David Pearah Quincey Koziol | 210-212 |
| 12:15pm - 1:15pm | Birds of a Feather | The Internet of Things and HPC: Are They Teaming Up to Work Together? | | Pete Beckman Nicolás Erdödy | 701 |
| 12:15pm - 1:15pm | Birds of a Feather | The Message Passing Interface: On the Road to MPI 4.0 and Beyond | | Martin Schulz | 703 |
| 12:15pm - 1:15pm | Birds of a Feather | Women in HPC: Non-Traditional Paths to HPC and How They Can and Do Enrich the Field | | Rebecca Hartman-Baker Toni Collis Neelofer Banglawala | 301-302-303 |
| 1:30pm - 2pm | Exhibitor Forum | HPC Trends | The Silver Lining of the Cloud is the EDGE | Revathi Narayanan | 501-502 |
| 1:30pm - 2pm | Exhibitor Forum | Interconnects | Interconnect Your Future with Mellanox "Smart" Interconnect | Gerald Lotto | 503-504 |
| 1:30pm - 2pm | Paper | Machine Learning and Quantum Computing | Performance Modeling under Resource Constraints Using Deep Transfer Learning | Aniruddha Marathe Rushil Anirudh Nikhil Jain Abhinav Bhatele Jayaraman Thiagarajan Bhavya Kailkhura Jae-Seung Yeom Barry Rountree Todd Gamblin | 301-302-303 |
| 1:30pm - 3pm | Panel | Supercomputing in the Shadow of Giants: Perspectives and Insights from Supercomputing Leaders Outside the "Big 5" Regions and Organizations | | Jay Lofstead Mark Dietrich Antonio Tеду A. Gomes Marek Michalewicz Happy Sithole | 201-203 |
| 2pm - 2:30pm | Exhibitor Forum | HPC Trends | ARM's Road to Exascale | Eric Van Hensbergen | 501-502 |
| 2pm - 2:30pm | Exhibitor Forum | Interconnects | Protecting against Hyper Scale Network Attacks with Bump-in-the-Wire 100G filtering | Carolyn Raab | 503-504 |
| 2pm - 2:30pm | Paper Best Paper Finalists Best Student Paper Finalists | Machine Learning and Quantum Computing | Obtaining Dynamic Scheduling Policies with Simulation and Machine Learning | Danilo Carastan-Santos Raphael Y. de Camargo | 301-302-303 |
| 2pm - 2:30pm | Paper | Performance Evaluation Tools | Representative Paths Analysis | Nathan Tallent | 402-403-404 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|--------------|--|---|--|---|-----------------------------|
| | | | | Darren Kerbyson Adolfv Hoisie | |
| 2pm - 2:30pm | Paper | Software for HPC Facilities | Charliecloud: Unprivileged Containers for User-Defined Software Stacks in HPC | Reid Priedhorsky Tim Randles | 405-406-407 |
| 2:30pm - 3pm | Exhibitor Forum | HPC Trends | Efficient Managing and Monitoring of InfiniBand HPC Clusters | Tor Skeie | 501-502 |
| 2:30pm - 3pm | Exhibitor Forum | Interconnects | A Networked-FPGA Platform Offering Flexible Ethernet Switching from Layer 1 All the Way to Full SDN via P4 | Matthew Knight | 503-504 |
| 2:30pm - 3pm | Paper | Machine Learning and Quantum Computing | 0.5 Petabyte Simulation of a 45-Qubit Quantum Circuit | Thomas Häner Damian S. Steiger | 301-302-303 |
| 2:30pm - 3pm | Paper | Performance Evaluation Tools | ScrubJay: Deriving Knowledge from the Disarray of HPC Performance Data | Alfredo Gimenez Todd Gamblin Abhinav Bhatele Chad Wood Kathleen Shoga Aniruddha Marathe Peer-Timo Bremer Bernd Hamann Martin Schulz | 402-403-404 |
| 2:30pm - 3pm | Paper | Software for HPC Facilities | Securing HPC: Development of a Low Cost, Open Source, Multi-Factor Authentication Infrastructure | W. Cyrus Proctor Patrick Storm Matthew R. Hanlon Nathaniel Mendoza | 405-406-407 |
| 3pm - 4:45pm | ACM Student Research Competition, Poster | ACM Student Research Competition: Presentations by Semi-Finalists | | Karl W. Schulz Kengo Nakajima Osamu Tatebe | 701 |
| 3:30pm - 4pm | Exhibitor Forum | FPGAs in HPC | Efficiently Accelerating HPC Workloads with FPGAs | Michael Strickland | 501-502 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-----------------|-----------------|---|--|--|------------------------------------|
| 3:30pm - 4pm | Paper | Materials and Chemistry | Embracing a New Era of Highly Efficient and Productive Quantum Monte Carlo Simulations | Amrita Mathuriya Ye Luo Raymond C. Clay III Anouar Benali Luke Shulenburg Jeongnim Kim | 402-403-404 |
| 3:30pm - 4pm | Paper | Performance Tuning | Towards Fine-Grained Dynamic Tuning of HPC Applications on Modern Multi-Core Architectures | Mohammed Sourouri Espen Birger Raknes Nico Reissmann Johannes Langguth Daniel Hackenberg Robert Schöne Per Gunnar Kjeldsberg | 301-302-303 |
| 3:30pm - 4pm | Paper | State of the Practice: Operations | Failures in Large Scale Systems: Long-Term Measurement, Analysis, and Implications | Saurabh Gupta Tirthak Patel Christian Engelmann Devesh Tiwari | 405-406-407 |
| 3:30pm - 4pm | Exhibitor Forum | Storage | Spectra Logic Delivers a New Paradigm in Tape Library Deployment | Matt Starr | 503-504 |
| 3:30pm - 4:15pm | Invited Talk | Invited Talks 4 | Artificial Intelligence and The Virtuous Cycle of Compute | Pradeep Dubey | Mile High Ballroom |
| 3:30pm - 5pm | Panel | Blurring the Lines: High-End Computing and Data Science | | Sandy Landsberg Francine Berman Steve Conway Robert Grossman Satoshi Matsuoka Rick Stevens Michela Taufer | 201-203 |
| 4pm - 4:30pm | Exhibitor Forum | FPGAs in HPC | Enabling FPGAs for the Software Developers | Bernhard Friebe | 501-502 |
| 4pm - 4:30pm | Paper | Materials and Chemistry | An Efficient MPI/OpenMP Parallelization of the Hartree-Fock Method for the Second Generation of Intel Xeon Phi Processor | Vladimir Mironov Alexander Moskovsky Kristopher Keipert Michael D' mello Mark Gordon Yuri Alexeev | 402-403-404 |
| 4pm - 4:30pm | Paper | Performance | CAPES: | Yan Li | 301-302-303 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|--------------|------------------------------|---|--|---|------------------------------------|
| | Best Student Paper Finalists | Tuning | Unsupervised Storage Performance Tuning Using Neural Network-Based Deep Reinforcement Learning | KennethChang Oceane Bel Ethan L. Miller Darrell D. E. Long | |
| 4pm - 4:30pm | Paper | State of the Practice: Operations | GUIDE: A Scalable Information Directory Service to Collect, Federate, and Analyze Logs for Operational Insights into a Leadership HPC Facility | Sudharshan S.Vazhkudai RossMiller DeveshTiwari ChristopherZimmer FeiyiWang Sarp Oral RaghulGunasekaran DerylSteinert | 405-406-407 |
| 4pm - 4:30pm | Exhibitor Forum | Storage | Burst Buffers: Flash in the Pan? | James Coomer | 503-504 |
| 4pm - 6pm | Exhibits | Family Day | | | Exhibit Halls A, B, E and F |
| 4:15pm - 5pm | Invited Talk | Invited Talks 4 | Inference and Control in Routing Games | Alexandre Bayen | Mile High Ballroom |
| 4:30pm - 5pm | Exhibitor Forum | FPGAs in HPC | Cooling Hot FPGAs: A Thermals First Approach | Ron Huizen JeffMilrod | 501-502 |
| 4:30pm - 5pm | Paper | Materials and Chemistry | Efficient and Scalable Calculation of Complex Band Structure Using Sakurai-Sugiura Method | Shigeru Iwase Yasunori Futamura Akira Imakura Tetsuya Sakurai Tomoya Ono | 402-403-404 |
| 4:30pm - 5pm | Paper Best Paper Finalists | Performance Tuning | sPIN: High-Performance Streaming Processing in the Network | Torsten Hoefler Salvatore Di Girolamo Konstantin Taranov Ryan Grant RonaldBrightwell | 301-302-303 |
| 4:30pm - 5pm | Paper | State of the Practice: Operations | Scientific User Behavior and Data-Sharing Trends in a Petascale File | Seung-Hwan Lim Hyogi Sim RaghulGunasekaran Sudharshan S.Vazhkudai | 405-406-407 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|-----------------|-----------------------------|---|---|-----------------------------|
| | | System | | |
| 4:30pm - 5pm | Exhibitor Forum | Storage Building End-to-End NVMe over Fabric Infrastructure for HPC | Rick Kumar | 503-504 |
| 4:30pm - 5pm | Student Cluster Competition | Student Cluster Competition Finale Student Cluster Competition | | Booth 796 - Exhibit Floor |
| 5:15pm - 6:45pm | Birds of a Feather | A Comparison of Distributed Memory Fast Fourier Transform (FFT) Library Packages | Samar Aseeri Benson Muite | 607 |
| 5:15pm - 7pm | Birds of a Feather | Big Data and Exascale Computing (BDEC) Community Report | Jack Dongarra Mark Asch Peter Beckman | 710-712 |
| 5:15pm - 7pm | Birds of a Feather | Building Efficient Clouds for HPC, Big Data, and Deep Learning Middleware and Applications | DhableswarPanda Xiaoyi Lu | 709 |
| 5:15pm - 7pm | Birds of a Feather | From Outreach to Education to Researcher - Innovative Ways of Expanding the HPC Community | Weronika Filinger Nicholas Brown Julie Mullen TomMaiden LornaRivera ScottCallaghan | 210-212 |
| 5:15pm - 7pm | Birds of a Feather | HPC in Space: Supercomputing at 17,500 MPH | Mark Fernandez John Kichury Eng Lim Goh | 603 |
| 5:15pm - 7pm | Birds of a Feather | High Performance Computing Education in US Data Science | Weijia Xu KellyGaither DanielKatz Ann Stapleton GopalanOppiliappan MarkSpeck Hui Zhang Rosalia Gomez | 703 |
| 5:15pm - 7pm | Birds of a Feather | Lustre Community BoF: Lustre Deployments for the Next 5 Years | Frank Baetke SarpOral | 405-406-407 |
| 5:15pm - 7pm | Birds of a Feather | Machine Learning for Big Data: Integrated, Collaborative, Multi-Technological Solutions to Multi-Objective Problems | Sofia Vallecorsa Marie-ChristineSawley | 605 |
| 5:15pm - 7pm | Birds of a Feather | National Strategic Computing Initiative Update | William Harrod Irene Qualters MarkSims | 601 |
| 5:15pm - 7pm | Birds of a Feather | Open MPI State of the Union XI | Jeffrey Squyres George Bosilca | 503-504 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|--------------|--------------------|--|--|-----------------------------|
| 5:15pm - 7pm | Birds of a Feather | OpenMP® is Twenty. Where Is It Going? | Jim Cownie Michael Klemm | 205-207 |
| 5:15pm - 7pm | Birds of a Feather | OpenSHMEM in the Era of Exascale | Steve Poole Barbara Chapman Tony Curtis OscarHernandez VivekSarkar Jeff Kuehn Sameer Shende Pavel Shamis Manjunath Venkata | 501-502 |
| 5:15pm - 7pm | Birds of a Feather | OpenStack For HPC: Best Practices for Optimizing Software-Defined Infrastructure | Blair Bethwaite StigTelfer MartialMichel Mike Lowe Timothy Randles Robert Budden Benjamin Lynch Bruno Silva TomKing SimonThompson | 507 |
| 5:15pm - 7pm | Birds of a Feather | Reconfigurable Supercomputing (RSC) | Martin Herborcht Alan George Herman Lam | 301-302-303 |
| 5:15pm - 7pm | Birds of a Feather | The Green500: Trends in Energy-Efficient Supercomputing | Wu Feng ErichStrohmaier NatalieBates ThomasScogland | 402-403-404 |
| 5:15pm - 7pm | Birds of a Feather | The Virtual Institute of I/O and the IO-500 | Julian Kunkel JayLofstead John Bent | 201-203 |

106年11月16日(星期四)

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-----------------|--|--|---|---|---------------------------------------|
| 8:30am - 9:15am | Invited Talk | Plenary Invited Talk | Lessons on Integrating and Utilizing 10 Million Cores: Experience of Sunway TaihuLight | Haohuan Fu | Mile High Ballroom |
| 8:30am - 5pm | ACM Student Research Competition Poster | ACM Student Research Competition | SC17 Research Posters | | Four Seasons Ballroom |
| 8:30am - 5pm | ACM Student Research Competition Poster | Research Posters | SC17 Research Posters | | Four Seasons Ballroom |
| 8:30am - 5pm | Poster, Scientific Visualization & Data Analytics Showcase | Scientific Visualization & Data Analytics Showcase Posters | | Vetria Byrd | Mile High Prefunction |
| 9:15am - 10am | Invited Talk | Plenary Invited Talk | Molecular Simulation at the Mesoscale | Rommie Amaro | Mile High Ballroom |
| 10am - 3pm | Doctoral Showcase | Exhibition of Doctoral Showcase Posters | | | Four Seasons Ballroom |
| 10am - 3pm | Exhibits | Exhibits | | | Exhibit Halls A, B, E and F |
| 10am - 6pm | Emerging Technologies | Emerging Technologies Showcase (Day 3) | | Felix Wolf Franck Cappello | 401 |
| 10:30am - 11am | ACM Gordon Bell Finalist | ACM Gordon Bell Finalists | Redesigning CAM-SE for Petascale Climate Modeling Performance on Sunway TaihuLight | Haohuan Fu Junfeng Liao NanDing XiaohuiDuan Lin Gan Yishuang Liang Xinliang Wang Jinzhe Yang YanZheng WeiguoLiu ... | 301-302-303 |
| 10:30am - 11am | Paper | Communication Efficient Methods | Scaling Betweenness Centrality Using Communication-Efficient Sparse Matrix Multiplication | Edgar Solomonik Maciej Besta Flavio Vella Torsten Hoefler | 405-406-407 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|-------------------|--------------------------|--|---|--|------------------------------------|
| 10:30am - 11am | HPC Impact Showcase | HPC Impact Showcase: Defense Systems | Accelerating Innovation of Defense Systems with Computational Prototypes and High Performance Computing | Douglass E. Post | 501-502 |
| 10:30am - 11am | Paper | Performance Analysis | Predicting the Performance Impact of Different Fat-Tree Configurations | Nikhil Jain Abhinav Bhatele Louis Howell David Boehme Ian Karlin Edgar A. Leon Misbah Mubarak Noah Wolfe Todd Gamblin Matthew Leininger | 402-403-404 |
| 10:30am - 11am | Exhibitor Forum | System Cooling | Future of the Thermal Management – Thercon-LHP Water-Free Solutions for HPC Cooling | Yury F. Maydanik | 503-504 |
| 10:30am - 11:15am | Invited Talk | Invited Talks 5 | Cyber-Physical System and Industrial Applications of Large-Scale Graph Analysis and Optimization Problems | Katsuki Fujisawa | Mile High Ballroom |
| 10:30am - 12pm | Panel | Common Big Data Challenges in Bio., Geo., Climate, and Social Sciences | | Sushil Prasad Joel Saltz Vipin Kumar Chaitanya Baru E. Lynn Utery Daniel Reed Pete Beckman Sangram Ganguly | 201-203 |
| 10:30am - 12pm | Students@SC | Experiencing HPC for Undergraduates: Careers in HPC | | Steve Poole Swann Perarneau Daniel Katz Dorian Arnold Sunita Chandrasekaran Michael Wolfe | 701 |
| 11am - 11:30am | ACM Gordon Bell Finalist | ACM Gordon Bell Finalists | 15-Pflops Nonlinear | Haohuan Fu Conghui He Bingwei Chen | 301-302-303 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|----------------|--------------------------|--|--|---|------------------------------------|
| | | | Earthquake Simulation on Sunway TaihuLight: Enabling Depiction of Realistic 10 Hz Scenarios | Zekun Yin Zhenguo Zhang Wenqiang Zhang Tingjian Zhang Wei Xue WeiguoLiu WanwangYin ... | |
| 11am - 11:30am | Paper | Communication Efficient Methods | Distributed Southwell: An Iterative Method with Low Communication Costs | Jordi Wolfson-Pou Edmond Chow | 405-406-407 |
| 11am - 11:30am | HPC Impact Showcase | HPC Impact Showcase: Defense Systems | Accelerating Defense Innovation of US Naval Vessels with Computational Prototypes and High Performance Computing | Wesley M. Wilson | 501-502 |
| 11am - 11:30am | Paper | Performance Analysis | A Comparative Study of SDN and Adaptive Routing on Dragonfly Networks | Peyman Faizian Md Atiqul Mollah Zhou Tong XinYuan MichaelLang | 402-403-404 |
| 11am - 11:30am | Exhibitor Forum | System Cooling | Chip-to-Atmosphere: Providing Safe and Effective Cooling for High-Density, High-Performance Data Center Environments | Geoff Lyon DavidMeadows | 503-504 |
| 11:15am - 12pm | Invited Talk | Invited Talks 5 | Computing with Physics: Analog Computation and Neural Network Classification with a Dot Product Engine | Catherine Graves | Mile High Ballroom |
| 11:30am - 12pm | ACM Gordon Bell Finalist | ACM Gordon Bell Finalists | Massively Parallel 3D Image Reconstruction | Xiao Wang AmitSabne PuttSakdhngool Sherman J. Kisner Charles A. Bouman Samuel P. Midkiff | 301-302-303 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|------------------|---------------------|--|--|-----------------------------|
| 11:30am - 12pm | Paper | Communication Efficient Methods Tessellating Stencils | Liang Yuan Yunquan Zhang Peng Guo ShanHuang | 405-406-407 |
| 11:30am - 12pm | HPC Impact Showcase | HPC Impact Showcase: Defense Systems Accelerating Defense Innovation of Military Aircraft with Computational Prototypes and High Performance Computing | Robert L. Meakin | 501-502 |
| 11:30am - 12pm | Paper | Performance Analysis Run-to-Run Variability on Xeon Phi Based Cray XC Systems | Sudheer Chunduri Kevin Harms ScottParker VitaliMorozov SamuelOshin NaveenCherukuri KalyanKumaran | 402-403-404 |
| 11:30am - 12pm | Exhibitor Forum | System Cooling Benefits of Having Sensors in Your Water Cooled HPC | Mads Melchior Lars Meisner | 503-504 |
| 12:15pm - 1:15pm | Birds of a Feather | Analyzing Parallel I/O | Philip Carns JulianKunkel | 402-403-404 |
| 12:15pm - 1:15pm | Birds of a Feather | BeeGFS - Architecture, Implementation Examples, and Future Development | Sven Breuner Frank Baetke | 507 |
| 12:15pm - 1:15pm | Birds of a Feather | Charm++ and AMPI: Adaptive and Asynchronous Parallel Programming | Phil Miller Laxmikant Kalé Sam White | 301-302-303 |
| 12:15pm - 1:15pm | Birds of a Feather | Charting the PMIx Roadmap | Ralph Castain David Solt ArtemPolyakov | 210-212 |
| 12:15pm - 1:15pm | Birds of a Feather | HPC Education: Meeting of the SIGHPC Education Chapter | Richard Coffey Fernanda Foertter Steve Gordon | 205-207 |
| 12:15pm - 1:15pm | Birds of a Feather | HPC Systems Monitoring Data in Action | Jim Brandt MikeShowerman AnnGentile | 703 |
| 12:15pm - 1:15pm | Birds of a Feather | MPICH: A High-Performance Open-Source MPI Implementation | Ken Raffenetti Pavan Bala ii Abdelhalim Amer Yanfei Guo Neelima Bayyapu Kavitha Madhu | 708 |
| 12:15pm - 1:15pm | Birds of a Feather | Machine Learning for Parallel | Hans-ChristianHoppe Felix Wolf | 501-502 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|------------------|---------------------|--|---|------------------------------------|
| | | Performance Analytics | | |
| 12:15pm - 1:15pm | Birds of a Feather | Recruitment: How to Build Diverse Teams | Toni Collis LornaRivera | 605 |
| 12:15pm - 1:15pm | Birds of a Feather | SAGE2 9th Annual International SC BOF: Scalable Amplified Group Environment for Global Collaboration | Jason Leigh Maxine Brown LucRenambot | 503-504 |
| 12:15pm - 1:15pm | Birds of a Feather | Sharing Research Data: Data Commons, Distributed Clouds, and Distributed Data Services | Robert Grossman | 405-406-407 |
| 12:15pm - 1:15pm | Birds of a Feather | Slurm User Group Meeting | Morris Jette DannyAuble | 201-203 |
| 12:15pm - 1:15pm | Birds of a Feather | The Ethernet Portfolio for HPC | John D'Ambrosia | 710-712 |
| 12:45pm - 1:30pm | Awards Presentation | Awards Ceremony SC17 Awards Session | | Mile High Ballroom |
| 1:30pm - 2pm | Paper | Fast Multipole Methods and Linear Algebra Geometry-Oblivious FMM for Compressing Dense SPD Matrices | Chenhan D. Yu James Levitt Severin Reiz George Biros | 405-406-407 |
| 1:30pm - 2pm | Paper | Use and Management of Non-Volatile Memories Transactional NVM Cache with High Performance and Crash Consistency | Qingsong Wei Chundong Wang Cheng Chen Yechao Yang JunYang Mingdi Xue | 402-403-404 |
| 1:30pm - 3pm | Panel | Virtualization Ecosystems – Supporting Increasingly Complex Scientific Applications | Kenton McHenry Mike Conway NiallGaffney ChristineKirkpatrick RobKooper MahidharTatineni JaroslawNabrzycki | 201-203 |
| 2pm - 2:30pm | Paper | Fast Multipole Methods and Linear Algebra Low Communication FMM-Accelerated FFT on GPUs | Cris Cecka | 405-406-407 |
| 2pm - 2:30pm | Paper | Use and Management of Non-Volatile Memories PapyrusKV: A High-Performance Parallel Key-Value Store for Distributed NVM Architectures | Jungwon Kim Seyong Lee Jeffrey Vetter | 402-403-404 |
| 2:30pm - 3pm | Paper | Fast Multipole Methods and Designing Vector-Friendly Compact | Kyungjoo Kim Timothy B. Costa | 405-406-407 |

| TIME | TYPE | SESSION / PRESENTATION | | PRESENTERS | LOCATION |
|--------------|-------|---|--|---|-----------------------------|
| | | Linear Algebra | BLAS and LAPACK Kernels | Mehmet Deveci Andrew M. Bradley Simon D. Hammond Murat E. Guney Sarah Knepper Shane Story Sivasankaran Rajamanickam | |
| 2:30pm - 3pm | Paper | Use and Management of Non-Volatile Memories | Unimem: Runtime Data Management on Non-Volatile Memory-Based Heterogeneous Main Memory | Kai Wu Yingchao Huang Dong Li | 402-403-404 |
| 3:30pm - 4pm | Paper | In-System Processing for Performance | Input-Aware Auto-Tuning of Compute-Bound HPC Kernels | Philippe Tillet David Cox | 402-403-404 |
| 3:30pm - 4pm | Paper | Optimizing MPI | Why Is MPI So Slow? Analyzing the Fundamental Limits in Implementing MPI-3.1 | Ken Raffenetti Abdelhalim Amer Lena Oden Charles Archer Wesley Bland Hajime Fujita Yanfei Guo Tomislav Janjusic Dmitry Dumov Michael Blocksom ... | 405-406-407 |
| 3:30pm - 5pm | Panel | Post Moore Supercomputing | | Jeffrey S. Vetter George Michalogiannakis Murray Thom Karen Bergman Max Shulaker Bill Harrod | 201-203 |
| 4pm - 4:30pm | Paper | In-System Processing for Performance | Leveraging Near Data Processing for High-Performance Checkpoint/Restart | Abhinav Agrawal Gabriel H. Loh James Tuck | 402-403-404 |
| 4pm - 4:30pm | Paper | Optimizing MPI | ParaStack: Efficient Hang Detection for MPI Programs at Large Scale | Hongbo Li Zizhong Chen Rajiv Gupta | 405-406-407 |
| 4:30pm - 5pm | Paper | In-System Processing for Performance | Melissa: Large Scale In Transit Global Sensitivity Analysis Avoiding | Théophile Terraz Alejandro Ribes Yvan Fournier Bertrand Jooss Bruno Raffin | 402-403-404 |

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|--------------|-----------|--|---|--|
| | | Intermediate Files | | |
| 4:30pm - 5pm | Paper | Optimizing MPI Scalable Reduction Collectives with Data Partitioning-Based Multi-Leader Design | Mohammadreza Bayatpour Sourav Chakraborty Hari Subramoni Xiaoyi Lu Dhabaleswar K. Panda | 405-406-407 |
| 6pm - 9pm | Reception | Technical Program Reception | | EXDO Event Center 1399 35th St, Denver, CO 80205 |

106年11月17日(星期五)

| TIME | TYPE | SESSION / PRESENTATION | PRESENTERS | LOCATION |
|----------------|----------|---|--|-----------------------------|
| 8:30am - 10am | Panel | HPC Software: Is “Cool Stuff” Really Incompatible with Sustainability? | Dairsie Latimer Paul Selwood Mike Dewar Lorena Barba Rebecca Hartman-Baker Guy Lonsdale | 205-207 |
| 8:30am - 10am | Panel | Silent Errors in HPC Systems | Krishna Kant Devesh Tiwari Sriram Krishnamoorthy Mattan Erez Taieb Znati Dorian Arnold | 201-203 |
| 8:30am - 12pm | Workshop | H2RC: Third International Workshop on Heterogeneous Computing with Reconfigurable Logic | Michaela Blott Torsten Hoefler Franck Cappello Michael Lysaght Jason Bakos | 402-403-404 |
| 8:30am - 12pm | Workshop | Computational Approaches for Cancer | Eric Stahlberg Patricia Kovatch Thomas Barr | 605 |
| 8:30am - 12pm | Workshop | Fourth International Workshop on Visual Performance Analysis - VPA 2017 | Joshua A. Levine Fabian Beck Judit Gimenez Abhinav Bhatele | 301 |
| 8:30am - 12pm | Workshop | MTAGS17: 10th Workshop on Many-Task Computing on Clouds, Grids, and Supercomputers | Ke Wang Dongfang Zhao Vani Mandava | 405-406-407 |
| 8:30am - 12pm | Workshop | The 2nd International Workshop on Data Reduction for Big Scientific Data (DRBSD-2) | Qing Liu Scott Klasky Ian Foster Mark Ainsworth | 302-303 |
| 8:30am - 12pm | Workshop | WOLFHPC: Workshop on Domain-Specific Languages and High-Level Frameworks for High-Performance Computing | Sriram Krishnamoorthy J. Ramanujam P. Sadayappan | 710-712 |
| 10:30am - 12pm | Panel | Energy Efficiency Gains From Software: Retrospectives and Perspectives | Daniel Reed Satoshi Matsuoka Thomas Schulthess John Shalf William Gropp | 201-203 |

二、會議照片



圖 1: 會議地點



圖 2: Blue Bear



圖 3: 報到領牌



圖 4: Workshop



圖 5: Exhibition



圖 6: Invited talk



圖 7: Paper



圖 8: 活動晚會