HPC 22
SAUDI ARABIA

جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY
كلية علوم الحاسب وتقنية المعلومات
College of Computer Science and Information Technology

SAUDI HPC/AI CONFERENCE 2022

Using HPC & AI to Accelerate and Improve Medical Research

27–29 September 2022

www.hpcsaudi.org


بسم الله الرحمن الرحيم


22
HPC
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Under the Patronage of His Excellency

Welcome Note

Dr. Abdullah M. Almuhaideb
General Chair, Saudi HPC / AI Conference 2022

On behalf of the organizers of the 11th annual Saudi High Performance Computing Conference (Saudi HPC) 2022, I would like personally welcome each of you at the College of Computer Science and Information Technology (CCSIT), Imam Abdulrahman Bin Faisal University (IAU). It is an exciting time for our college and university to host such a prestigious event at our premises. This year conference theme is "U*sing HPC & AI to Accelerate and Improve Medical Research"*. The conference will be held on September 27-29, 2022, at Building#D3, Imam Abdulrahman Bin Faisal University, Dammam.

The Saudi HPC Conference is the premier event in the region, bringing together users, experts and technology providers from the Kingdom and abroad to exchange business ideas and experiences. In its previous ten editions, the conference addressed topics related to HPC Applications, Big Data, Analytics, Artificial Intelligence, and Machine Learning.

Key themes of the conference include:

- **Role of HPC in Medical Research**
- **HPC in AI, Big Data**
- **Emerging Technologies and HPC Centers, Facilities, and Applications**
- **HPC Cyber Security and Cloud Computing**

The Saudi HPC conference offers a premier regional event where participants will have the opportunity to interact with global HPC leaders on the challenges facing the HPC community today. We anticipate participants from in-Kingdom institutions as well as HPC vendors. The first two days will include technical presentations followed workshops on Day 3. The technical program consists of four plenary sessions, 3-4 workshops, hackathon, a student poster session, and a panel discussion.

During breaks, vendor displays will be available over coffee and the technical poster session is not to be missed!

Study this booklet to maximize opportunity over three rich days. Once again, I would like to welcome you to the Saudi HPC 2022 and if you need any kind of assistance, please do not hesitate to call the organizing committee.

Thank you for joining us!

Saudi HPC 2022 Organizers

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Focus Area

Keynote Sessions

Technical Sessions

Panel Discussion

Workshops

Exhibition

Poster Competition

Hackathon Competition

Agenda

Agenda

DAY 1: Tuesday– September 27, 2022

Time	Title	Speaker
8:30	**Registration**	
09:00-09:30	**Opening Ceremony**	
9:00	The National Anthem of the Kingdom of Saudi Arabia	
9:03	Quran	
9:05	Organizing Committee Speech by Dean of Computer Science and Information Technology College	**Dr. Abdullah Mohammed Almuhaideb**, Dean, CCSIT, IAU
9:10	Opening Speech by his Excellency President of Imam Abdulrahman Bin Faisal University (IAU)	**Prof. Abdullah M. Alrubaish**, President, IAU
9:20	Sponsors Honoring	
9:30	Exhibition Official Opening + Coffee Break + Networking	

First Session

Time	Title	Speaker
10:00-12:00	**Plenary Session 1: Role of HPC in Medical Research**	**Session Chair: Dr. Sumayh Aljameel** Assistant Professor, Chair of Computer Science Department, CCSIT, IAU. Director of the Technical Systems office, IAU
10:00	Keynote: HPC & AI with Intel in the New Era of Supercomputing	**Dr. Jean-Laurent Philippe** HPC Director, Intel
10:30	Application of Artificial Intelligence in Cytogenetics	**Yahya Bokhari** Associate Research Scientist, King Abdullah International Medical Research Center (KAIMRC).
10:40	The current status of the biomedical/biological research in term of HPC usage and presence	**Mohammed S. Alarawi** Research Specialist, Comparative Genomics and Genetics, King Abdullah University of Science and Technology (KAUST).
10:50	Genomics Optimization And Scalability	**Zeeshan Kamal Siddiqi** HPC & AI Technical Team, Lenovo
11:00	Increasing diagnostic rate in Clinical Genomics variant interpretation using AZIZ supercomputer	**Dr. Nofe Ateq Alganmi** Assistant Professor, King Abdulaziz University
11:10	Discussion	All session speakers will join and session chair will moderate the discussion

11:30	**Panel Discussion: High Performance Computing in Healthcare**	**Session Chair: Dr. Khalid Adnan Alissa** Dean of ICT at IAU
		Prof. Dhabaleswar K. (DK) Panda Professor and University Distinguished Scholar, The Ohio State University, USA
		Prof. Mohammed Alshahrani, Director General, King Fahad Hospital of the university-Khober-Saudi Arabia
		Dr. Saber Feki Sr. Computational Scientist Lead, KAUST
		Prof. Rashid Mehmood Director of Research, Training, and Consultancy, HPC Center, King Abdulaziz University
		Eng. Ahmed Al-Jeshi Board member of the Annual Saudi HPC/AI Conference
		Eng. Saeed Zahrani Senior Director of Cloud Engineering at CNTXT
10:00-12:30	**Poster Showcase (parallel session)**	
12:00-12:30	**Dhohr Prayer + Coffee Break**	

Second Session

Time	Title	Speaker
12:30 – 3:00	**Plenary Session 2: HPC in AI, Big Data**	**Session Chair: Dr.Dina Alabbad** Assistant Professor, Head of Computer Information Systems Department at CCSIT, Director of Data Management office-IAU.
12:30	Keynote: High Performance Computing and artificial intelligence in medical physics applications	**Dr. Othmane Bouhali** Director of Research Computing and Research Professor at Texas A&M University at Qatar.
12:50	Exascale Computing	**Paul Calleja** Director, Research Computing Services, Cambridge University, UK
1:10	Road to Exascale	**Andrew Grant** Global VP, Strategic HPC Projects, ATOS
1:20	Addressing the Exascale storage challenge	**Sven Breuner** Field CTO, VAST Data
1:30	Leveraging High Performance Computing for Big Data Processing	**Badr Badghaish** Geophysicist IV, Saudi Aramco
1:40	Leveraging DAOS Storage System for Seismic Data Storage and Manipulation	**Merna Moawad** Senior Software Engineer, BrightSkies Technologies
1:50	Data Analytics & AI in HPC	**Paul Brook** (online) EMEA Director, Data Centric Workloads Specialists, Dell
2:00	Hybridized 'HPC - Ensemble ML' Towards Making Data Speak More Clearly: A Unique Paradigms Union as panacea for Improved Medical Research & Solutions	**Dr. Sunday Olusanya Olatunji (Aadam)** Associate Professor at CCSIT, IAU

2:10	Challenges of Exascale and beyond	**Bruno LECOINTE** VP Group Business support HPC AI Quantum at ATOS
2:20	Coding in the Entanglement Domain	**Naya Nagy** Assistant professor at IAU
2:30	Leveraging Artificial Intelligence to Optimize Reservoir Simulation HPC Environment	**Alanood Alrassan** Petroleum Engineer System Analyst, Saudi Aramco
2:40	Discussion	All session speakers will join and session chair will moderate the discussion
3:10	Lunch Break	

DAY 2 WEDNESDAY – SEPTEMBER 28, 2022

First Session

Time	Talk	Speaker Name
9:00-12:00	**Plenary Session 3: HPC Cyber Security and Cloud Computing**	**Session Chair: Dr. Mustafa Youldash** Assistant Professor, IAU.
9:00	Keynote: Extreme-Scale Environmental Statistics	**David E Keyes** Professor, Applied Mathematics and Computational Science Director, Extreme Computing Research Center at KAUST
9:30	Keynote: High-Performance Deep Learning, Machine Learning, and Data Science on Modern HPC Systems	**Dhabaleswar K. (DK) Panda,** Professor and University Distinguished Scholar, The Ohio State University, USA
10:00	Cloud-native HPC use case	**Walid Shaari,** Cloud Architect, Saudi Aramco **Nora Alwadaah,** HPC Specialist, Saudi Aramco
10:10	Smartization of Societies: High-Performance Ingredients and Examples	**Prof. Rashid Mehmood** Director of Research, Training, and Consultancy HPC Center, King Abdulaziz University
10:20	HPC Cybersecurity benchmark	**Muneera M. Almuhaidib** Computer Operating System Specialist, Saudi Aramco
10:30	Networking + Exhibition + Coffee Break	
10:50	How to improve Biomedical Analytics while reducing Carbon Footprint	**Rick Koopman** EMEA Technical Lead HPC, Lenovo
11:00	Accelerating Intelligent Infrastructure for a Changing World	Dipl. Eng. THIERS Laurent, Vice President, DDN
11:10	Coding in the Entanglement Domain	Naya Nagy, Assistant professor, IAU
11:20	Discussion	All session speakers will join and session chair will moderate the discussion
9:00-11:30	Poster Showcase (parallel session)	
11:50-12:30	Dhohr Prayer + Coffee Break	

Second Session

Time	Title	Speaker
12:30-2:00	**Plenary Session 4: Emerging Technologies and HPC centers, facilities, and applications**	**Session Chair: Dr. May I. Aldossary** Assistant Professor, Vice Dean of Academic Affairs, CCSIT, IAU.
12:30	Keynote: Research Computing @ NYUAD	**Muataz Al Barwani** Senior Director, Center for Research Computing, New York University Abu Dhabi, Abu Dhabi, UAE.
12:50	Keynote: HPC and AI services and applications at KAUST	**Dr. Jysoo Lee** Director KAUST
1:10	Cray AI Development Software Environment for HPE SUPERCOMPUTING	**Edmondo Orlotti** AI Business Development Manager, Hewlett Packard Enterprise
1:20	Simulation Runtime Optimization via Auto-Tuning of Numerical Tolerances	**Obai Alnajjar** Petroleum Engineering System Analyst, Saudi Aramco
1:30	SUPERCOMPUTING FOR THE EXASCALE COMPUTING	**Edmondo Orlotti** AI Business Development Manager, Hewlett Packard Enterprise
1:40	Accelerating your HPC journey	**Mohamad Jaghoub** Senior Field Application Engineer for AMD META, AMD
1:50	Multi-dimensional HPC: A deep-dive into the Convergence of HPC and AI	**Balamurugan Ramassamy** Director HPC APAC & GCC Countries, Altair
2:00	Aziz HPC Centre	**Dr. Rayan Mosli** HPC Center Deputy Director for Technical and Administrative Affairs at King Abdulaziz University
2:10	HPC system and applications at KFUPM	**Dr. Afaque Shams** Associate Professor, KFUPM
2:20	Taking Medical AI from Research to Clinical Production with HPC	**Dr. Mustafa Youldash** Assistant professor, IAU
2:30	Discussion	All session speakers will join and session chair will moderate the discussion

Closing Session

2:50	**Poster and Hackathon Winners Announcements**
3:10	**Honoring Participants and Organizers**
3:25	**Closing remarks**
3:30	**Group photo + Lunch Break**

Day–3: Thursday– September 29, 2022 (Parallel Workshops)

Time	Technical Workshops, Session Chair: Dr.Rami M Mohammad			
	Workshop 1	**Workshop 2**	**Workshop 3**	**Workshop 4 (online)**
9 -11	**Data Science on HPC platforms - (part-1)- By:** **1-Saber Feki** Sr. Computational Scientist Lead, KAUST **2-Mohsin Shaikh** Computational Scientist, KAUST **3- Didier Barradas Bautista** Staff Scientist, KAUST **4-Rooh Khurram** Staff Scientist, KAUST	**DPC++ Training Workshop (part-1) By:** **Amr Mohamed Nasreldin Elsayed** HPC software Engineer, Brightskies Technologies	**Enabling and Democratizing MLops in Healthcare, By:** **Dr. Valerio Rizzo** AI Lead & Solution Architect, Lenovo	**Power, Application Efficiency and Challenges for a HPC Vendor, By:** **1-Jim Hearnden** Enterprise Technologist Data Centre Power & Cooling EMEA **2-Martin Hilgeman** HPC application specialist, Dell
11-12	**(continued) Data Science on HPC platforms - (part-1)- By:** **1-Saber Feki** Sr. Computational Scientist Lead, KAUST **2-Mohsin Shaikh** Computational Scientist, KAUST **3- Didier Barradas Bautista** Staff Scientist, KAUST **4-Rooh Khurram** Staff Scientist, KAUST	**(continued) DPC++ Training Workshop (part-1), By:** **Amr Mohaemed Nasreldin Elsayed,** HPC software Engineer, Brightskies Technologies	**Workshop 5** **Cray AI Development Software Environment for HPE SUPERCOMPUTING Workshop (part-I), By:** **Andrea Carboni** AI Solutions Engineer, Hewlett Packard Enterprise	
12:00 - 12:30	**Dhohr Prayer + Coffee Break**			
12:30 -1:45	**(continued) Data Science on HPC platforms - (part-2)- By:** **1-Saber Feki** Sr. Computational Scientist Lead, KAUST **2-Mohsin Shaikh** Computational Scientist, KAUST **3- Didier Barradas Bautista** Staff Scientist, KAUST **4-Rooh Khurram** Staff Scientist, KAUST	**(continued) DPC++ Training Workshop (part-2), By:** **Amr Mohaemed Nasreldin Elsayed,** HPC software Engineer, Brightskies Technologies	**(continued) Cray AI Development Software Environment for HPE SUPERCOMPUTING Workshop (part-2), By:** **Andrea Carboni** AI Solutions Engineer, Hewlett Packard Enterprise	
2:00	**Lunch Break**			

Keynote Sessions

Keynote Sessions

Dr. Othmane Bouhali

Texas A&M University in Qatar

Talk Title: High Performance Computing and artificial intelligence in medical physics applications.

Short Description

Modelling in medical physics and nuclear medicine has witnessed significant increase thanks to the development of computational resources in the past decade. In this talk we will present our ongoing research in areas of radiotherapy and internal dosimetry. We will show that Monte Carlo tools coupled with HPC resources and methods have been a game changer in the fields of medical imaging and diagnosis.

Moreover, we will also address the benefit that AI provides to improve medical imaging capabilities and achieve dose optimization in treatment of cancer and other diseases.

Jean-Laurent Philippe

HPC EMEA Director, Intel

Talk Title: HPC & AI with Intel in the New Era of Supercomputing.

Short Description

HPC, AI, and Analytics users ask more of their HPC-AI systems than ever before. High Performance Computing is the foundation of research and discovery. Artificial Intelligence is adding to it. Intel's deep investments in developer ecosystems, tools, technology and an open platform are clearing the path forward to scale artificial intelligence everywhere. Intel has made AI more accessible and scalable for developers through extensive optimizations of popular libraries and frameworks on Intel® Xeon® Scalable processors. Intel's investment in multiple AI architectures to meet diverse customer requirements, using an open standards-based programming model, makes it easier for developers to run more AI workloads in more use cases. Let's look at Intel HPC-AI strategy and new innovations including the latest Intel® Xeon® Scalable processors, data center GPUs and powerful software tools. Together, let's accelerate the next era of innovation in HPC-AI.

Dhabaleswar K. (DK) Panda

Professor and University Distinguished Scholar,
The Ohio State University

Talk Title: High-Performance Deep Learning, Machine Learning, and Data Science on Modern HPC Systems.

Short Description

This talk will start with an overview of challenges being faced by the AI community to achieve high-performance Deep Learning (DL), Machine Learning (ML), and Data Science on Modern HPC systems with both scale-up and scale-out strategies. Next, we will focus on a range of solutions to address these challenges: 1) MPI-driven Deep Learning on CPU and GPU-based systems, 2) Out-of-core DNN training and exploiting Hybrid (Data and Model) parallelism for training large models and data, 3) High-performance MPI Runtime for cuML to support GPU-accelerated ML applications, and 4) High-Performance Dask for supporting data science applications. Case studies to accelerate DL, ML, and data science applications on modern HPC systems will be presented.

Jysoo Lee

HPC and AI services and applications at KAUST

Talk Title: HPC and AI services and applications at KAUST.

Short Description

As Supercomputers are becoming an essential universal tool for scientific discoveries, HPC was embedded in the KAUST DNA since its first year of operation. With the latest increased interest in AI, KAUST has adopted a strategy to provide the necessary tools and support for its AI researchers. In this talk, an overview of KAUST HPC and AI infrastructure, associated services and applications will be given. Some collaborations especially with Saudi organizations will also be highlighted.

Paul Calleja

Director, Research Computing Services,
Cambridge University, UK

UNIVERSITY OF CAMBRIDGE

Talk Title: Exascale computing

Speaker Profile

Paul Calleja is the Director of the Cambridge Open Exascale Lab and of Research Computing Services at the University of Cambridge.

Dr Calleja obtained his Ph.D. in computational bio-physics at the University of Bath. After obtaining a post-doctoral research position at Birkbeck, University of London, he moved into private industry, where he spearheaded the early commercialisation of High Performance Computing cluster solutions in the UK.

Following six years in the commercial sector – during which time he led the market transition from proprietary SMP systems to commodity cluster-based solutions – Dr. Calleja returned to academia. At Imperial College London, Dr Calleja led the formation of a new HPC service, before moving in 2006 to the University of Cambridge to direct a major reorganisation of research computing services. This has resulted in University-wide HPC capabilities using a novel pay-per-use cloud computing model. The University of Cambridge is now home to the fastest academic supercomputer in the UK.

Muataz Al Barwani

Senior Director, Center for Research Computing,
New York University Abu Dhabi, UAE

Talk Title: Research Computing @ NYUAD.

Short Description

Research computing historically has been the purview of a few fields within engineering and applied sciences with the focus on access to and the using of High-Performance Computing (HPC) systems. However more recently, other disciplines such as social sciences and humanities have ventured into data intensive research, this requires additional resources and support.

To cater for this expansion and growth, universities should not only grow their computing and data storage resources but also introduce new services such as consulting & professional services, application development and data science services including; analytics, visualization, big data, data management and the use of artificial intelligence (AI) techniques such as machine learning, natural language processing and computer vision.

This talk will provide insight into the Center for Research Computing at New York University Abu Dhabi (NYUAD); the infrastructure, applications, tools, governance, staff and the skills needed to manage and support all computational and data intensive research activities carried out at NYUAD.

Technical Sessions

Technical Sessions

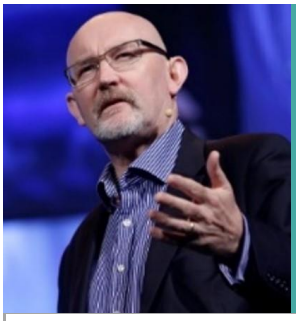
Yahya Bokhari

Associate Research Scientist, King Abdullah International Medical Research Center

Talk Title: Application of Artificial Intelligence in Cytogenetics.

Short Description

Laboratory image analysis is among the most important skills needed for the diagnosis of genetic diseases. Applying artificial intelligence methods and algorithms to lab-medical images not only helps in saving time but also leads to more accurate results. Chromosomal Analysis is one of the most difficult images that AI can be applied on. To auto-analyze the images, we used multiple AI methods to enhance and unify the image's quality."



Paul Brook

EMEA Director, Data Centric Workloads Specialists, Dell

Talk Title: Data Analytics & AI in HPC.

Short Description

Data is growing, AI is everywhere and HPC is converging with every emerging and disruptive technology you hear about. You know this, so this session will focus upon the Why this is happening and how you can accelerate your journey into the next generation of HPC. This session will spotlight how the complex data management process integrates into a modern HPC environment. We look ahead for the next generation of HPC environment where the data gathered at the edge, processed using AI and flows though a distributed HPC. AI and Data Analytics in HPC spans across hybrid clouds and innovative on premises cloud enabled HPC services. The future for HPC is amazing, the potential is huge. Join this session to get a closer look at the How as well as the why of Data Analytics & AI in HPC.

Andrew Grant

Global VP, Strategic HPC Projects, ATOS

Talk Title: Road to Exascale.

Short Description

Exascale computing is the term given to the next 50-100 fold increase in speed over the fastest supercomputers in use today. This super powerful machine is poised to transform modeling and simulation in science and engineering. It is hoped that the exascale machines will solve some or all of the major problems that currently challenging to overcome.
Join us with Mr. Andy Grant where he speaks about the implementation and application of such systems and the transition of HPC towards Exascale computing.

Bruno LECOINTE

VP Group Business support HPC AI Quantum at ATOS

Talk Title: Challenges of Exascale and beyond.

Short Description

The scale of today's leading HPC systems, which operate at the petascale, has put a strain on many simulation codes. The current challenge is to move from 1015 flop/s (petaflop) to the next milestone of 1018 flop/s – an exaflop. It is crucial to note that hardware is not the only exascale computing challenge, but also software and applications. Such systems could have over a million cores, but also need to excel in reliability, programmability, power consumption and usability (to name a few).
Join us with Mr. Bruno Lecointe as he elaborates on the current and future challenges of such complex systems.

Dr. Afaque Shams

Assistant professor, KFUPM

Talk Title: HPC system and applications at KFUPM.

Short Description

In this talk the existing and plan for new HPC system at KFUPM will be presented. The main applications requiring HPC capabilities will then be highlighted. Finally, I will present other HPC options for researchers at Saudi universities when the on-premises HPC is not enough.

Mohammed S. Alarawi

Research Specialist, KAUST

Talk Title: The current status of the biomedical/biological research in term of HPC usage and presence.

Short Description

The volume of data generated from biological source had increased massively. Since the introduction of high throughput sequencing, imaging and screening platforms; the rate of digitalizing biology pushed computational resources to new limits for, compute, storage and data transfer. The secondary use of biological data increases the value of research money. The number of algorithms and tools developed to analyze biological data is increasing rapidly. The projection of zettabyte of raw data, nonetheless the intermediate analysis results is the near future, as major databases are doubling every 12-18 months. This plays a major role into pooling resources and develop strategy to enable best practice use of data and resources. Biological/biomedical research within Saudi Arabia need focus in exercising fair use of data and fair access to HPC resources to further achieve the goals of improving human life by answering fundamental research questions.

Edmondo Orlotti

AI Business Development Manager,
Hewlett Packard Enterprise

Hewlett Packard Enterprise

Talk Title:

SUPERCOMPUTING FOR THE EXASCALE COMPUTING ERA

Short Description

Cray AI Development Environment is a machine learning training platform that makes building machine learning models fast and easy. The software platform enables Machine Learning Engineers and researchers to:

· Train models faster using state-of-the-art distributed training: by provisioning machines, setting up networking, optimizing communication between machines, efficient distributed data loading, and fault tolerance.

· Automatically find high-quality models with advanced hyperparameter tuning: including state-of-the art algorithms developed by the creators of Hyperband1 and ASHA2

· Efficiently utilize different accelerators (e.g. GPUs): with intelligent and configurable resource management.

· Track, reproduce, and collaborate on experiments: with automatic experiment tracking that works out-of-the-box, covering code versions, metrics, checkpoints, and hyperparameters.

As an end-to-end training platform, the system integrates these features into an easy-to-use, high-performance Machine Learning and Deep Learning environment that can be deployed on bare metal, Kubernetes, or the cloud, supporting the largest providers such as AWS, Azure, and GCP.

Prof. Rashid Mehmood

Director of Research, Training, and Consultancy, HPC Center,
King Abdulaziz University

Talk Title:

Smartization of Societies: High-Performance Ingredients and Examples.

Short Description

Smartization of our societies and living spaces could enable a sustainable future for us humans due to its data-driven analytics approach and its focus on the triple bottom line (TBL) -- social, environmental, and economic sustainability. Precisely, smartization relies on collecting data and making informed decisions on policy and action using cutting-edge technologies such as the internet of things (IoT), big data, artificial intelligence, cloud, fog, edge, and distributed computing.

In this talk, I would review some of our research at KAU on bringing innovation through smartization of our environments.

Wolfgang Mertz

Chief Technology Officer Unstructured Data Solutions
at EMC, Dell

Talk Title: AI & HPC in Healthcare.

Short Description

Medicine and Healthcare are on a transition from a “one size fits all” treatment for a given disease to a more patient centric pathway. This is called “Precision Medicine” or “Personalized Medicine”. Key to this is analyzing and utilizing the vast amount of healthcare data available. Some of the algorithms used are not only data intensive but also computer intensive and utilize HPC systems. This session will give an overview of those trends in healthcare.

Dr. Sunday Olusanya Olatunji (Aadam)

Associate Professor at CCSIT, IAU

Talk Title: Hybridized 'HPC - Ensemble ML' Towards Making Data Speak More Clearly: A Unique Paradigms Union as panacea for Improved Medical Research & Solutions.

Short Description

The continuous need for improved medical research cannot be over emphasised considering the threat of different variants of diseases, known and unknown, that continued to plague the World due to several reasons. Artificial Intelligence techniques have been gaining ground, especially different variants of machine learning algorithm for effective and early diagnosis of various diseases. However, there have been several challenges mitigating against taking full advantages of these latest AI technologies, and foremost of these is the "heterogeneous nature of patient healthcare records in formats and location". Presently researchers mostly focused on one of the specific types of datasets (e.g. clinical data, CT scan output, MRI, notes, etc.) to develop the target predictive solution or any other AI based solutions. This will not allow us take full advantages of the various types of datasets simultaneously, hence, the need to bring in the concepts of ML ensembles that allow different models to be built using different algorithms or different data types or combination of both in unique ways and then those different models can be made to cooperatively and collaboratively unite to achieve the final decision with better performance. Ensemble ML has been established as the best way to take advantage of various AI and ML solutions with several real-life competitions that have demonstrated the superiority of this unique variant of ML paradigm. However, despite the huge potency and power of ensemble techniques in achieving better outcomes always, there is the challenge of running into computational complexity problem as the number of models to be combined increased. The use of superior computing resources to be able to facilitate combining several individual solutions (sometimes hundreds of different solutions needed to be combined) into a single cooperative entity called ensembled solution that will always achieve better outcome is a big buttle-neck.

Therefore, considering the power and advantages presented by HPC, it portends that a careful and systematic coupling of the use of ensemble technique with the superior HPC powers and advantages will go a long way in resolving this computational power challenges of the ensemble ML thereby ushering into the World the unique "HPC-Ensemble ML" as a unique panacea to achieving sustainable and improved medical research and solution deliveries.

Sven Breuner

Field CTO, VAST Data

Talk Title:

Addressing the Exascale storage challenge.

Short Description

VAST Data's managed storage software unlocks the value of data and 31odernizes datacentres in preparation for the era of AI computing. VAST delivers real-time performance to all data and overcomes the historic cost barriers to building all-flash datacentres. Since its launch in February 2019, VAST has become the fastest-selling infrastructure startup in history. Join Sven Breuner during this session to learn more.

Muneera M. Almuhaidib

Computer Operating System Specialist, Saudi Aramco

Talk Title:

HPC Cybersecurity benchmark.

Short Description

This presentation shares the outcomes of a research project on HPC cybersecurity posture that was done recently by Saudi Aramco. The main purpose was to see what other main HPC centers are doing in terms of security. The presentation covers the research problem, objectives, survey, benchmarking, and feasible ways to enhance the ECC HPC security.

Balamurugan Ramassamy

Director HPC APAC & GCC Countries, Altair

Talk Title:

Multi-dimensional HPC: A deep-dive into the Convergence of HPC and AI

Short Description

High performance computing (HPC) and artificial intelligence (AI) are converging. This requires administrators to manage both workloads together in an unsiloed environment. This presentation will illustrate how PBS Professional the industry's leading job scheduling and workload management solutions together with other HPC Tools can be used as a unique scheduler both for HPC and Kubernètes. We will also explore integration with the most important AI tools.

Walid Shaari

Cloud Architect, Saudi Aramco

Nora Alwadaah

HPC Specialist, Saudi Aramco

Talk Title: Cloud-native HPC use case

Short Description

This presentation will present the available HPC cloud-native services and how they can be utilized to showcase the smart modern way for running HPC applications securely and in a cost-effective way. We will introduce the scope and extent of the current state of HPC services in the cloud and how they provide the required building blocks to build the required infrastructure and services for HPC workloads. Innovating without Infrastructure Constraints, improving security and operational posture and enabling advanced workflows.

Merna Moawad

Software Engineer, BrightSkies Technologies

Talk Title:

Leveraging DAOS Storage System for Seismic Data Storage and Manipulation.

Short Description

The DAOS seismic graph is introduced to the seismic community, utilizing the evolving DAOS technology, to solve some of the seismic IO bottlenecks caused by the SEGY data formatthrough leveraging the graph theory in addition to the DAOS object-based storage to design andimplement a new seismic data format natively on top of the DAOS storage model in order to accelerate data access, provide in-storage compute capabilities to process data in place and to get rid of the serial seg-y file constraints. The DAOS seismic graph API is built on top of theDAOS file system(dfs) and seismic data is accessed and manipulated using the DAOS seismic graph API after accessing the root seismic dfs object. The mapping layer is perfectly utilizing the graph theory and the object storage to split the acquisition geometry represented by the tracesheaders away from the time-series data samples.

Obai Alnajjar

Pet Engrg Sys Analyst IV, Saudi Aramco

Talk Title:

Simulation Runtime Optimization via Auto-Tuning of Numerical Tolerances.

Short Description

The presentation will give an overview of Saudi Aramco efforts to optimize the runtime of numerical reservoir simulators. These efforts focused on optimization of the reservoir simulation model solver tolerances, global source code optimizations (e.g. complex well modeling, domain decomposition, MPI communication reduction), and HPC environment tuning. The presentation will shed the light on a new innovative approach to determine the optimum numerical solver tolerances by analyzing various parameters (e.g. pressure and saturation changes, material balance errors, etc.). This innovative approach has the potential to speed up the simulation runtime by up to 60%. This will result in improving the simulation runtime and allowing for accommodating more simulation runs to address the business requirements.

Rick Koopman

EMEA Technical Lead HPC and AI, Lenovo

Talk Title:

How to improve Biomedical Analytics while reducing Carbon Footprint.

Short Description

Rick will talk about recent Technology developments and work with customers on reducing runtimes and improving quality of results of Biomedical Analytics/Genomics workloads while also dramatically reducing the Carbon footprint of the Technology required to achieve these improvements.

Alanood Alrassan

Petroleum Engineer System Analyst, Saudi Aramco

Talk Title: Leveraging Artificial Intelligence to Optimize Reservoir Simulation HPC Environment.

Short Description

This presentation will give an overview of several AI algorithms that have been developed in-house to optimize the utilization of the reservoir simulation HPC compute resources. This development capitalizes on Deep Learning and Big Data Mining to accurately predict GigaPOWERS jobs' resources requirements (e.g. cores, memory & runtime). This is accomplished by predicting the optimal number of cores and memory requirements while maintaining an optimized runtime and ensuring maximum scalability. This effort helped to optimize the utilization of compute resources and significantly improve reservoir simulation KPI's (e.g. Job Wait Time, HPC effectiveness, etc.).

Dr. Nofe Ateq Alganmi
Assistant Professor, King Abdulaziz University

Talk Title: Increasing Diagnostic rate in Clinical Genomics Variant Interpretation using Aziz Supercomputer

Short Description

With the current knowledge of NGS (Next Generation Sequencing), its medical uses, and the relevant progress in information technology (such as high-performance computing), it is possible to imagine the near-future vision of ubiquitous medical software systems that will not only continuously support the "bench-to-bedside" transition but will also be available in custom toolboxes for all phases of diagnosis and treatment.

In this talk, promising results, and best practice in using King Abdulaziz university supercomputer (AZIZ) to apply genetics medicine in clinics will be presented.

Naya Nagy

Assistant Professor at CCSIT, IAU

Talk Title: Coding in the Entanglement Domain

Short Description

Quantum computers have the potential to both affect or intrude into existing systems as well as to build new, more versatile systems. This talk will address a few problems that cover both domains.

The first example comes from the process of bitcoin mining. A quantum computer of a reasonable size is proven to mine for bitcoins with a quadratic speedup, therefore consistently outperforming a strong parallel machine. Practical sizes of today's quantum computers are not reaching the necessary memory as yet.

The second example, claims that the photon is the ideal physical support to transmit information, as it has the maximum speed of transmission possible. Polarization of a photon is the predominant quantum property used to encode information, but other encoding domains have been considered. In this talk, we put forward the entanglement degree of freedom of a photon as an exploitable resource for encoding information in quantum cryptographic protocols. We show an application of this concept in steganography. A quantum image can hold a hidden message in the entanglement domain while the original image is not changed at all, not even minutely. This is unlike the classical method.

The end of the talk will describe the state of the art on existing quantum computers: size, capacity, and the price of the quantum race.

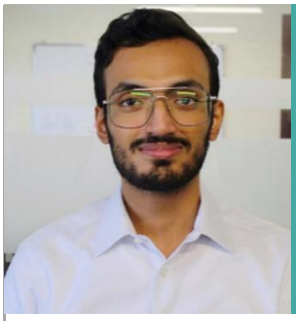
Dr. Rayan Mosli

Assistant Professor at King AbdulAziz University

Talk Title:
Aziz HPC Centre.

Short Description

This talk will present HPC facilities at Aziz.



Badr Badghaish

Geophysicist IV, Saudi Aramco

Talk Title:
Leveraging High Performance Computing for Big Data Processing.

Short Description

Datasets such as 3D seismic datasets are typically enormous and are therefore computationally expensive to generate seismic attributes on. They may also contain noise, which can degrade the results of interpretation algorithms and computed seismic attributes. As a result, powerful filtering algorithms such as Non-Local Means (NLM), are required to produce noise-reduced and structurally-preserved results. Such powerful algorithms are computationally intensive for large seismic datasets and would therefore benefit significantly from hardware acceleration.

Zeeshan Kamal Siddiqi

HPC/AI Technical Sales – META at Lenovo

Talk Title: Genomics Optimization and Scalability.

Short Description

Did you know that Lenovo helps Genomics researchers analyze a whole human genome in 53 minutes, and whole exomes in about a minute? In fact, in standard cloud or on-prem environments the same analysis usually takes 60-150 hrs.! That means Lenovo GOAST, a Genomics Optimization and Scalability Tool, is 167X faster than standard environments. Accelerated execution speeds mean your users get to process more genomes concurrently, find answers faster, and make breakthroughs that save more lives.

GOAST leverages an architecture of carefully selected hardware to accelerate genomics performance. Lenovo uses the open-source tools your scientists know and trust yet tuning them precisely to maximize the use of a CPU-based architecture. This design choice uses standard Off The Shelf (OTS) components–no GPUs or FPGAs of any kind. A CPU-based infrastructure and open source tools mean costs 50% lower than other solutions requiring GPUs and proprietary software licenses.

What's more? The Lenovo Genomics R&D group has already done the work for you so your users can focus on their science, and you on supporting them on their goals. And unlike DIY solutions, GOAST gives you access to a turnkey, pre-optimized set-up delivering high-performing results from day one.

Mohamad Jaghoub

Senior Field Application Engineer for AMD META, AMD

Talk Title: Accelerating your HPC journey.

Short Description

AMD technologies has been gaining momentum in HPC space, this session will talk about the technologies that AMD is developing to support accelerating your HPC and AI use cases, this includes 3D-Vcache technology, GPUs and adaptive computing.

Laurent Thiers

Vice President at DataDirect Networks

Talk Title: Accelerating Intelligent Infrastructure for a Changing World.

Short Description

Post-pandemic world: Corporate Investments in AI hit a record High, and Artificial Intelligence Dramatically Shifts the Boundaries of Traditional Computing and Analytics. Data has become a necessary strategic tool, which must deliver accurate real time insight into any enterprise's business, customers and changing market conditions. Existing IT and data storage systems inadequate to handle the very high speed and massive scale requirements of AI and Analytics.

To succeed in today's AI-driven world, a new high-performance data-centric IT approach is an absolute necessity:

- Data is the Source Code of AI
- Data is Imperative to AI
- Storage is Imperative to AI

Join our Technical Storage presentation and you will have no secrets why "DDN is the de facto name for AI storage in high-performance environments".

Mustafa Youldash

Assistant Professor, IAU

جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

Talk Title:

Taking Medical AI from Research to Clinical Production with HPC.

Short Description

Healthcare demands new computing paradigms to meet the needs for personalized medicine, next-generation clinics, enhanced quality of care, and breakthroughs in biomedical research to treat disease. Artificial Intelligence (AI) has the ability to revolutionize, and personalize) targeted healthcare for individual patients. The regulatory frameworks for AI in healthcare are a critical component in managing and maximizing accurate healthcare predictions.

The lifecycle of medical AI involves labeling medical imaging data (such as 2- and 3-dimensional scans like X-ray, CT and MRI data), training models, building and optimizing AI applications, and finally deploying and monitoring these applications in clinical production. In this session we will introduce a rich suite of HPC frameworks (and platforms) that can help researchers (and data scientists alike) label data and train top performing models rapidly.

Workshops

Workshops

Workshop–1: Data Science on HPC Platforms

Short Description: Methods in Machine and Deep Learning are being investigated to either augment or replace traditional simulation. Contemporary trends in hardware and software have enabled convergence of HPC and AI. In this workshop we survey these trends and explore what is available on system level and in software to ease the transition to developing data science workloads. The talks include a walk through the current hardware and system resources available to accelerate the Data science workflows. It is followed by the cataloging of software tools and frameworks available to develop ML/DL models, accelerate their training process and handle the associated data requirements at scale. Also presented will be some examples where communities (e.g. CFD and Geoscience), who traditionally rely on classical HPC simulations, leverage Data Science methods to accelerate their scientific investigations. Attendees are assumed to have no prior experience with ML/DL workloads.

Saber Feki

Sr. Computational Scientist Lead, KAUST

Speaker(s) profile:

Saber Feki leads the computational and data science and engineering at the KAUST Supercomputing Core Laboratory, providing support, training, advanced services and research collaborations with users of the leadership supercomputer Shaheen II Cray XC40 and a heterogeneous cluster “Ibex” with over 600 GPUs. Saber is passionate about technology, and enjoys working with users and technology vendors to plan and execute refreshes to KAUST HPC and AI infrastructure with the latest hardware and software technologies. He is leveraging his expertise to support and consult for several similar deployments for local and regional organizations such as the American University of Sharjah, and the National Center of Meteorology of Saudi Arabia.

Saber received his MSc and Ph.D. degrees in computer science from the University of Houston in 2008 and 2010, respectively. He then joined the oil and gas company TOTAL in 2011 as an HPC Research Scientist. Saber has been working at KAUST since 2012.

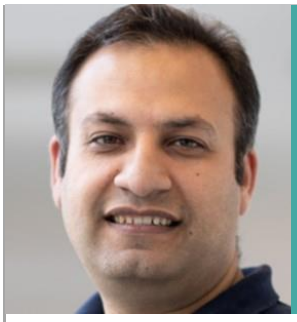
Didier Barradas Bautista

Staff Scientist, KAUST

Speaker(s) profile:

Didier Barrradas-Bautista is a staff scientist at the KAUST Visualization Lab in Saudi Arabia. He supports the ongoing research on machine learning and AI at the University by providing training to use computational resources and data science.

Didier has worked in bioinformatics and mathematical modeling using machine learning and high-performance computing. He is enthusiastic about the latest trends in machine learning and Artificial intelligence's impact on the world. He enjoys the insight provided by data science combined with the power supplied by HPC systems. Didier received this Ph.D. degree from the University of Barcelona in collaboration with the Barcelona Supercomputing Center in 2017.

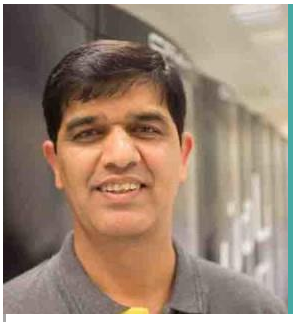


Mohsin Shaikh

Computational Scientist, KAUST

Speaker(s) profile:

Mohsin Ahmed Shaikh is a Computational Scientist at King Abdullah University of Science and Technology.



Rooh Khurram

Saff Scientist, KAUST

جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

Speaker(s) profile:

Rooh Khurram is working as a Staff Scientist at KAUST Supercomputer Lab at King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. He has conducted research in finite element methods, high performance computing, multiscale methods, fluid structure interaction, detached eddy simulations, in-flight icing, and computational wind engineering.

He has over 20 years of industrial and academic experience in CFD. He specializes in developing custom made computational codes for industrial and academic applications. His industrial collaborators include: Boeing, Bombardier, Bell Helicopter, and Newmerical Technologies Inc. Before joining KAUST in 2012, Rooh worked at the CFD Lab at McGill University and the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign. Rooh received his Ph.D. from the University of Illinois at Chicago in 2005. In addition to a Ph.D. in Civil Engineering, Rooh has degrees in Mechanical Engineering, Nuclear Engineering, and Aerospace Engineering.

Workshop–2: DPC++ Training Workshop

Short Description

Workshop introducing the DPC++ technology, targeting educating the audience about the ambitions behind it, how to write simple programs using it and some of the advanced features it offers. Data Parallel C++ is a high-level language designed for data-parallel programming. The intent is to provide developers with a higher-level language to use other than OpenCL and other languages, making programs portable across different architectures while keeping the ability to write hardware-specific kernels to optimize performance on different platforms.

Amr Mohamed Nasreldin Elsayed

HPC software Engineer, Brightskies Technologies

Speaker(s) profile:

Amr Elsayed is an HPC software engineer who's been working with Brightskies for 4 years. Originally a graduate from Alexandria University with a bachelor's in computer engineering, during his time with Brightskies contributed in multiple projects including multiple collaborations with Intel regarding leveraging DAOS filesystem for oil and gas workflows, as well as contributing in open-sourcing the first seismic imaging code based on DPC++ as well as assisting customers on-site offering consultancy on software design and optimization.

Workshop–3: Enabling and Democratizing MLops in Healthcare

Short Description

The implementation of AI-based systems is having increasing success in the Healthcare Industry, enabling technological advances for both diagnosis and treatment of clinical conditions, as well as for the optimization and improvement of the efficiency of healthcare facility management.

ML-based systems' R&D and deployment have seen the emergence of the so-called MLOps, a framework that aims to solve many of the organizational challenges related to the training and deployment phases.

The implementation of MLops framework also requires the development of SW platforms, which provide tools for development teams to simplify and optimize workflows by reducing potential bottlenecks due, for example, to the management and use of a complex HW and SW infrastructure for the prototyping and development of AI models.

Dr. Valerio Rizzo
AI Lead & Solution Architect, Lenovo

Speaker(s) profile:

Valerio is the AI Lead & Solution Architect for Lenovo, he is key member of an expert team of Artificial Intelligence, Machine Learning and Deep Learning specialists operating within the EMEA field sales organization and its business development team. He is a recognized expert in the fields of neuroscience and neurophysiology with 10 years of track record in brain research made between Italy and USA.

Workshop–4: Power, Application Efficiency and Challenges for a HPC Vendor

Short Description

This workshop consists of two modules.

Module 1: HPC drives innovation & discovery, but increasing demands for more performance are driving up the heat of next-gen HPC processors and accelerators. In this workshop we will learn about current and future cooling approaches and the challenges of balancing with sustainability requirements

Module 2: With all the advances in massively parallel and multi-core computing with CPUs and domain specific accelerators, it is often overlooked whether the computational work is being done in an efficient manner. This efficiency is largely determined at the application level and therefore puts the responsibility of sustaining a certain performance trajectory into the hands of the user. It is observed that the adoption rate of new hardware capabilities is decreasing and lead to a feeling of diminishing returns. At the same time, the well-known laws of parallel performance are limiting the perspective of a system builder. The presentation tries gives an overview of these challenges and what can be done to overcome them. It will also offer a CPU centric view of application performance at a very low level. The overview will be amended by a few case studies and optimization strategies on real applications.

DELL Technologies AMD

Jim Hearnden

Enterprise Technologist Data Centre Power & Cooling EMEA

Speaker(s) profile:

An Enterprise Technologist specialising in Data Centers, specifically Power & Cooling with long term experience of all types of Computer Hardware & environments. With a background in electrical, mechanical & electronic engineering & also a member of the BCS (was the British Computer Society)
Jim has worked in the IT industry for 41+ years, predominately in Professional Services for a variety of major companies, including Banks, Finance Houses, Telecomm Companies & hardware manufacturers. During this time, he delivered multiple projects involving data center builds & refurbishments as both Technical Authority & Project Manager.

Has now been with Dell for over 16 years, He undertakes consultancy & audit on Data Centre matters for Dell's customers as well as supporting Dell's sales force. Another area is partner support working with Dell's data centre infrastructure partners.

He has also completed & passed the ITIL Practioner exam, EU Code of Conduct for Data Centres exam & DCDs Energy Efficiency Best Practice certification. Together with being Dell's only certified EU CoC for Data Centre assessor. He has also authored articles that have appeared in various trade journals as well as appearing as a speaker at various trade shows. Jim has undertaken media training internally to enable him to both speak publicly & on social media on Dell's behalf.

Martin Hilgeman

HPC application specialist, Dell

Speaker(s) profile:

Martin joined Dell Technologies in 2011, after having worked as an HPC application specialist for 12 years at SGI and IBM. In 2019, he joined AMD as a senior manager and worked on porting and optimizing the major HPC applications to the “Rome” microarchitecture. Martin returned to Dell Technologies in May 2020 as the HPC performance lead and Distinguished Member of Technical Staff in Dell ISG. He owns a master’s degree in physical chemistry, obtained at the VU University of Amsterdam.

Workshop–5: Cray AI Development Software Environment for HPE SUPERCOMPUTING Workshop

Short Description

The HPE Cray AI Development Environment is a machine learning training platform that makes building machine learning models fast and easy. The software platform enables Machine Learning Engineers and researchers to:

- Train models faster using state-of-the-art distributed training: by provisioning machines, setting up networking, optimizing communication between machines, efficient distributed data loading, and fault tolerance.
- Automatically find high-quality models with advanced hyperparameter tuning: including state-of-theart algorithms developed by the creators of Hyperband1 and ASHA2
- Efficiently utilize different accelerators (e.g. GPUs): with intelligent and configurable resource
- management.
- Track, reproduce, and collaborate on experiments: with automatic experiment tracking that works outof-the-box, covering code versions, metrics, checkpoints, and hyperparameters.

As an end-to-end training platform, the system integrates these features into an easy-to-use, high performance Machine Learning and Deep Learning environment that can be deployed on bare metal, Kubernetes, or the cloud, supporting the largest providers such as AWS, Azure, and GCP.

Hewlett Packard Enterprise

Andrea Carboni

AI Solutions Engineer, Hewlett Packard Enterprise

Speaker(s) profile:

Andrea is a presales solution engineer for the AI Strategy and Solution Group.

Panel Discussion

Panel Discussion

on

High Performance Computing in Healthcare

Moderator:

Dr. Khalid Adnan Alissa, Dean ICT, Imam Abdulrahaman Bin Faisal University

Panelist:

1. **Dr. Dhabaleswar K. (DK) Panda**, Professor and University Distinguished Scholar, The Ohio State University
2. **Prof. Mohammed Saeed Saad Alshahrani**, MD, SSC-EM, MSED, FCCM, Emergency and Critical Care Departments, King Fahd Hospital of the University, Imam Abdulrahaman Bin Faisal University
3. **Dr. Rashid Mehmood,** Director of Research, Training, and Consultancy, HPC Center, King Abdulaziz University
4. **Dr. Saber Feki,** Sr. Computational Scientist Lead, KAUST
5. **Eng. Ahmed Al-Jeshi**, Saudi HPC
6. **Eng. Saeed Zahrani**, Senior Director of Cloud Engineering at CNTXT

Abstract:

In healthcare where time is life, the integration of the latest breakthroughs in high performance computing (HPC) into the biomedical research field speeds up the development of computationally expensive, neurocomputing methods, including machine learning, neural networks and its variant architectures, deep networks and multi-source healthcare data representation and learning. HPC has been used in healthcare for a long time such as in bioinformatics, genetics, human organs and body modeling, and much more. High performance computing (HPC) helps professionals accurately analyze their data and improve outcomes for patients, from discovering new drugs to finding the best tailored treatment options.

High Performance Computing (HPC) is a crucial technology that offers new opportunities, reshaping the way we receive and provide health services. The COVID-19 outbreak has further demonstrated that HPC is a major asset in fighting against the virus. High performance computing technologies are at the foreground to carry out and accelerate radical biological and medical breakthroughs that would directly translate into real benefits for society and environment.

This session brings together high-level experts to share their views about the way supercomputers could be used to address complex issues in health research. Reducing the time and cost of drug discovery, accelerating training of digital pathology images, mitigating pandemic, developing personalized medicine, improving the overall costs of health care are only few overall drivers for the use of HPC in health research to serve the community more efficiently. This discussion will highlight associated challenges, opportunities and make recommendations.

The panel discussion is structured as follows:

- Introduction of speakers and background information
- The panelist will provide his insight on the uses of HPC, digital pathology, pandemic mitigation, latest trends in medical research, and challenges etc (3-5 min).
- Q&A/discussion with attendees (20 min)

Moderator:

Dr. Khalid Adnan Alissa

Dean of ICT, Imam Abdulrahman Bin Faisal University (IAU).

Moderator Profile:

Dr. Khalid Alissa has a PhD in information security. He is currently an assistant professor at Imam Abdulrahman bin faisal university and a consultant in cybersecurity. He also works as the dean of information and communication technologies (CIO). Dr. Khalid won the prestigious award "Outstanding leadership" and manage to get first place in digital transformation in education sector in Saudi Arabia.

Panelists:

Dhabaleswar K. (DK) Panda

Professor and University Distinguished Scholar,
The Ohio State University

Panelist Profile:

DK Panda is a Professor and University Distinguished Scholar of Computer Science and Engineering at the Ohio State University. He serves as the Director of the newly-established $20M NSF-AI Institute, ICICLE (https://icicle.ai). He has published over 500 papers in the area of high-end computing and networking. The MVAPICH2 (High-Performance MPI and PGAS over InfiniBand, Omni-Path, iWARP, and RoCE) libraries, designed and developed by his research group (http://mvapich.cse.ohio-state.edu), are currently being used by more than 3,200 organizations worldwide (in 89 countries). More than 1.56M downloads of this software have taken place from the project's site. This software is empowering several InfiniBand clusters (including the 4th, 13th, 26th, 38th, and 39th ranked ones) in the TOP500 list. The RDMA packages for Apache Spark, Apache Hadoop, Memcached together with OSU HiBD benchmarks, and MPI4dask from his group (http://hibd.cse.ohio-state.edu) are also publicly available. These libraries are currently being used by more than 340 organizations in 38 countries. More than 43,000 downloads of these libraries have taken place. High-performance and scalable versions of MPI-driven runtimes for AI (Deep Learning Training and Machine learning (MPI4cuML)) are available from https://hidl.cse.ohio-state.edu. Prof. Panda is an IEEE Fellow. More details about Prof. Panda are available at http://www.cse.ohio-state.edu/~panda.

Mohammed Saeed Saad Alshahrani

Professor, Emergency and Critical Care Departments, King Fahd Hospital of the University, Imam Abdulrahaman Bin Faisal University.

Panelist Profile:

Professor Alshahrani is the Vice Dean for Hospital Affairs and Director General of the King Fahd Hospital of the University, and a professor at the College of Medicine-IAU.
He is the first Saudi national to hold full professorship title in Emergency Medicine and is ranked in the year 2022 as one of the top 10 highest publishing authors on a national level **(World Scientist and University Rankings 2022-AD Scientific Index)**
Dr. Alshahrani is a panel member of multiple critical care clinical practice guidelines and has published more than 80 articles in high impact journals like JAMA, NEJM, Critical Care, Annals of EM, and other international journals.
He is the current chairman of Critical Care Scientific Council at the Saudi Commission for Health Specialties and a Co-chairman of Guidelines, Saudi Critical Care Society.
Dr. Alshahrani holds a master's degree in Medical education and an on-going Executive MBA education.

Saber Feki

Sr. Computational Scientist Lead, KAUST

Panelist Profile:

Saber Feki leads the computational and data science and engineering at the KAUST Supercomputing Core Laboratory, providing support, training, advanced services and research collaborations with users of the leadership supercomputer Shaheen II Cray XC40 and a heterogeneous cluster “Ibex” with over 600 GPUs. Saber is passionate about technology, and enjoys working with users and technology vendors to plan and execute refreshes to KAUST HPC and AI infrastructure with the latest hardware and software technologies. He is leveraging his expertise to support and consult for several similar deployments for local and regional organizations such as the American University of Sharjah, and the National Center of Meteorology of Saudi Arabia.
Saber received his MSc and Ph.D. degrees in computer science from the University of Houston in 2008 and 2010, respectively. He then joined the oil and gas company TOTAL in 2011 as an HPC Research Scientist. Saber has been working at KAUST since 2012.

Prof. Rashid Mehmood

Director of Research, Training, and Consultancy, HPC Center,
King Abdulaziz University

Panelist Profile:

Rashid Mehmood is the Research Professor of Big Data Systems and the Director of Research, Training, and Consultancy at the High Performance Computing Centre, King Abdulaziz University, Saudi Arabia. He has gained qualifications and work experience from universities in the UK including Cambridge and Oxford Universities. Rashid has 25 years of experience in computational modelling, simulations, and design using computational intelligence, big data, high performance computing, and distributed systems. His broad research aim is to develop multi-disciplinary science and technology to enable a better quality of life and a smart economy with a focus on real-time intelligence and dynamic (autonomic) system management. He has published over 200 research papers including 6 edited books. He has organised and chaired international conferences and workshops including EuropeComm 2009, Nets4Cars 2010-2013, SCE 2017-19, SCITA 2017, HPC Saudi 2018, and DCAI 2022. He has led and contributed to academia-industry collaborative projects funded by EPSRC, EU, UK regional funds, and Technology Strategy Board UK with a value of over £50 million. He is a founding member of the Future Cities and Community Resilience (FCCR) Network, a member of ACM, OSA, Senior Member IEEE, and former Vice-Chairman of IET Wales SW Network.

Eng. Ahmed Al-Jeshi,

Board member of the Annual Saudi HPC/AI Conference

Panelist Profile:

Ahmed is currently a board member of the Annual Saudi HPC/AI Conference and the MEA HPC and AI Regional Director at Intel Corporation. In his current role, Ahmed handles the relationship with executives and technical decision makers in the Middle East and Africa region to help them ensure that they get the most out of their investment in HPC and AI Clusters as well as educating them on the latest trends in his field. He also helps those customers in designing the right solution to their HPC/AI problems and making sure that the solution is well-balanced and cost effective according to their needs. Ahmed's customers include customers with huge HPC/AI deployments who are listed in the top500 list of most powerful supercomputers in the world. He also works with different types of partners including OEM's, ISV's, CSP's, and SI's to either guide them to position/design the right solutions to their customers or to educate them on the latest trends.

Also, Ahmed has served in many boards throughout his career. Currently, he is a board member and the Technical Chair of the Annual Saudi HPC/AI Conference and a board member of the Enterprise Board of Advisors for KFUPM COE Department.

Prior to joining Intel, Ahmed worked for Microsoft where he was also leading their HPC efforts in the MEA region and then he was appointed as Commercial Sector Accounts Manager in Saudi Arabia. Before that, Ahmed worked at Power and Water Utility Company for Jubail and Yanbu (Marafiq) and SBM in different technical and managerial roles.

Ahmed holds a Bachelor's Degree in Computer Engineering with Honors from King Fahd University of Petroleum and Minerals in Saudi Arabia and an MBA Degree with Honors from University of Bahrain. He is currently attempting a second Master Degree in Business Analytics and Big Data from IE University in Madrid, Spain.

Eng. Saeed Zahrani

Senior Director of Cloud Engineering at CNTXT

Panelist Profile:

Saeed is currently a Senior Director of Cloud Engineering at CNTXT, a Saudi Aramco joint venture with a vision to accelerate digital transformation in the kingdom of Saudi Arabia. Prior to this, He worked as an IT Consultant, part of the EXPEC Computer Center Technology Planning team. His role involved architecting, and designing HPC solutions for Saudi Aramco Upstream business. In addition to his work at Saudi Aramco, Saeed is a member of the College of Computer Science and Information Technology advisory board at Imam Abdulrahman Bin Faisal University, and is the chairman of the annual HPC Saudi National Committee. Saeed's main interest is to spread technology knowledge and adoption in the kingdom, by helping to build collaboration between industry and academia. Saeed holds a Bachelor of Science degree in Computer Engineering from Oregon State University and a Masters in Computer Science from Sheffield University.

ORGANIZING COMMITTEE

Organizing Committee

Dr. Abdullah Mohammed Almuhaideb (Chair of the Organizing Committee)

Dr. Abdullah Ali Mohamed Alqahtani (Vice Chair of the Organizing Committee)

Dr. Nasro Min Allah (Chair of the Scientific Committee)

Dr. Naya Marius Nagy (Hackathon and Posters Coordinator)

Dr. Tufail Yousef Alyousef (Media and Public Relations Coordinator)

Eng. Saeed Hussain Zahrani (Saudi HPC national committee)

Eng. Ahmed Ali Al-Jeshi (Saudi HPC national committee)

Dr. Deemah Ali Al-Qahtani (Treasurer and Sponsors Coordinator)

Dr. Rami M Mohammad (Program/Keynotes Coordinator)

Dr. Dhiaa Abdulrab Ali Musleh (Exhibition Coordinator)

Dr. Irfan Ullah Abdur rab (Workshops Coordinator)

Dr. Mohammad Alsawwaf (Hackathon and Posters Coordinator)

Dr. Nehad Mohamed Ibrahim (Administration Coordinator)

Eng. Omar Khaled Alharbi (IT Coordinator)

Mr. Ahmad Mohammad Alabdallah (Graphic Designer)

Mr. Abdulrahman Mubarak Alkhaldi (Administration Coordinator)

Ms. Maryam Mohammad Aldossary (Hackathon and Posters Coordinator)

Ms. Reem Alassaf (Hackathon and Posters Coordinator)

Scientific Committee

Dr. Nasro Min Allah (Chair of the Scientific Committee)

Dr. Naya Marius Nagy (Vice Chair of the Scientific Committee for Competitions)

Dr. Saber Feki (Panel Coordinator)

Dr. Rami M Mohammad (Program/Keynotes Coordinator)

Dr. Irfan Ullah Abdur rab (Workshops Coordinator)

Administrative and Financial Committee

Dr. Abdullah Ali Mohamed Alqahtani (Chair of the Administrative and Financial Committee)

Dr. Deemah Ali Al-Qahtani (Treasurer and Sponsors Coordinator)

Dr. Dhiaa Abdulrab Ali Musleh (Exhibition Coordinator)

Dr. Nehad Mohamed Ibrahim (Administration Coordinator)

Mr. Hussain Ali Aldabous (Travel and Visa arrangements)

Conference Venue

D3, Imam Abdulrahman Bin Faisal University, Dammam, KSA

The main campus of Imam Abdulrahman Bin Faisal University (IAU) is located in Dammam—the largest city in the Eastern Province of Saudi Arabia. Dammam is an important Saudi port on the Arabian Gulf. Recently, it expanded to the limits of its modern neighboring towns—Al-Khobar and Al-Dhahran. Dammam is the home for world's most important centers for petroleum production and refining. The population of the region surpasses a million. IAU is located about ten kilometers from the Arabian Gulf, seven kilometers from the city of Al-Khobar, twenty kilometers from Dammam's province's administrative capital, and 45 kilometers from King Fahd International Airport.

9:00 AM

27–29
September 2022

Emergency Contact:

ccsit.hpc@iau.edu.sa

Building D3

Imam Abdulrahman Bin Faisal University, Dammam, KSA.

https://goo.gl/maps/fJDY69J62HGsi1ND9


22
HPC
SAUDI ARABIA
جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY
كلية علوم الحاسب وتقنية المعلومات
College of Computer Science and Information Technology