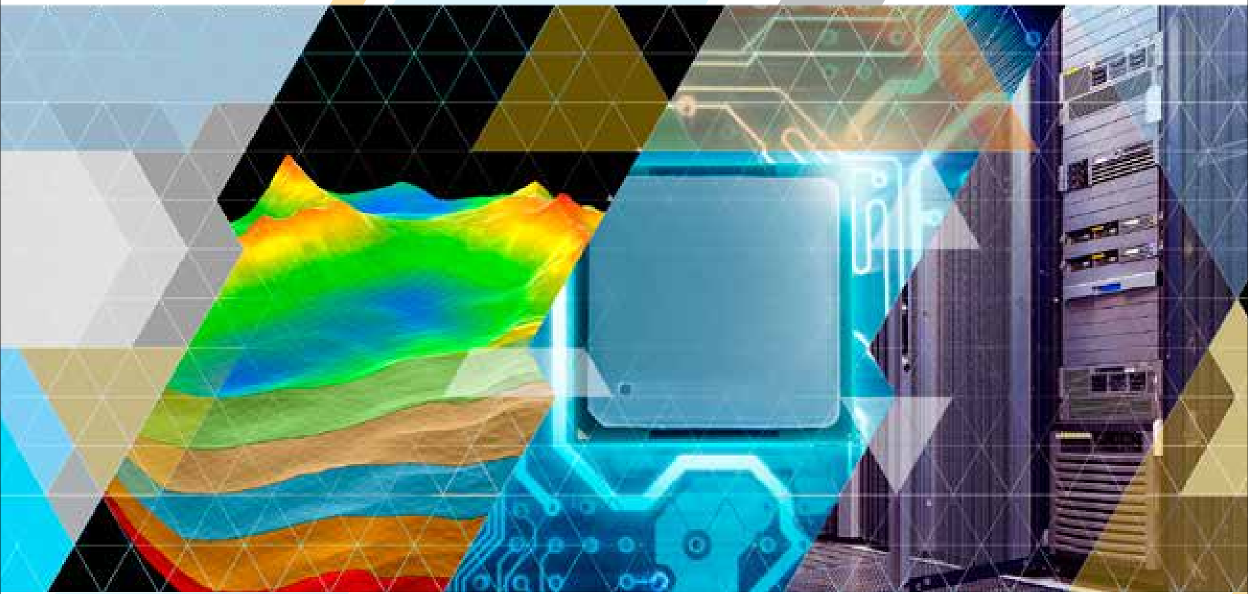


OIL AND GAS

HIGH PERFORMANCE COMPUTING CONFERENCE

2019 TECHNICAL PROGRAM

Tweet and follow: #oghpc ■ http://og-hpc.org

MARCH 4-6, 2019

RICE | KEN KENNEDY
INSTITUTE FOR INFORMATION TECHNOLOGY

k2i.rice.edu

MESSAGE FROM THE 2019 OGHPC COMMITTEE

Welcome to the 12th annual Rice Oil and Gas High Performance Computing Conference at Rice University. The theme for this year's conference is meeting the computing-capacity demand in the energy industry for the next decade. It is always exciting to bring together the brightest minds from across academia, the National Labs, and the energy and IT industries. All share a passion for high-performance computing and a desire to meet our needs and leverage the next wave of technology. We are engineers and scientists, geologists, programmers and industry leaders, but we share common goals that keep this conference relevant and engaging.

At a time when digital transformation is all the buzz, being able to continue innovating at the leading edge of computing remains essential. At the forefront of our endeavors, technology remains the most critical enabler. It will drive the high performance computing needed for both industry and the world.

To meet the challenges ahead, we must set aside our traditional mindsets and seek alternative solutions, whether in developing the next generation of computational capabilities or the sources of energy we depend on as a society. We must embrace this new era in computing as an opportunity for advancements in systems architectures, and invest in such technologies as AI, IoT, edge computing, and software – these technologies will change, if not drive, the future of energy. We must not wait to embrace their potential.

Our investments in people and technology today will help drive innovation and support systems scalability tomorrow. Highly sophisticated systems architectures will require a diverse workforce that can not only apply high-performance computing technologies at an advanced level, but also be prepared to harness the complexities of the next generation of systems to solve critical societal and industrial problems. To succeed we must train and develop this workforce now. There is a need for new education and training. The time when 20+ years as a student set one up for a 40+ year career is gone. We need to support an agile workforce that will be looking to pivot not once, but possibly many times during their working life.

With this as the backdrop, the future is great and we are excited to bring you a stellar program with speakers from Shell, AMD, Arm, Intel, the U.S. Department of Energy's Exascale Computing Project, Texas Advanced Computing Center, Women in HPC, NAG, and RIKEN. We invite you to study the program carefully and use the two days as a platform to learn, engage and network. The value you derive from this conference will depend on your investment in connecting and driving conversation.

We want to thank and acknowledge all of the OGHPC Conference Sponsors and Partners, including those who support the Ken Kennedy Institute's graduate fellowship programs at Rice University, and the OGHPC Technical Program Committee for their many contributions to this year's conference.

We encourage you to discuss the various aspects of the challenges at hand, question the risks and investment opportunities involved, and share best practices for driving adoption of the advanced analytics and technologies in industry. Together we can make the energy industry of tomorrow the very best.

Warm regards,
2019 OGHPC Organizing Committee

David Baldwin, Shell
Sverre Brandsberg-Dahl, Independent
Donny Cooper, Total
Erik Engquist, Rice University
Keith Gray, BP
Alex Loddoch, Chevron
Scott Morton, Rice University
Jan E. Odegard, Rice University
Ernesto Prudencio, Schlumberger
Michael Schoemann, Equinor
Mike Townsley, ExxonMobil

Technical Program Committee:

Tom Cullison, Nvidia
Bosen Du, BP
Maxime Hugues
Samantha Krebsbach, ExxonMobil
Tom McDonald, Chevron
Alex Morris, Shell
Paul Singer, Equinor
Mike Thomspon, Schlumberger
Cheng Zhan, Anadarko
Lin Zhuo, Chevron
+ Organizing Committee

OGHPC Conference Code of Conduct

The conference program committee invites all sponsors, volunteers, speakers, attendees, media, exhibitors and other participants to help us realize a safe and positive conference experience for everyone.

OGHPC Conference venues are shared with members of the public that are not attendees of the conference; please be respectful to all patrons of these locations.

Please note that audio-recording and/or videotaping and/or photography of any portion of the OGHPC Conference Technical Program material is strictly prohibited without prior consent of the OGHPC Staff.

RICE

Unconventional Wisdom

RICE | KEN KENNEDY

INSTITUTE FOR INFORMATION TECHNOLOGY

The Ken Kennedy Institute for Information Technology is dedicated to the advancement of research in the fields of computing and information technology. Our goal is to provide broad support for a strong community of research experimentation that challenges traditional disciplinary limits. We see our most important role as being a catalyst for research collaboration across the conventional boundaries of school, department, center and laboratory. We work to encourage partnerships with industry, government and other universities to help solve real-world problems.

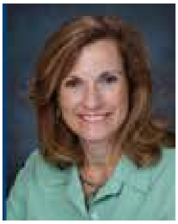
The Ken Kennedy Institute's power lies in its ability to challenge traditional boundaries, look beyond individual faculty members and departments, and collaborate with industry leaders to solve critical problems that will have a direct societal impact.

For more information on the Ken Kennedy Institute, visit the website: k2i.rice.edu

Toni Collis

Chair and Co-Founder, Women in HPC & CBDO, Appentra Solutions

Dr Toni Collis is the Chair and co-founder of (WHPC) and Chief Business Development Office at Appentra Solutions. With a background in computational physics and the development of parallel applications, having previously worked as an Applications Consultant in HPC Research and Industry at Edinburgh Parallel Computing Centre (EPCC), Toni provides technical and business insight on a range of projects and is passionate about enabling everyone to effectively and efficiently use the HPC resources that will help their work. Her role in WHPC is a natural extension of this as her vision for WHPC is to bring HPC to those who may not be able to access or participate in the community for reasons beyond access. She has been on the organising committee for a variety of workshops and conferences including leading the team for the previous WHPC workshops and is a member of a variety of international HPC advisory bodies.



Patricia (Trish) Damkroger

Vice President, Intel Data Center Group

Patricia (Trish) Damkroger is Vice President and General Manager of the Technical Computing Initiative (TC) in Intel's Data Center Group. She leads Intel's global Technical Computing business and is responsible for developing and executing Intel's strategy, building customer relationships and defining a leading product portfolio for Technical Computing workloads, including emerging areas such as high performance analytics and artificial intelligence. This includes traditional HPC, workstations, processors and co-processors, and includes all aspects of solutions including industry leading computer storage, network and software products. Ms. Damkroger has more than 27 years of technical and managerial roles both in the private sector and within the United States Department of Energy, most recently as the Associate Director of Computation (acting at Lawrence Livermore National Laboratory leading a 1,000 person group that is one of the word's leading supercomputing and scientific experts. Since 2006, Ms. Damkroger has been a leader of the annual Supercomputing Conference series, the premier international meeting for high performance computing. She was the SC14 General Chair in New Orleans and has held many other committee positions. She was named one of HPCwire's People to Watch in 2014. Ms. Damkroger has a master's degree in electrical engineering from Stanford University.

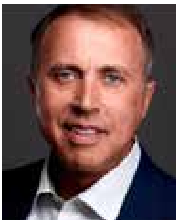
Lori Diachin

Deputy Director, Exascale Computing Project

Before joining the Exascale Computing Project as the Deputy Director, Lori had been serving as the Deputy Associate Director for Science and Technology in the Computation Directorate at Lawrence Livermore National Laboratory (LLNL) since 2017. The Computation Directorate has approximately 1000 staff serving the needs of the laboratory in areas ranging from high performance computing, computing sciences for the missions of LLNL, and information technology for business and workforce enablement. As Computation DAD for S&T, Lori serves as a senior-level advisor to the Computation Associate Director (AD) and to division leaders and institute directors on strategies to develop and sustain critical computer and computational capabilities. She is also the Program director for the HPC4Manufacturing and HPC4Materials programs in the DOE EERE and FE program offices. She has been involved with DOE's SciDAC program since its inception and currently serves as the FASTMath institute director; leading a team of over 50 researchers from 10 different organizations.

She served for 6 years as the Director for the Center for Applied Scientific Computing (CASC) and 2 years as the Acting Information Technology Department head. CASC houses approximately 125 applied mathematicians, computer scientists, and data scientists who conduct world class, collaborative scientific research and development on problems critical to national security. The Center's core competencies include high performance computing, computational physics, numerical mathematics, computer science, and data science.

Lori Diachin has over 20 years experience in applied mathematics research where her areas of expertise include mesh quality improvement, mesh component software, numerical methods, and parallel computing. Before joining LLNL, Lori was a computer scientist at Argonne National Laboratory and a Member of the Technical Staff at Sandia National Laboratory. Lori received her Bachelors degree in Mathematics from Edinboro University of Pennsylvania in 1988 and her Ph.D. in Applied Mathematics from University of Virginia in 1992.



Brent Gorda

Senior Director of HPC Business, Arm

Brent Gorda leads the HPC business for Arm. Prior to this recent role, he spent a year consulting (HPC/Quantum/AI) and advising startup CEO's in Silicon Valley. Earlier in his career, he founded Whamcloud, which he sold to Intel and served as the General Manager for Intel's High Performance Data Division. Brent has also served on many advisory boards (SCxy, Cray Research, Westera) and founded the Student Cluster Competition, a world-wide event affecting the careers of thousands of undergraduates each year.

Brent is a technically savvy entrepreneur with a love for disruptive change. Be it in the business model, the technology or the team, he has an ability to lead globally distributed teams to success.

Brent brings more than 25 years of business & technology implementation and leadership experience. He participated in the shift from vector to parallel computing in the early 90's. In the mid-90's he worked on the first Java compiler shipped by Sun Microsystems while pioneering new business models online. In the 2000's. Brent held the contract for the creation for IBM's BlueGene architecture. Brent has a keen interest in new business opportunities driven by technology including big compute and data workloads such as Artificial Intelligence and Machine Learning.

Mr. Gorda has numerous successes specifically in managing very strong technical teams in resource constrained situations. He creates an environment wherein team members are able to reach well beyond their comfort zones to realize the impossible. The positive, reinforcing environment always results in high-performance teams that exceed their targets, enjoy their work and are happy. The retention rates speak to the success of Brent's management style.

Brent holds a BSc. in Computing Sciences from the University of Alberta and has Ph.D. studies in Computing Sciences at the University of California at Davis.

Detlef Hohl

Chief Scientist Computation and Data Science, Shell

Detlef Hohl holds a Master's degree in chemistry from Technical University of Munich and a PhD in theoretical physics from Technical University of Aachen (Germany). Before joining Shell in 1997, he was senior scientist at the German National Laboratory Forschungszentrum Jülich.

Detlef started at Shell's Bellaire Technology Center in seismic imaging research, then moved to Promise seismic inversion R&D, and became R&D team leader for Quantitative Reservoir Management in 2006. From 2010-2017 he was General Manager Computation and Modeling where he led a project portfolio in data analytics, computational engineering and materials science, geoscience and petroleum engineering.

Detlef is adjunct professor at Rice University (Computational and Applied Math) and University of Houston, and visiting scholar at the UK National data science laboratory Alan Turing Institute. He held various temporary and visiting positions at NCSA, SISSA Trieste, NIST and Stanford University.

CONTINUED

Satoshi Matsuoka

Director, RIKEN Center for Computational Science, Japan

Satoshi Matsuoka had been a Full Professor at the Global Scientific Information and Computing Center (GSIC), the Tokyo Institute of Technology since 2000, and the director of the joint AIST-Tokyo Tech. Real World Big Data Computing Open Innovation Laboratory (RWBC-OIL) since 2017, and will become a Specially Appointed Professor at Tokyo Tech starting 2018 along with his directorship at R-CCS. He received his Ph. D. from the University of Tokyo in 1993.

He has been the leader of the TSUBAME series of supercomputers that have won many accolades such as world #1 in power-efficient computing. He also leads various major supercomputing research projects in areas such as parallel algorithms and programming, resilience, green computing, and convergence of big data/AI with HPC.

He has written over 500 articles according to Google Scholar, and chaired numerous ACM/IEEE conferences, including the Program Chair at the ACM/IEEE Supercomputing Conference (SC13) in 2013. He is a Fellow of the ACM and European ISC, and has won many awards, including the JSPS Prize from the Japan Society for Promotion of Science in 2006, presented by his Highness Prince Akishino; the ACM Gordon Bell Prize in 2011; the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology in 2012; the 2014 IEEE-CS Sidney Fernbach Memorial Award, the highest prestige in the field of HPC; and recently HPDC 2018 Achievement Award from ACM.

Forrest Norrod

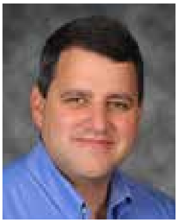
Senior Vice President and General Manager, AMD

Forrest Norrod is senior vice president and general manager of the Datacenter and Embedded Solutions Business Group at AMD. In this role, he is responsible for managing all aspects of strategy, business management, engineering and sales for AMD datacenter and embedded products. Norrod has more than 25 years of technology industry experience across a number of engineering and business management roles at both the chip and system level.

Norrod most recently was vice president and general manager of the Server Business at Dell from December 2009 to October 2014, driving the business to market share leadership in several key geographies and markets while delivering consistent revenue and profitability growth. In his role as vice president and general manager of Dell Data Center Solutions, Norrod successfully led the creation of the company's first internal startup, which established Dell's leadership presence in the hyper-scale datacenter market. He joined Dell as CTO of Client Products in August 2000, then led the company's Enterprise Engineering before ultimately having responsibility for all of Dell's global engineering teams.

Prior to Dell, Norrod worked at Cyrix Corp from 1993 to 1997 and National Semiconductor from 1997 to 2000 leading the integrated x86 CPU businesses.

Norrod holds Bachelor of Science and Master of Science degrees in electrical engineering from Virginia Tech and holds 11 US patents in computer architecture, graphics and system design. He also serves on the Board of Directors of Intersil Corporation.



Dan Stanzione

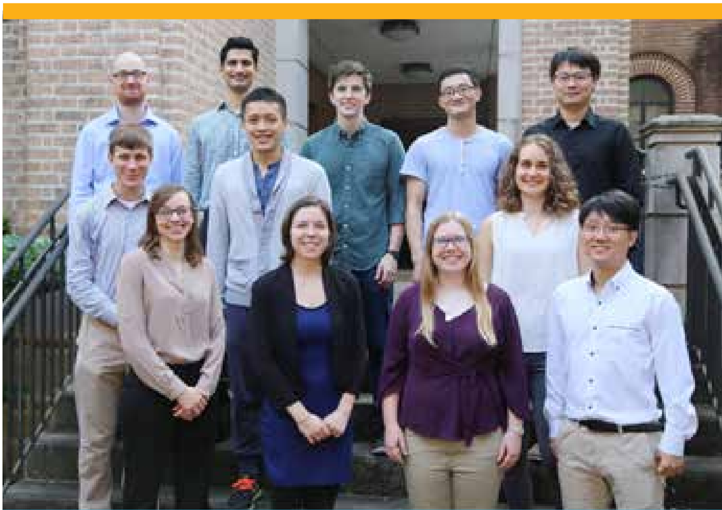
Executive Director, Texas Advanced Computing Center & Associate Vice President for Research, UT Austin

Dr. Stanzione is the Executive Director of the Texas Advanced Computing Center (TACC) at The University of Texas at Austin. A nationally recognized leader in high performance computing, Stanzione has served as deputy director since June 2009 and assumed the Executive Director post on July 1, 2014.

He is the principal investigator (PI) for several leading projects including a multimillion-dollar National Science Foundation (NSF) grant to deploy and support TACC's Stampede supercomputer over four years. Stanzione is also the PI of TACC's Wrangler system, a supercomputer designed specifically for data-focused applications. He served for six years as the co-director of CyVerse, a large-scale NSF life sciences cyberinfrastructure in which TACC is a major partner. In addition, Stanzione was a co-principal investigator for TACC's Ranger and Lonestar supercomputers, large-scale NSF systems previously deployed at UT Austin. Stanzione previously served as the founding director of the Fulton High Performance Computing Initiative at Arizona State University and served as an American Association for the Advancement of Science Policy Fellow in the NSF's Division of Graduate Education.

Stanzione received his bachelor's degree in electrical engineering and his master's degree and doctorate in computer engineering from Clemson University, where he later directed the supercomputing laboratory and served as an assistant research professor of electrical and computer engineering.

The Ken Kennedy Institute for Information Technology congratulates the 2018-19 Graduate Fellowship Award recipients!



Rice Ken Kennedy Institute Graduate Fellowship Award recipients (front row, from left to right) Christopher Thiele, Manav Bhati, Jordan Shivers, Wenya Shu, Yicheng Wu. (second row, from left to right) Philip Taffet, Ao Cai, Eleni Litsa. (back row, from left to right) Alana Semple, Mae Markowski, Carly Fagnant, Jaeho Lee.

The Ken Kennedy Institute for Information Technology is pleased to recognize the achievements and research of Rice University's graduate students by awarding fellowships to students pursuing research in computational science and engineering, high-performance computing, and data analytics.

Fellowship awards are made possible with support from sponsors and funding from the Rice Oil and Gas High Performance Computing Conference.

We welcome you to become a partner in sponsoring the Ken Kennedy Institute Fellowship Program at Rice University. For more information, please visit the website at: k2i.rice.edu.

THANK YOU TO ALL THE 2018-2019 GRADUATE FELLOWSHIP SPONSORS!

bp

CRAY
THE SUPERCOMPUTER COMPANY

ExxonMobil

Schlumberger

RICE | KEN KENNEDY
INSTITUTE FOR INFORMATION TECHNOLOGY

k2i.rice.edu

OIL AND GAS
HIGH PERFORMANCE COMPUTING CONFERENCE

- **A** Parallel Session A: AI & Deep Learning
- **B** Parallel Session B: Data Storage & I/O Performance
- **K** Keynote
- **N** Networking
- **P** Panel Discussion
- **L** Plenary
- **S** Poster Session
- **T** Workshop

8:30 a.m. – 12:00 p.m.	T	**Workshop: Best Practices in Supercomputing Systems Management** » Room 280
	T	**Workshop: Hiring, Developing and Retaining an Inclusive Workforce** » Room 1003
12:00 p.m. – 1:00 p.m.	N	**Conference Registration & Networking** » Event Hall
1:00 p.m. – 1:15 p.m.		**Welcome** » Auditorium
1:15 p.m. – 2:00 p.m.	K	**High Performance Computing and High Performance Data Analytics, and What O&G Will Do With It In The Next 10 Years** » Auditorium Speaker(s): **Detlef Hohl**, Shell
2:00 p.m. – 2:30 p.m.	L	**Evolving System Design for HPC: Next Generation CPU and Accelerator Technologies** » Auditorium Speaker(s): **Forrest Norrod**, AMD
2:30 p.m. – 3:00 p.m.	L	**Arm in HPC** » Auditorium Speaker(s): **Brent Gorda**, Arm
3:00 p.m. – 3:30 p.m.	N	**Break** » Event Hall
3:30 p.m.	A	**Parallel Session A : AI & Deep Learning** » **Auditorium**
3:30 p.m.	B	**Parallel Session B: Data Storage & I/O Performance** » **Room 280**
5:10 p.m.	N	**Networking Reception** » Event Hall

Parallel Session A: AI & Deep Learning ⟫ **Auditorium** *Moderator(s): Sverre Brandsberg-Dahl • Ernesto Prudencio, Schlumberger*	
3:30 p.m. - 3:50 p.m.	**AI for HPC in Oil & Gas: Experiences and Opportunities** Speaker(s): Anne C. Elster
3:50 p.m. - 4:10 p.m.	**Zero-Communication Model Parallelism for Distributed Extreme-Scale Deep Learning** Speaker(s): Qixuan Huang • Tharun Medini • Anshumali Shrivastava
4:10 p.m. - 4:30 p.m.	**Strong Scaling Strategy for Deep Neural Network Seismic Segmentation Models** Speaker(s): Daniel Chevitarese • Renato Cunha • Eduardo Rodrigues • Daniela Szwarcman
4:30 p.m. - 4:50 p.m.	**Interactive Machine Learning and Inference** Speaker(s): Michele Isernia
4:50 p.m. - 5:10 p.m.	**Accelerating Traditional Data Science using GPUs and RAPIDS** Speaker(s): Ty McKercher

Parallel Session B: Data Storage & I/O Performance ⟫ **Room 280** *Moderator(s): Alexander Morris, Shell • Alex Loddoch, Chevron*	
3:30 p.m. - 3:50 p.m.	**Providing Balanced Systems and Expectations with the IO500** Speaker(s): John Bent • Steve Crusan
3:50 p.m. - 4:10 p.m.	**Solving I/O Slowdown: The “Noisy Neighbor” Problem** Speaker(s): John Fragalla
4:10 p.m. - 4:30 p.m.	**Future-Looking Data Storage for Peak Performance at ACCRE’s HPC Environment** Speaker(s): David Feller • Mariana Menge
4:30 p.m. - 4:50 p.m.	**Breaking the Memory/IO Wall in Oil & Gas Applications using Approximation Techniques: Mixed Precision and Compression.** Speaker(s): Rached Abdelkhalek • David Keyes • Hatem Ltaief • Issam Said
4:50 p.m. - 5:10 p.m.	**A Generic and Holistic High Performance Distributed Computing and Storage System for Large Datasets in Oil and Gas Industry** Speaker(s): Kristie Chang • Lu Wang

C Parallel Session C: Software Technology & Applications
D Parallel Session D: Systems & Facilities
K Keynote
N Networking
P Panel Discussion
L Plenary
S Poster Session
T Workshop

7:30 a.m. – 8:30 a.m.	N	**Breakfast & Networking** » Event Hall
8:30 a.m. – 8:45 a.m.		**Welcome** » Auditorium
8:45 a.m. – 9:30 a.m.	K	**The U.S. Exascale Computing Project: Addressing Extreme-Scale Computing Challenges** » Auditorium Speaker(s): **Lori Diachin**, Exascale Computing Project
9:30 a.m. – 10:00 a.m.	L	**New Era in HPC** » Auditorium Speaker(s): **Trish Damkroger**, Intel
10:00 a.m. – 10:30 a.m.	L	**Computing for the Endless Frontier** » Auditorium Speaker(s): **Dan Stanzione**, Texas Advanced Computing Center
10:30 a.m. – 11:00 a.m.	N	**Break** » Event Hall
11:00 a.m.	C	**Parallel Session C: Software Technology & Applications** » **Room 280**
11:00 a.m.	D	**Parallel Session D: Systems & Facilities** » **Auditorium**
12:40 p.m. – 1:45 p.m.	N	**Lunch & Networking** » Event Hall
1:45 p.m. – 2:15 p.m.	L	**Democratising Access to HPC** » Auditorium Speaker(s): **Toni Collis**, Appentra & Women in HPC
2:15 p.m. – 3:15 p.m.	P	**Early Career Panel** » Auditorium Moderator: **Andrew Jones**, NAG Speaker(s): **Samantha Krebsbach**, ExxonMobil • **Bosen Du**, BP • **Joao Barbosa**,TACC • **Additional panelists to be selected from the audience**.
3:15 p.m. – 4:00 p.m.	K	**Post-K: A Game Chaning Supercomputer for Convergence of HPC and Big Data/AI** » Auditorium Speaker(s): **Satoshi Matsuoka**, Riken Center for Computational Science, Japan
4:00 p.m. – 6:00 p.m.	S	**Poster and Closing Networking Session** » Event Hall

WEDNESDAY, MARCH 6

8:30 a.m. – 12:00 p.m.	T	**Workshop: Singularity Containers: Secure, Repeatable and Mobile Runtimes for Oil and Gas Applications and Workflows** » Room 280
	T	**Workshop: Speeding Up the Parallelisation Process: An Algorithmic Approach to Multicore and GPU Programming** » Room 1003

Parallel Session C: Software Technology & Applications » Room 280
Moderator(s): Scott Morton, Rice University • Bosen Du, BP • Tom Cullison, Nvidia

11:00 a.m. – 11:20 a.m.	**Automatic Generation of Production-grade Hybrid MPI-OpenMP Parallel Wave Propogators Using Devito** Speaker(s): Tim Burgess • Gerard Gorman • Fabio Luporini • Amik St-Cyr
11:20 a.m. – 11:40 a.m.	**An Overview of RAJA** Speaker(s): Arturo Vargas
11:40 a.m. – 12:00 p.m.	**Seismic Modeling on Arm Architectures** Speaker(s): Fabrice Dupros • Conrad Hillairet • Beau Paisley
12:00 p.m. – 12:20 p.m.	**Swift and Parsl: Parallel Scripting for HPC Workflow in Science and Engineering** Speaker(s): Yadu Babuji • Kyle Chard • Benjamin Clifford • Ian Foster • Stefan Gary • Daniel S. Katz • Zhuozhao Li • Marmar Mehrabadi • Matthew Shaxted • Alvaro Vidal Torreira • Michael Wilde • Anna Woodward • Justin Wozniak
12:20 p.m. – 12:40 p.m.	**Python Workflows on HPC Systems: Pitfalls and Best Practice** Speaker(s): Janis Keuper • Philipp Reusch • Dominik Strassel

Parallel Session D: Systems & Facilities » Auditorium
Moderator(s): Keith Gray, BP • David Baldwin, Shell

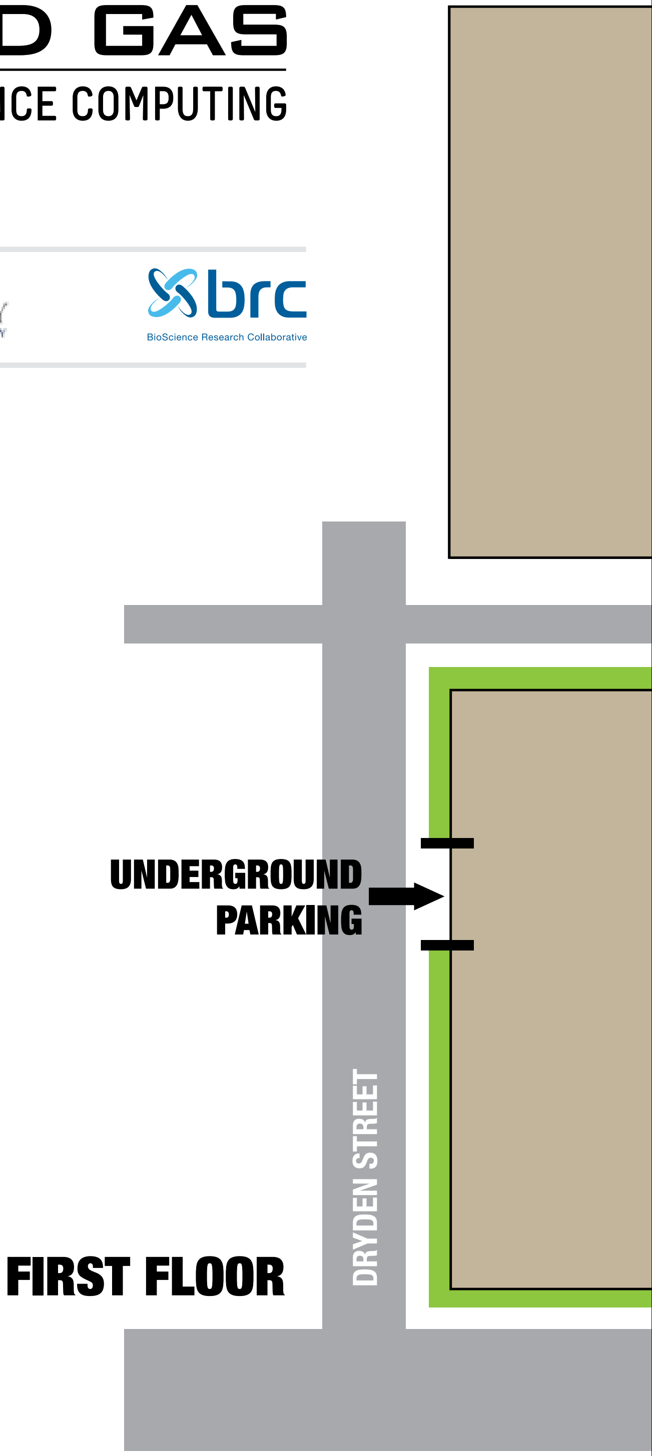
11:00 a.m. – 11:20 a.m.	**CORAL System Update** Speaker(s): Charles Compton • Jim Kahle
11:20 a.m. – 11:40 a.m.	**Perlmutter - a 2020 pre-exascale GPU-accelerated system for NERSC.** Speaker(s): Nicholas Wright
11:40 a.m. – 12:00 p.m.	**Extreme Efficiency in the Exascale Data Centre** Speaker(s): Stuart Midgley
12:00 p.m. – 12:20	**Moving Seismic Migration Into Cloud** Speaker(s): Tom McDonald • Ling Zhuo
12:20 p.m. – 12:40 p.m.	**Cloud-based HPC Services for Well Stimulation Planning** Speaker(s): Ken Sheldon

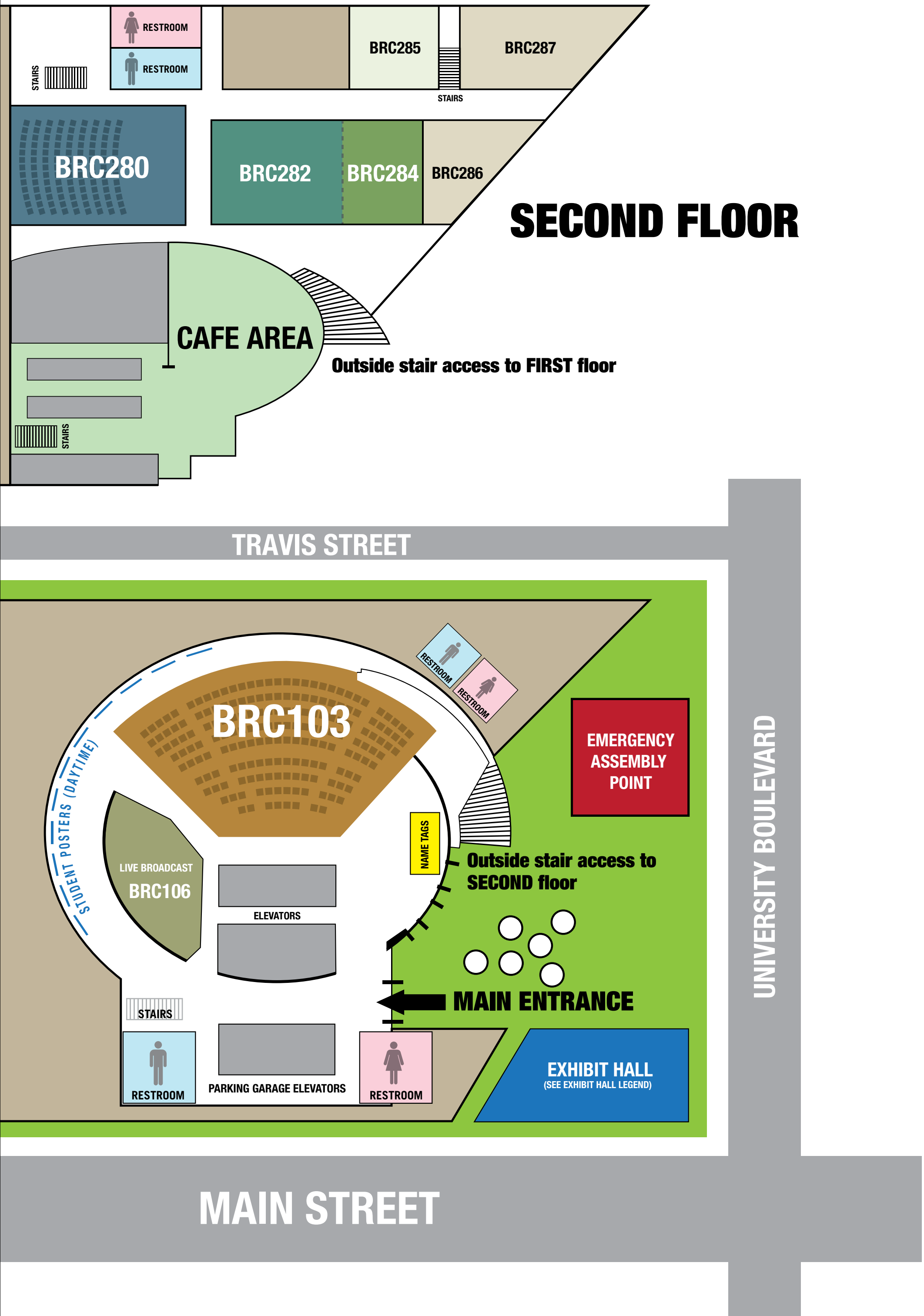
OIL AND GAS

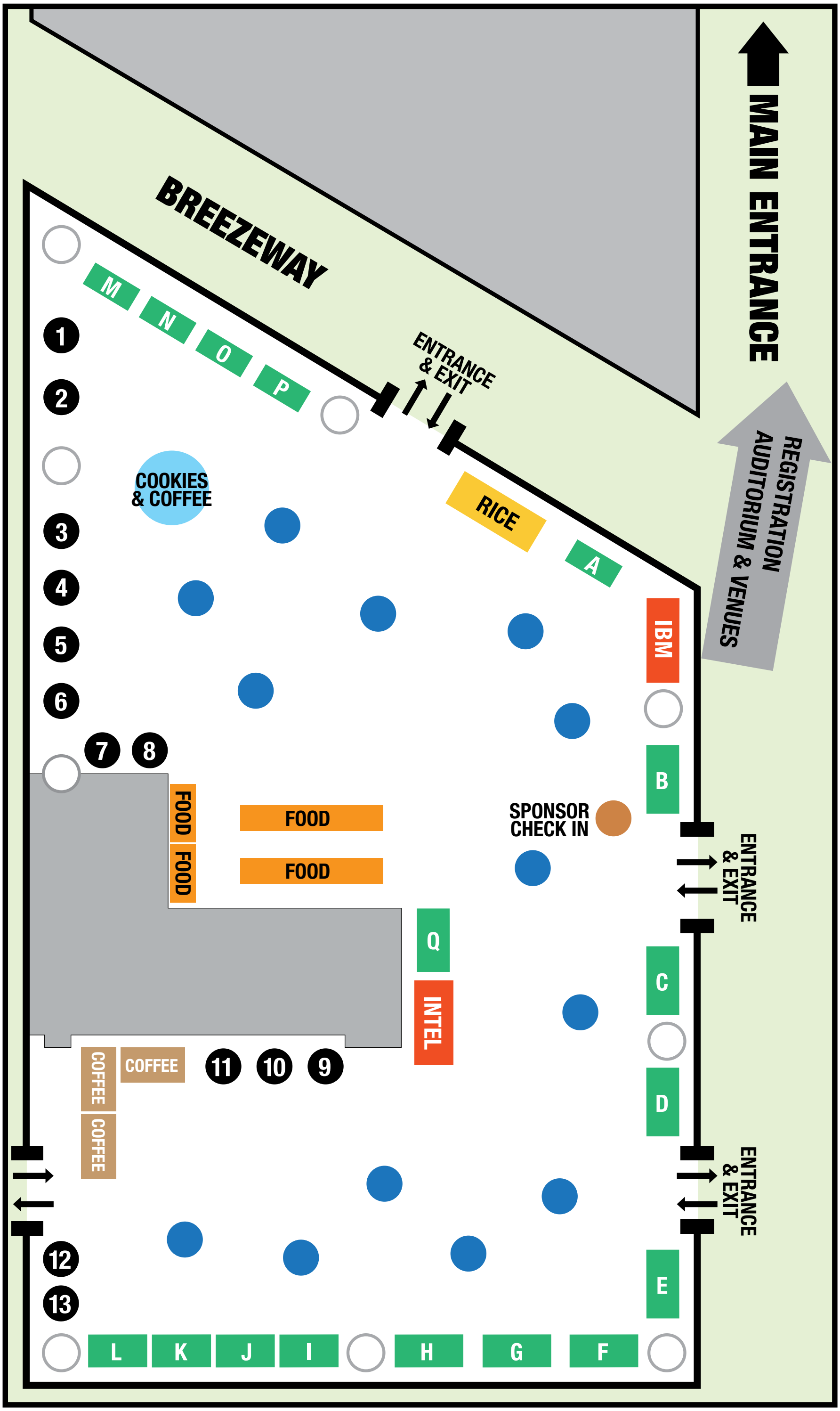
HIGH PERFORMANCE COMPUTING CONFERENCE

RICE | KEN KENNEDY INSTITUTE FOR INFORMATION TECHNOLOGY

brc BioScience Research Collaborative




RESTROOM
RESTROOM
STAIRS
BRC285
BRC287
STAIRS
BRC280
BRC282
BRC284
BRC286
SECOND FLOOR
CAFE AREA
Outside stair access to FIRST floor
STAIRS
TRAVIS STREET
RESTROOM
RESTROOM
BRC103
STUDENT POSTERS (DAYTIME)
EMERGENCY ASSEMBLY POINT
UNIVERSITY BOULEVARD
NAME TAGS
LIVE BROADCAST
BRC106
ELEVATORS
Outside stair access to SECOND floor
MAIN ENTRANCE
STAIRS
RESTROOM
PARKING GARAGE ELEVATORS
RESTROOM
EXHIBIT HALL
(SEE EXHIBIT HALL LEGEND)
MAIN STREET


MAIN ENTRANCE
BREEZEWAY
REGISTRATION
AUDITORIUM & VENUES
ENTRANCE & EXIT
Main Street
M
N
O
P
1
2
3
4
5
6
7
8
COOKIES & COFFEE
RICE
A
IBM
B
SPONSOR CHECK IN
FOOD
FOOD
FOOD
FOOD
Q
INTEL
C
D
COFFEE
COFFEE
COFFEE
11
10
9
12
13
E
L
K
J
I
H
G
F

Platinum Sponsors

Gold Sponsors

Silver Sponsors

Bronze Sponsors

Food Tables

Coffee Bar

Guest Tables

SPONSOR INDEX

PLATINUM

AMD

Intel

GOLD

Rice University

SILVER

A	NetApp
B	Arista Networks
C	Cray
D	Microsoft
E	Mellanox Technologies, Inc.
F	Rescale
G	Fraunhofer, ITWM
H	DDN Storage
I	Panasas
J	SUSE
K	WekaIO
L	Red Hat
M	OmniSci, Inc.
N	Amazon Web Services
O	Dell EMC
P	Oracle Cloud Infrastructure
Q	Hewlett Packard Enterprise

BRONZE

1	Penguin Computing
2	Altair
3	Arm
4	Quantum Corporation
5	Geophysical Society of Houston
6	Spectra Logic/Strong Link
7	Stream Data Centers
8	SUPERMICRO
9	Univa
10	Pure Storage
11	PCPC Direct, Ltd.
12	Green Revolution Cooling
13	Velocity Compute

LAUNCH PAD

Delta PERFORM™ LLC

Sylabs, Inc.

MEDIA PARTNERS

HPC Wire

inside HPC

Intersect 360

Station Houston

Texas Women in High Performance Computing

The Next Platform


AMD
THE
RULE BOOK
FOR
DATACENTERS
OH SORRY, DID YOU NEED THAT?
If we followed the rules, we'd have never built EPYC™ processors.
AMD
EPYC

The Ken Kennedy Institute Computational Science & Engineering Fellowships

Funded by proceeds from the OG-HPC Conference, the goal of this fellowship program is to attract exceptional graduate students to Rice University in the fields of computational science and engineering, high performance computing, and data analytics, with special consideration given to students with research interests in areas of relevance to the energy industry.

2018/19

Kyle Busse, Computational & Applied Mathematics
Yuxin Tang, Computer Science
William Lewis, Computer Science
Maryam Khalid, Electrical & Computer Engineering
Alex Macklin, Electrical & Computer Engineering
Yujie Jiang, Statistics

2017/18

Nathaniel Kroeger, Computational & Applied Mathematics
Nigel Tan, Computational & Applied Mathematics
Teresa Tse, Electrical & Computer Engineering
Keren Zhou, Computer Science

2016/17

Jonas Actor, Computational & Applied Mathematics
Andrew Wells, Computer Science

2015/16

Temitayo Ajayi, Computational & Applied Mathematics
Jeff Dudek, Computer Science
Indu Manickam, Electrical & Computer Engineering
Rebecca Smith, Computer Science
Jasper Tan, Electrical & Computer Engineering
Robert Weylandt, Statistics
Yabin Zhang, Computational & Applied Mathematics

For additional details visit k2i.rice.edu

OIL AND GAS
HIGH PERFORMANCE COMPUTING
CONFERENCE

RICE

A Comparison of Image Segmentation Methods
Jonas Actor, Beatrice Riviere and David Fuentes

A Discontinuous Galerkin Method for first-order elastic-acoustic coupled wave equations
Kaihang Guo and Jesse Chan

A Parallel Pore-scale Simulator for Multiphase Flow in 3D Digital Rock Images
Sahar Bakhshian and Seyyed Abolfazl Hosseini

A Parallel Workflow Framework for Data and Compute Intensive Applications
Kwai Wong, Frank Betancourt, Daniel Nichols and Stan Tomov

Application of Smoothed Particle Hydrodynamics (SPH) to Flow Simulations in Oil Reservoir Rocks
Jaime Klapp, Leonardo Di G Sigalotti and Carlos Enrique Alvarado Rodríguez

Bubble-Bubble Pinch-off in Symmetric and Asymmetric Microfluidic Expansion Channels for Ordered Foam Generation
Daniel Vecchiolla, Vidya Giri and Sibani Lisa Biswal

Characterizing Spatiotemporal Trends in Extreme Precipitation across the Southern Texas Coast
Carly Fagnant, Avantika Gori, Kathy Ensor, Antonia Sebastian and Philip Bedient

Computing Challenges and Solutions in Rock Drilling Model enabled Drill Bit Design
Prathamesh Desai and C. Fred Higgs Iii

Data-Parallel Distributed Training of very Large Models beyond GPU Capacity
Charles Compton and Amit Juneja

Data Weighted Full-Waveform Inversion with Adam Method
Ao Cai and Colin Zelt

Deep Global Model Reduction Learning
Siu Wun Cheung

Developing and Integrating New Solvers for OPM
Geir A. Hasle and Anne C. Elster

Don't Let Unused Switch Ports Go to Waste: Exploring Alternative Means of Supporting Big-Data Broadcast in Commodity Data Center with Shufflecast
Sushovan Das, Afsaneh Rahbar, Xiaoye Steven Sun, T. S. Eugene Ng and Ang Chen

Efficient Solid-Shell Formulations for Nonlinear Thermoelastic Analysis of Thin-Walled Structures
Wenya Shu and Ilinca Stanciulescu

Exascale Archiving
Meghan Wingate McClelland

Extending HPCToolkit to Measure and Analyze Code Performance on GPU-accelerated Platforms
Keren Zhou, Mark Krentel and John Mellor-Crummey

Foundational Algorithmic Speedup from Quantum Chemistry
Jonathan Jerke and Bill Poirier

Gas Detection and Localization Wireless Sensor Network
Nadya Mohamed and Joseph Cavallaro

Hierarchical Scale Separation: A Linear Solver Based on Block Relaxation and Multigrid
Christopher Thiele, Mauricio Araya-Polo, Faruk Omer Alpak and Riviere Beatrice

Industrial Use Case on Using Neural Networks for Predictive Maintenance in Petrochemical Refineries
Zaid Al-Ars

Lagrange-Multiplier Based Optimization Methods for Time-Domain Decomposition Formulations of Optimal Control Problems
Nathaniel Kroeger and Matthias Heinkenschloss

Mechanical Criticality in Athermal Semiflexible Polymer Networks
Jordan Shivers, Sadjad Arzash, Abhinav Sharma and Fred MacKintosh

Multilevel Time Domain Decomposition for the Parallel Solution of Optimal Control Problems
Shengchao Lin and Matthias Heinkenschloss

Multiphase Fluid Flow Simulator with Applications in Porous Media
Chen Liu, Lu Lin and Beatrice Riviere

Multi-scale Modeling of Li-ion Battery Anode Materials Using Reactive Force Fields
Manav Bhati and Thomas P. Senftle

Nano-sized Titanium Borides for Oil Field Applications and Energy Storage
Zhou Zhou, Keiko Kato, Yu Xie, Robert Vajtai and Pulickle Ajayan

Parallel Large-Scale Earth Model Interpretation of Ultra-Deep Directional EM Measurement
Han Lu, Qiuyang Shen, Jiefu Chen, Xuqing Wu and Xin Fu

Persistence of Passwords and TLS secrets in Android
Jaeho Lee, Ang Chen and Dan S. Wallach

PhaseCam3D - Learning Phase Masks for Passive Single View Depth Estimation
Yicheng Wu, Vivek Boominathan, Huaijin Chen, Aswin Sankaranarayanan and Ashok Veeraraghavan

Plug Flow in the Earth's Asthenosphere
Alana Semple and Adrian Lenardic

Reduction of Energy Consumption in Crude Oil Distillation Through Parastillation
Lilian Biasi, Matthias Heinkenschloss and Antonio Meirelles

Risk-Averse PDE-Constrained Optimization
Mae Markowski and Matthias Heinkenschloss

Simulating the Viscous Fingering Effect in Porous Media
Bryan Doyle, Beatrice Riviere and Michael Sekachev

Understanding Congestion in High Performance Interconnection Networks Using Sampling
Philip Taffet and John Mellor-Crummey

Understanding the Role of Iron Tosylate on Heavy Oil Viscosity Reduction
Yan Xu, Ciceron Ayala-Orozco, Michael Wong, Michael Shammai and Pinn-Tsong Chiang

THANK YOU TO THIS YEAR'S PARTICIPANTS AND SPONSORS!

PLATINUM LEVEL SPONSORS

AMD

intel

GOLD LEVEL SPONSORS

RICE
Unconventional Wisdom

SILVER LEVEL SPONSORS

Arista Networks
Amazon Web Services
Cray
Dell EMC
DDN Storage
Fraunhofer, ITWM
Hewlett Packard Enterprise
Mellanox Technologies, Inc.
Microsoft
NetApp
OmniSci, Inc.
Oracle Cloud Infrastructure
Panasas
Red Hat
Rescale
SUSE
WekaIO

BRONZE LEVEL SPONSORS

Altair
Arm
Geophysical Society of Houston
Green Revolution Cooling
PCPC Direct, Ltd.
Penguin Computing
Pure Storage
Quantum Corporation
Spectra
Stream Datacenters
SUPERMICRO
Univa
Velocity Compute

LAUNCH PAD

Delta PERFORM™ LLC
Sylabs, Inc.

MEDIA PARTNERS

HPCwire
inside HPC
Intersect 360
Station, Houston
Texas Women in High Performance Computing
The Next Platform

OIL AND GAS
HIGH PERFORMANCE COMPUTING CONFERENCE

RICE | KEN KENNEDY
INSTITUTE FOR INFORMATION TECHNOLOGY

k2i.rice.edu