

Collaborations to ENable TRansnational cyberinfrastructure

Connecting Data, Applications and People in  
Smart Cyberinfrastructure and IoT

# CENTRA4 & PRAGMA36

Inspiring Insight for Data Ecosystem with  
AI & Big Data & High Performance Computing

Applications & Pacific Rim Application and Grid Middleware Assembly

Pacific Rim Application and Grid Middleware Assembly

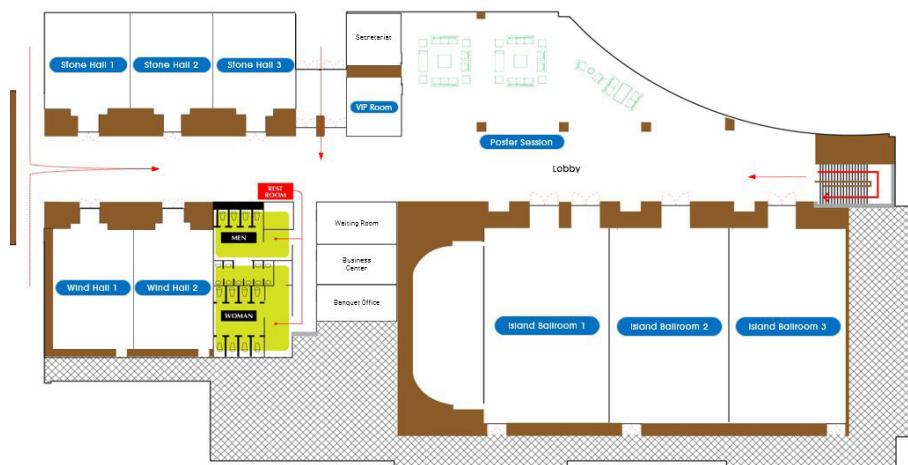
April 22(Mon)~27(Sat), 2019  
Phoenix Jeju, South Korea



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## Venue



## Shuttle

### Hotel > Phoenix

- \* Date : April 22(Mon)~26(Fri)
- \* Time : 1<sup>ST</sup> (08:00 AM), 2<sup>ND</sup> (08:30 AM), 3<sup>RD</sup> (09:00 AM) - It takes approximately 20 minutes (onetime)
- \* Course: Jeju Hotel Thira(Departure: 08:00,08:30,09:00) > Jeju Stay In Seongsan  
    > Sunrise Hotel Seopjikoji > Phoenix Jeju(Arrival:08:20,08:50,09:20)
- \* Date : April 27(Sat)
- \* Course: Jeju Hotel Thira(Departure: 06:40) > Jeju Stay In Seongsan  
    > Sunrise Hotel Seopjikoji > Phoenix Jeju(Arrival:07:00)

### Phoenix > Hotel

- \* Date : April 22(Mon)
- \* Time : 1<sup>ST</sup> (18:00 PM), 2<sup>ND</sup> (18:30 PM), 3<sup>RD</sup> (19:00 PM) - It takes approximately 20 minutes (onetime)
- \* Course: Phoenix Jeju(Departure: 18:00,18:30,19:00) > Sunrise Hotel Seopjikoji  
    > Jeju Stay In Seongsan > Jeju Hotel Thira
- \* Date : April 23(Tue)~26(Fri)
- \* Time : 1<sup>ST</sup> (19:00 PM), 2<sup>ND</sup> (19:30 PM), 3<sup>RD</sup> (20:00 PM)
- \* Course : Phoenix Jeju(Departure: 19:00,19:30,20:00) > Sunrise Hotel Seopjikoji  
    > Jeju Stay In Seongsan > Jeju Hotel Thira



# Welcome



It is a great honor to host this upcoming joint event of the 4th CENTRA (Collaborations to ENable TRansnational cyberinfrastructure Applications) and the 36th PRAGMA (Pacific Rim Applications and Grid Middleware Assembly). On behalf of the Organizing Committee, my great colleagues in KISTI (Korea Institute of Science and Technology Information) and I would like to more than welcome everyone to Korea.

For the past more than 50 years, KISTI has been contributed to many sectors of Korea's science, technology and industry to get great achievements by providing the world-class supercomputing service, the global cooperative ultra-high-speed research network called KREONET (Korea Research Environment Open NETwork), and the largest information arsenal for science and technology in Korea. The KISTI's 5th generation of a supercomputer called Nurion was ranked the 13th on Top 500 list at Supercomputing Conference 2018 as of November 2018.

These days KISTI is focusing on the various activities of open access to computing and all the scientific data. We hope this joint workshop is beneficial to Korean research communities and also to various scientific communities to continue efforts for transnational cyberinfrastructure such as CENTRA and PRAGMA. We also hope to have a productive and wonderful gathering at Korea's most beautiful Jeju Island.

We really look forward to seeing you in Jeju on April 22nd - 27th, 2019.

Thank you very much.

President of KISTI,  
Hee-Yoon Choi

# CENTRA 4 Committee

## Program Chair

- **José Fortes**, Advanced Computing and Information Systems Laboratory (ACIS Lab), University of Florida, USA

## Program Committee

- **Te-Lung Liu**, National Center for High-performance Computing (NCHC), Taiwan
- **Renato Figueiredo**, Advanced Computing and Information Systems Laboratory (ACIS Lab), University of Florida, USA
- **Aimee Stewart**, Biodiversity Institute and Natural History Museum, The University of Kansas, USA
- **Christopher Stewart**, Computer Science & Engineering, The Ohio State University, USA
- **Jason Haga**, National Institute of Advanced Industrial Science and Technology (AIST), Japan
- **Shinji Shimojo**, Osaka University and National Institute of Information and Communications Technology (NICT), Japan
- **Fang-Pang Lin**, Cloud Computing and System Integration Division and Center of Excellence for Cyber Enablement of Applications (CECEA), National Center for High-performance Computing, Taiwan
- **Rui Oliveira**, Associate Professor at the Informatics Department of University of Minho and Member of the Administration Board of the Institute for Systems and Computer Engineering, Technology and Science (INESCTEC), Portugal
- **Beth Plale**, Data to Insight Center of Pervasive Technologies, Indiana University Bloomington (personal website), USA
- **Woojin Seok**, Korea Institute of Science and Technology Information (KISTI), Korea

## Demo/Poster Committee

- **Jeonghoon Moon**, Korea Institute of Science and Technology Information (KISTI), Korea

## Local Committee

- **Woojin Seok**, Korea Institute of Science and Technology Information (KISTI), Korea
- **Joobum Kim**, Korea Institute of Science and Technology Information (KISTI), Korea
- **kiwook Kim**, Korea Institute of Science and Technology Information (KISTI), Korea



# PRAGMA 36 Committee

## Program Chair

- **Ruth Jongsuk Lee**, Korea Institute of Science and Technology Information (KISTI), Korea
- **Shava Smallen**, University of California, San Diego, USA

## Program Committee

- **Aimee Stewart**, KU Biodiversity Institute, USA
- **Nadya Williams**, University of California San Diego, USA
- **Fang-Pang Lin**, National Center for High-performance Computing, Taiwan
- **Peter Azberger**, University of California, San Diego, USA
- **Habibah A. Wahab**, Professor, Universiti Sans Malaysia
- **Renato Fuigeredo**, University of Florida, USA
- **Heru Suhartanto**, Universitas Indonesia, Indonesia
- **Sri C. Haryanti**, Universitas YARSI, Indonesia
- **Nurul Hashimah Ahamed Hassain Malim**, Universiti Sains Malaysia, Malaysia
- **José Fortes**, University of Florida, USA
- **Hongliang Li**, Jilin University, China
- **Susumu Date**, Osaka University, Japan
- **Hsiu-Mei Chou**, National Center for High-performance Computing, Taiwan
- **Shinji Shimojo**, Osaka University, Japan
- **Jason Haga**, National Institute of Advanced Industrial Science and Technology, Japan
- **Siddeswara Guru**, University of Queensland, Australia
- **Jelina Tetangco**, Advanced Science and Technology Institute, Philippine
- **Kum Won Cho**, Korea Institute of Science and Technology Information, Korea
- **Weicheng Huang**, National Applied Research Laboratories, Taiwan
- **Beth Plale**, Indiana University & National Science Foundation (NSF), USA
- **Grace Hong**, University of Florida, USA

## Demo Committee

- **Kohei Ichikawa**, National Institute of Advanced Industrial Science and Technology (NAIST), Japan
- **Sri C. Haryanti**, Universitas YARSI, Indonesia

## Student Poster and Lightning Talks

- **Wassapon Watanakesuntorn**, Nara Institute of Science and Technology, Japan

## Local Committee

- **Buyoung Ahn**, Korea Institute of Science and Technology Information (KISTI), Korea
- **Jaeou Chae**, CDSSE Co., Korea
- **Jaiho Oh**, Pukyong National University, Korea
- **James Junghun Shin**, Korea Institute of Science and Technology Information (KISTI), Korea
- **Jongseong Lee**, Korea Institute of Science and Technology Information (KISTI), Korea
- **Karpjoo Jeong**, Konkuk University, Korea
- **Soohong Lee**, Yonsei University, Korea
- **Soonwook Hwang**, Korea Institute of Science and Technology Information (KISTI), Korea
- **Sik Lee**, Korea Institute of Science and Technology Information (KISTI), Korea
- **Sungho Kim**, Konkuk University, Korea
- **Woojin Seok**, Korea Institute of Science and Technology Information (KISTI), Korea

# CENTRA4 Meeting Agenda

Connecting Data, Applications and People in Smart Cyberinfrastructure and IoT

Monday, April 22, 2019

09:00 Registration (and Poster Setup)

09:30 ~ 10:30 Plenary Opening and Flyby Session

Session Chair: Woojin Seok

Welcome remarks: Hee-Yoon Choi (President, KISTI)

Opening Talk/Keynote: "P4: Its Concept and Applications to Data Science"

Sangheon Pack (Korea University, South Korea)

Presentation: "CENTRA 4: Objectives, Partners and Desired Outcomes"

José Fortes (University of Florida, USA)

Kum Won Cho (KISTI, South Korea)

Fang-Pang Lin (NCHC, Taiwan)

Rui Oliveira (INESC TEC, Portugal)

Shinji Shimojo (NICT, Japan)

10:30 ~ 10:45 Group Photo

10:45 ~ 12:15 Plenary Dive-in Session 1: Ongoing Projects (15 mins each)

Session Chair: Shinji Shimojo

Project review: "Dynamically Aggregating Smart Community Sensors, Edge and Cloud Resources with Overlay VPNs"

Renato Figueiredo, Ken Subratie, Saumitra Aditya, Vahid Daneshmand (University of Florida, USA)

Eiji Kawai, Hiroaki Yamanaka, Naomi Terada (NICT, Japan)

Glenn Ricart (US Ignite, USA)

Hyuk-Jae Lee (Seoul National University, South Korea)

Jingtao Sun, Tomoya Tanjo (NII, Japan)

Kohei Ichikawa (NAIST, Japan)

Ryousei Takano (AIST, Japan)

Susumu Date, Takuda Yamada, Yoshiyuki Kido (Osaka University, Japan)

Project review: "SDN-IP Peering for IoT Data Transmission"

Te-Lung Liu, Grace Hui-Lan Lee, Jen-Wei Hu (NCHC/NARLabs, Taiwan)

Shinji Shimojo, Naomi Terada, Yoshihiko Kanaumi, Eiji Kawai (NICT, Japan)

Yasuaki Shinzato, Fukumasa Morifuji, Hirofuyu Noguchi (OOL, Japan)

Chu-Sing Yang (NCKU, Taiwan)

Chien-Chao Tseng (NCTU, Taiwan)

Joe Mambretti, Jim Chen, Fei Yeh (iCAIR, USA)

Jelina Tetangco, Jay Combinido, Peter Banzon, Christian Matira, Jon Perdon (ASTI, Philippines)

Linh Truong Dieu, Binh Minh Nguyen, Ngo Hong Son (HUST, Vietnam)

Phạm Dinh Lam (VNU, Vietnam)

Chalermpol Charnsripinyo (NECTEC, Thailand)

Luke Jing Yuan (MIMOS, Malaysia)

**Project Review: "AVAU Applications for Smart Agriculture"**

Ming-Der Yang, Hui Ping Tsai, Cloud Tseng, Yu-Chun Hsu (National Chung Hsing University, Taiwan), Christopher Stewart (Ohio State University, USA)

**Project Review: "Edge-Net.org"**

Glenn Ricart, Rick McGeer (US Ignite, USA)

Justin Cappos (NYU, USA)

Timur Friedman (UPMC Sorbonne Universités, France)

Albert Rafetseder (Universität Wien, Austria)

Ada Gavrilovska (Georgia Tech, USA)

John Kubiatowicz (UC Berkeley, USA)

Matt Hemmings (University of Victoria, Canada)

Bithika Khargharia (US Consultant, USA)

Aki Nakao (University of Tokyo, Japan)

with inspiration and consultation from Toshio Asai (NICT), Charlie Catlett (Argonne Nat'l

Lab), Eiji Kawai (JGN-X), Renato Figueiredo (UFL), Jason Haga (AIST), Ken Subratie (UFL),

Ling-Jyh Chen (Academia Sinica), Matthew Delcambre (UL Lafayette), Maxine Brown

(UIC), Felix Wu (UC Davis), Shinji Shimojo (University of Osaka), Tho Nguyen (UVA)

**Project Review: "IT for Natural Disaster Management & Visualization Alliance"**

Jason Haga (AIST, Japan)

Jason Leigh (University of Hawaii, USA)

Maxine Brown (University of Illinois, Chicago, USA)

Bill Chang (University of Hawaii, USA)

**Project review: "Collaborative Lifemapper"**

James Beach, Aimee Stewart (University of Kansas, USA)

Hsiu-Mei Chou, Fang-Pang Lin (NCHC, Taiwan)

Jason Leigh (University of Hawaii, USA)

Michael Elliott (University of Florida, USA)

**12:15 ~ 13:15 Lunch (Koji, 1f)**

**13:15 ~ 14:30 Plenary Dive-in Session 2: Ongoing Projects and New Projects (15-mins each)**

Session Chair: Shava Smallen

**Project review: "AirBox: a participatory ecosystem for PM2.5 monitoring"**

Ling-Jyh Chen (Academia Sinica, Taiwan)

Shyhtsun Felix Wu (UC Davis, USA)

Shava Smallen (San Diego Supercomputer Center, USA)

Lim Hock Beng (Singapore University of Technology and Design, Singapore)

Charlie Catlett (Argonne National Laboratory, USA)

**Project review: "Privacy-preserving Cloud Computing for IoT"**

João Paulo, Rogério Pontes, Ricardo Macedo, Tânia Esteves (INESCTEC, Portugal)

Woojin Seok (KISTI, South Korea)

**Proposed project: "ScienceLoRa: The Wireless IoT Network & Service in KREONET for IoT**

Applications in Science"

Joobum Kim, Woojin Seok, Jaeseung Kwak, Kiwook Kim, Jeonghoon Moon (KISTI, South Korea)

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**Proposed project:** "Semi-Automated Emergency Response Systems"

Tam Chantem, Ryan Gerdes, and Kevin Heaslip (Virginia Tech, Virginia, USA)

Pamela Murray-Tuite (Clemson University, South Carolina, USA)

**Proposed Project:** "Data Science Platform for Scaling Collaborative Research"

Alípio Jorge, Susana Barbosa, Nuno Moniz, Helder Oliveira, João Vinagre (INESCTEC, Portugal)

14:30 ~ 15:00

**Break**

(Posters will be on display for viewing by attendees and presentation by their authors)

15:00 ~ 16:30

**Plenary Dive-in Session 3: New Projects (15-mins each)**

**Session Chair:** Rui Oliveira

**Proposed project:** "Development of a low-cost camera system for object recognition/tracking and its applications"

Hyuk-Jae Lee (Seoul National University, South Korea)

Jinsung Kim and Kyujoong Lee (Sunmoon University, South Korea)

**Proposed project:** "Smart and Connected Communities Testbed"

Glenn Ricart (US Ignite, USA)

**Proposed project:** "HPC Demand Response"

Jason Liu (Florida International University, USA)

Xingfu Wu (University of Chicago, USA)

**Proposed project:** "SCALE3: A resilient IoT data gathering and real-time data processing for safe community alerting"

Kyungbaek Kim (Chonnam National University, South Korea)

Nalini Venkatasubramanian (UC Irvine, USA)

Cheng-Hsin Hsu (National Tsing Hua University, Taiwan)

**Proposed project:** "Secure Data Collaborations Using GFFS"

University of Virginia

Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI, USA)

Indiana University (USA)

Water Resources University (Vietnam)

Vietnam National University – International University (VNU-IU, Vietnam)

Department of State - Mekong Water Data Initiative (USA)

**Proposed project:** "Researcher introduction: Social-Edge CPS: Social-Cyber-Physical Systems Meet Edge Computing"

Hana Khamfroush (University of Kentucky, USA)

16:30 ~ 17:00

**Tea break and Group formation for Ongoing and New Projects**

Attendees interact and declare intention to join existing and/or new projects. Writing boards are provided for researchers to write their names under the proposed projects. Project elaborations, planning and discussions by the resulting collaboration groups take place in the second and third day of the agenda

17:30 ~ 19:00

**Welcome Dinner (Koji, 1f)**



Tuesday, April 23, 2019

08:30 ~ 10:00

**Panel:** "What is good about CENTRA and how to make it better"

**Panelists:**

Joobum Kim (KISTI, South Korea)

João Paulo (INESC TEC, Portugal)

Eiji Kawai (NICT, Japan)

Aimee Stewart (University of Kansas, USA)

Ming-Der Yang (NCHU, Taiwan)

Subratie Kensworth (University of Florida, USA)

**Panel Chair:** Renato Figueiredo (University of Florida, USA)

10:00 ~ 10:30

**Break**

10:30 ~ 12:00

**Catch-a-project-and-group concurrent breakout sessions**

Participants of different projects gather in distributed rooms to continue the formulation and advancement of collaborations around existing and proposed projects

12:00 ~ 13:00

**Lunch (Koji, 1f)**

13:15 ~ 14:30

**Concurrent group breakout sessions**

Participants of different projects gather in distributed rooms to continue the formulation and advancement of collaborations around existing and proposed projects

14:30 ~ 15:30

**Group reports**

**Session Chair:** Fang-Pang Lin

Plenary session with three-minute reports by each project leader

15:30 ~ 15:45

**Break**

15:45 ~ 17:00

**Panel:** "Sustaining and growing CENTRA towards CENTRA 10"

**Panelists:**

Minsun Lee (Chungnam National University, South Korea)

Rui Oliveira (INESC TEC, Portugal)

William Chang (University of Hawaii, USA)

Peter Arzberger (University of California San Diego, USA)

Hiroaki Harai (NICT, Japan)

**Panel Chair:** Beth Plale (Indiana University)

17:00 ~ 18:00

**Demo Session**

Demo 1 (10min): SAGE2 Visualizer for Edge Computing, Image Processing, and Object Recognition

Demo 2 (10min): Virtual Time Machine for Reproducible Network Emulation

Demo 3 (10min): FPGA Implementation of a Simplified YOLO Algorithm for Real-Time Object Detection

18:30 ~ 20:00

**Dinner (Koji, 1f)**

Wednesday, April 24, 2019

09:30 ~ 10:00

**Invited talk**

**Session Chair:** Joobum Kim

**Invited talk:** "Management of Crop Using On-site Measurements",  
Kwang Soo Kim (Seoul National University, South Korea)

10:00 ~ 10:30

**Break**

10:30 ~ 12:00

**Catch-a-project-and-group concurrent breakout sessions**

Participants of different projects gather in distributed rooms to continue the formulation and advancement of collaborations around existing and proposed projects

12:00 ~ 13:00

**Lunch (Koji, 1f)**

13:30 ~ 15:00

**Concurrent planning sessions for each project**

Participants of different projects gather in distributed rooms to identify and plan technical tasks, deliverables, outcomes and meetings to accomplish before CENTRA 5

15:30 ~ 16:30

**Plenary Take-away session**

Plenary session with three-minute reports by each project leader on plans for follow-up work before CENTRA 5

16:30 ~ 17:00

**Announcements for Future CENTRA Events and Closing Remarks**

"CENTRA 5 Announcement", Rui Oliveira (INESC TEC, Portugal)  
"Closing Remarks", José Fortes (University of Florida, USA)

17:00 ~ 18:00

**CENTRA Advisory Board and Steering Committee meeting**

Restricted to members of the CENTRA Advisory Board

18:30 ~ 20:00

**CENTRA Farewell & PRAGMA Welcome Dinner (Bulteok BBQ, Behind Red Bldg(beach))**



# PRAGMA 36 Meeting Agenda

Inspiring Insight for Data Ecosystem with AI & Big Data & High Performance Computing

Wednesday, April 24, 2019

**PRAGMA Student Workshop** Chair : Wassapon Watanakesuntorn, NAIST

08:30 ~ 09:00	<b>Registration</b>
09:00 ~ 09:10	<b>Introduction</b>
09:10 ~ 09:25	<b>Architecture of Traffic Engineering Module for Programmable Data-Plane Routers</b> (Juan Sebastian Aguirre, Osaka University, Japan)
09:25 ~ 09:40	<b>IoT-based Agricultural Care System for Farmers</b> (Novian Gilang Bujana, Universitas YARSI, Indonesia)
09:40 ~ 09:55	<b>Visual DGLIM</b> (Michael Elliott, ACIS, USA)
09:55 ~ 10:10	<b>Sliding Windows Alghorithm As Data Augmentation On Histopathology Images For Convolutional Neural Network Training</b> (Toto Haryanto, Universitas Indonesia, Indonesia)
10:10 ~ 10:25	<b>Secure Data Collaborations Using GFFS</b> (Courtney Hill, University of Virginia, USA)
10:25 ~ 10:45	<b>Coffee Break</b>
10:45 ~ 11:00	<b>The Study of Applying Edge Computing to Music Recognition</b> (Suchanat Mangkhangjaroen, Thammasat, Thailand)
11:00 ~ 11:15	<b>Security Test of Indonesian E-Health Community Cloud Model, Test Bed on PRAGMA Cloud</b> (Arie Surachman, Universitas YARSI, Indonesia)
11:15 ~ 11:30	<b>Towards Optimal Resource Utilization in Data Centers using Long Short-Term Memory</b> (Kundjanasith Thonglek, NAIST, Japan)
11:30 ~ 11:45	<b>Enabling Smart Agriculture Applications with Edge Computing and Deep Learning</b> (Hsin-Hung Tseng, NCHU, Taiwan)
11:45 ~ 12:00	<b>Wrap-Up</b>
12:00 ~ 13:00	<b>Dinner (Koji, 1f), Dinner</b>

Wednesday, April 24, 2019

## PRAGMA Pre-Workshop

13:30 ~ 15:00 **PRAGMA Pre-Workshop 1 (PRAGMA Speakers)** (Chair - Shava Smallen, UC San Diego)

- (30min) Smart Campus (Shinji Shimojo, Osaka University, Japan)
- (20min) Pacific Research Platform  
(Nadya Williams, University of California San Diego, USA)
- (20min) Visualizing Biodiversity Analyses with Lifemapper  
(Aimee Stewart, University of Kansas Biodiversity Institute, USA)
- (20min) Novel test case of PRAGMA-enabled water quality forecasting  
(Cayelan Carey, Virginia Tech, USA)

15:00 ~ 15:20 **Coffee Break + NETWORKING**

15:20 ~ 16:40 **PRAGMA Pre-Workshop 2 (Local Speakers)**

(Chair - Weicheng Huang, National Applied Research Laboratories)

- (20min) IoT Technology and Service for Smart World  
(Dohyeun Kim, Jeju National University, South Korea)
- (20min) Introduction of KREONET based on ScienceDMZ and activities  
(Jeonghoon Moon, KISTI, South Korea)
- (20min) Urban Traffic Congestion Prediction using Deep Learning for Smart City  
(Hongsuk Yi, KISTI, South Korea)
- (20min) Challenges and Opportunities of Next-Generation Sequencing: a High Performance Computing Perspective (Hyojin Kang, KISTI, South Korea)

16:40 ~ 17:00 **Coffee Break + NETWORKING**

17:00 ~ 18:20 **PRAGMA Pre-Workshop 3 (Local Speakers)**

(Chair - Heru Suhartanto, Universitas Indonesia)

- (20min) Introduction to KISTI-5 Supercomputer, Nurion  
(JunWeon Yoon, KISTI, South Korea)
- (20min) Korean Research Data Platform (Sa-kwang Song, KISTI, South Korea)
- (20min) Parallel distributed genome analysis pipeline and large-scale genome data researches in KISTI (Junehawk Lee, KISTI, South Korea)
- (20min) Microservices, Infrastructure and Coordination (Martin Swany, Indiana University, USA)

18:30 ~ 20:00 **CENTRA Farewell & PRAGMA Welcome Dinner (Bulteok BBQ, Behind Red Bldg(beach))**



Thursday, April 25, 2019

## PRAGMA Workshop

08:30 ~ 09:00	<b>Registration</b>
09:00 ~ 09:20	<b>Opening Ceremony</b> (Chair - Ruth Lee, KISTI) <ul style="list-style-type: none"> <li>• Speech by Dr. Hee-Yoon Choi, President of KISTI</li> <li>• Speech by Dr. Peter Arzberger, PRAGMA Founder</li> </ul>
09:20 ~ 09:50	<b>PRAGMA Welcoming Statement</b> (Chair - Ruth Lee, KISTI) <ul style="list-style-type: none"> <li>• Speech by Dr. Shava Smallen, PRAGMA Chair</li> </ul>
09:50 ~ 10:20	<b>Working Group Update</b> (Chair - Ruth Lee, KISTI) <ul style="list-style-type: none"> <li>• Resource/Cyber Learning WG, Telescience WG, Bioscience WG</li> </ul>
10:20 ~ 10:50	<b>Coffee Break (Group photo + Networking)</b>
10:50 ~ 11:20	<b>Keynote Talk</b> (Chair - Bill Chang, University of Hawaii) <ul style="list-style-type: none"> <li>• Opportunities and Challenges of Ecological Observation in East Asia-Pacific Region (Eun-shik Kim, Kookmin University, South Korea)</li> </ul>
11:20 ~ 12:00	<b>Invited Talks (PRAGMA Speaker)</b> (Chair - Nadya Williams, UC San Diego) <ul style="list-style-type: none"> <li>• Introduction to CENTRA Activities (José Fortes, University of Florida, USA)</li> <li>• Open Science, FAIR data, and Cyberinfrastructure (Beth Plale, NSF, USA)</li> </ul>
12:00 ~ 13:00	<b>Lunch (Koji, 1f)</b>
13:30 ~ 14:30	<b>Invited Talks (Local Speaker)</b> (Chair - Beth Plale, Indiana University & National Science Foundation) <ul style="list-style-type: none"> <li>• Digital Twin for Design Education and Research in KAIST (Soonhung Han, KAIST, South Korea)</li> <li>• AI Platform Trends: Challenges or Services? (Jeongcheol Lee, KISTI, South Korea)</li> <li>• Modularization of Quantum Theories for Web Platform (Cheol Ho Choi, Kyungpook National University, South Korea)</li> </ul>
14:30 ~ 16:00	<b>PRAGMA Working Groups (WG) Breakouts Session 1</b> <ul style="list-style-type: none"> <li>• Resource &amp; Cyber Learning WG</li> <li>• Telescience WG</li> <li>• Bioscience WG</li> </ul>
16:00 ~ 16:45	<b>PRAGMA Lightening Talks</b> (Chair - Chiao-Ning Chuang, NCTU)
16:45 ~ 17:15	<b>Coffee Break + NETWORKING</b>
17:15 ~ 18:00	<b>PRAGMA Poster Session</b> (Chair - Wassapon Watanakesuntorn, NAIST)
18:30 ~ 20:00	<b>Dinner (Koji, 1f)</b>

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**Friday, April 26, 2019**

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### PRAGMA Workshop

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09:00 ~ 09:20	<b>Invited Talk 1</b> (Chair - Fang-Pang Lin, NCHC) • GSDC: Datacenter for Data-Intensive Research (Sang Un Ahn, KISTI, South Korea)
09:20 ~ 09:40	<b>Invited Talk 2</b> (Chair - Fang-Pang Lin, NCHC) • Taiwania 2 (Weicheng Huang, National Applied Research Laboratories, Taiwan)
09:40 ~ 10:00	<b>Invited Talk 3</b> (Chair - Fang-Pang Lin, NCHC) • iDigBio (Annika Smith, PhD student)
10:00 ~ 10:30	<b>Coffee Break + NETWORKING</b>
10:30 ~ 12:00	<b>PRAGMA Demo Session 1</b> (Chair - Sri C. Haryanti, Universitas YARSI)
12:00 ~ 14:00	<b>Lunch and PRAGMA Steering Committee Meeting (Koji, 1f)</b>
14:00 ~ 15:15	<b>PRAGMA Working Groups (WG) Breakouts Session 2:</b> • Resource & Cyber Learning WG • Telescience WG • Bioscience WG
15:15 ~ 15:30	<b>Coffee Break + NETWORKING</b>
15:30 ~ 17:00	<b>PRAGMA Demo Session 2</b> (Chair - Kohei Ichikawa, NAIST)
17:00 ~ 17:20	<b>Best Poster &amp; Best Presentation Award Ceremony</b> (Chair - Kundjanasith Thonglek, NAIST)
17:20 ~ 18:30	<b>Wrap up &amp; Closing Ceremony</b> (Chair - Jason Haga, AIST) • Steering Committee Report • Working Group Summary • Introduction of Next PRAGMA
18:30 ~ 20:00	<b>Farewell Dinner (Koji, 1f)</b>

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**Saturday, April 27, 2019**

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### CENTRA & PRAGMA Networking and Collaboration Day

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	<b>Pick-up point : 1F, Bella Terrace Orange, Phoenix Resort</b>
07:00 ~ 07:20	<b>Participants gather</b>
07:20 ~ 07:30	Departure from Phoenix Resort to Seongsan Ilchulbong Peak
07:30 ~ 09:30	<b>Seongsan Sunrise Peak(120')</b>
09:30 ~ 10:00	Departure from Seongsan Ilchulbong Peak to Bijarim Forest
10:00 ~ 12:00	<b>Bijarim Forest(120')</b>
12:00 ~ 12:30	Departure from Bijarim Forest to Seongeup Folk Village
12:30 ~ 13:30	<b>Lunch</b>
13:30 ~ 15:30	<b>Seongeup Folk Village(120')</b>
15:30 ~ 16:00	Departure from Seongeup Folk Village to Phoenix Resort



# Keynote of PRAGMA 36



**Eun-Shik Kim**

## Opportunities and Challenges of Ecological Observation in East Asia-Pacific Region

Professor  
Kookmin University

Dr. Eun-Shik Kim is currently a professor of forest ecology at Kookmin University, Seoul, Korea and is serving the International Association for Ecology (INTECOL) as President, the Asia-Pacific Biodiversity Observation Network (AP BON) as co-chair, and the National Institute of Ecology of Korea (NIE) as Non-Standing Director. For over last two decades, he has been working with Long-Term Ecological Research (LTER) network at global as well local levels and served the East Asia-Pacific Regional Network of LTER (ILTER-EAP) as Chair. He also served the Ecological Society of Korea (ESK) and the East Asian Federation of Ecological Societies (EAFES) as President. In addition to his efforts in networking research and people, his research theme covers the changes of biodiversity and ecosystem function under changing climate and environment. Recently, domestically, he is working with the people for the "The Environment, Ecology, Meteorology, and ICT Consilience Forum" and "e-Science Forum" and is interested in establishing ecosystem observation platforms in Korea. Dr. Kim earned his undergraduate and MS degrees in forest science from Seoul National University and MS, MPhil, and PhD degrees on Forestry and Environmental Studies from Yale University, USA. He worked at the National Institute of Forest Science and the National Institute of Environmental Research before he moved to Kookmin University in 1991.

After the speaker introduces the background for him to initiate ecological studies of the Korean fir (*Abies koreana*) forest on Mt. Hallasan, Jeju Island, Korea, the perspectives for the ecological observation at local and regional as well as global levels are presented in terms of relevance, history, and activities with such international initiatives as the Long-Term Ecological Research (LTER), Biodiversity Observation Network (BON), and ecological observatory networks. Opportunities and challenges coming from the international and societal needs in such initiatives as CDB, IPCC, and IPBES to address UN SDGs are identified and issues for the consilience of the disciplines of environment, ecology, meteorology, and ICT are discussed as the linkage bridging the gap between science in ecology and the society, where the cooperation with PRAGMA community could synergize the advancement of the disciplines. In this talk, the speaker introduces a specific study case where the information and communication technology can contribute to the advancement of ecological observation in East Asia-Pacific Region.



**Beth Plale**

## **Open Science, FAIR data, and Cyberinfrastructure**

Science Advisor, National Science Foundation and Professor  
National Science Foundation and Indiana University Bloomington

**Dr. Plale** is currently a program officer at the National Science Foundation in the United States working on open science. She is also a Full Professor in the Dept. of Intelligent Systems Engineering at Indiana University Bloomington who has authored over 150 peer-reviewed publications. She is founding Director of the Data To Insight Center and the HathiTrust Research Center, and past Science Director of Pervasive Technology Institute.

Dr. Plale's research interests are in data management, cloud computing, Big Data, and open science. Dr. Plale's postdoctoral studies were done at Georgia Institute of Technology. Her PhD is from the Watson School of Engineering at the State University of New York Binghamton. She is one of the two USA founding members of the Research Data Alliance (RDA), and served as inaugural chair of the RDA Technical Advisory Board (TAB). She received the Early Career award from the Department of Energy (DOE).

Open science is a global effort to make data emerging from scientific research available for broader research, societal, and economic uses. Prompting substantially effort globally, open science is inherent recognition of the intrinsic value of research data. Open science is frequently mistaken for open access. Open access data are freely available, free of cost or other barriers. Open science allows for limited forms of data availability, particularly for data that may need protections of privacy and intellectual property, protection of human research participants, etc.. In this talk I will discuss open science activities in the US including funding agency activities, connect that activity to developments largely in the EU around FAIR principles (data should be Findable, Accessible, Interoperable, and Reusable), and finally raise questions about the role of cyberinfrastructure in open science.

**Soonhung Han**

## Digital Twin for Design Education and Research in KAIST

Professor

KAIST

Soonhung Han is a professor of the graduate program of Ocean Systems Engineering of the Department of Mechanical Engineering (<http://me.kaist.ac.kr>) of KAIST ([www.kaist.edu](http://www.kaist.edu)). He is leading the Intelligent CAD laboratory (<http://icad.kaist.ac.kr>) of KAIST, the STEP community of Korea ([www.kstep.or.kr](http://www.kstep.or.kr)), ISO/TC184/SC4/JWG16 visualization of product data, and the Korea ICT Convergence Network (<http://kicon.org/>). His research interests include STEP (ISO standard for the exchange of product model data), VR for engineering design, and knowledge-based design systems. His domain of interests includes shipbuilding and automotive. More information can be found from his personal web page at <http://icad.kaist.ac.kr/>.

A short introduction on

- KAIST
- Computational Design Center of EDISON program of Korea Government
- iCAD Laboratory of KAIST
- Ongoing digital twin studies inside iCAD lab.



**Jeongcheol Lee**

## AI Platform Trends: Challenges or Services?

Senior Researcher  
KISTI

He received the B. S., M. S., and Ph. D. degrees in Computer Engineering from Chungnam National University, Daejeon, Korea, in 2008, 2010, and 2014, respectively. He worked as a Post-Doctoral researcher in the department of Computer Science at University of California at Los Angeles from 2015 to 2017. He joined the Center for Computational Science Platform, Korea Institute of Science and Technology Information (KISTI), and is currently working as a senior researcher. He is interested in Internet of Things, Wireless Sensor Networks, Computational Science, and Machine Learning.

Recently, Machine Learning as a Service, so-called MLaaS, has been paid much attention from almost every industry and research group. The main reason is that it does not require any network server, storage, even data scientist in order to build productive service models, except data itself. For example, the AutoML at Google can give you a precise model after uploading some image datasets and the SageMaker at Amazon gives you an automated model builder and parameter optimization tools. IBM has also collaborated with H2O driverless AI in order to give you very simple and fully-automated solutions for making ML models. It seems that data itself is becoming more significant than algorithms and its detailed optimizing techniques. Has the expert group no longer needed?

Meanwhile, crowdsourcing platforms such as Kaggle, DrivenData, or Innocentive offer prize money and data in order to create a best-effort ML model by competitions. For a skilled scientist who can handle machine learning algorithms to some extent, it is the smartest way to imitate and learn machine learning cases in his field using such a platform. At this point, what is the best choice for accelerating your research or business by using machine learning? The speaker introduces recent AI trends as well as the KISTI-ML platform and its next plan.

**Cheol Ho Choi**

## Modulization of Quantum Theories for Web Platform

Professor

Kyungpook National University

Dr. Cheol Ho Choi is currently a professor of chemistry at Kyungpook National University. For over 20 years, he has performed various researches including the developments of quantum chemical theories and their applications. Past research includes new methods of the multiscale quantum theories for condensed phase chemical reactions. With this, he investigated the surface chemical reactions on semiconductors. His current research interests are the descriptions of photon energy conversion processes by developing new quantum theories for electronically excited states and their dynamics. In addition, he recently got interested in the modulations of quantum mechanical software for the web platforms. Dr. Choi earned a PhD on Physical Chemistry from the Georgetown University, and did postdoctoral work at Iowa State University. He currently lives in Daegu, South Korea.

Due to the complexity of quantum mechanical theories, the developments of their computer software have been mostly done by few closed research groups. Consequently, their development speed is largely limited by the capacity of each groups. Furthermore, it has been difficult for the outside developers who do not belong to the groups, to implement new ideas to the existing software, without reinventing the wheel. If common components—and groundbreaking computational components of the future—could be generalized to work with any quantum software package, or much more preferably, if they could be modulized and easily accessed in a web platform, quantum mechanical software developments would be dramatically accelerated. This also implies that the entire development processes can take the full advantages of open source environments.

In this talk, we introduce our modulization efforts of the most popular quantum chemical program GAMESS in order to explore the possibility of its implementation as a web platform of computational science and engineering

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## GSDC : Datacenter for Data-Intensive Research



**Sang Un Ahn**

Senior Engineer

KISTI

Dr. Sang Un Ahn received a Ph.D in Subatomic Physics from Blaise Pascal University, Clermont-Ferrand, France in 2011 and in Nuclear and Particle Physics from Konkuk University, Seoul, Korea in 2012. He joined GSDC at KISTI since June 2012 and has been working for the construction and operation of WLCG Tier-1 Center for CERN ALICE experiment. He is also in charge of the computing services that help deal with large amount of data produced from SFX experiment using X-ray Laser equipment recently commissioned at Pohang Accelerator Laboratory. He is one of the core organizers of Asia Tier Center Forum, where Asian grid communities for LHC grid computing gather to discuss and seek solutions for their common issues. Also he is an active member of CHEP, the international conference on Computing for High Energy and Nuclear Physics, where all topics related to software development and computing infrastructure for not only HENP but also emerging data-intensive experiments around the world are presented and discussed.

GSDC (Global Science experimental Data hub Center) is a Korean government funded project started in 2010 given to Korea Institute of Science and Technology Information. It has supported international/national research projects that handling large scale of data is crucial for their success: for example, WLCG Tier-1/Tier-2 Center for CERN LHC experiments where the Higgs particle was discovered and fundamental matter interactions were revealed, and LDG Tier-3 Center for LIGO experiment where the gravitational waves were detected for the first time ever in human history. In this talk, the current status of GSDC project including its computing infrastructure and services as well as its plan to support domestic experiment big data produced from large research facilities are presented.



## Smart Campus

Director and Professor  
Osaka University Cybermedia Center

Shinji Shimojo received the M.E. and Ph.D. degrees from Osaka University in 1983 and 1986, respectively. He has been a Professor with the Cybermedia Center at Osaka University since 1998 and since 2015, he had been the director of the Center.

**Shinji Shimojo**

Current research work is focusing on Internet Architecture of IoT, HPC system using SDN (Software Defined System). He is a founding Member of a long term collaboration on grid middleware and applications, Pragma and had been hosted UCSD students in PRIME program. Won the Osaka Science Prize in 2005. Received the Minister of Internal Affairs and Communications Award in 2016 for his contribution to the technological advancement and utilization promotion about network technology. Member of IEEE and IEICE, and IPSJ fellow.



**Nadya Williams**

## Pacific Research Platform

Research Scientist

University of California, San Diego

Nadya Williams is a Research Scientist at the San Diego Supercomputer Center at UC San Diego. She served as a functional lead in the design, specification and evaluation of software architectures for the scientific computing environments focusing on high performance, high throughput and virtual environments for PRAGMA and NBCR projects at UCSD. She recently joined the technical team for the Pacific Research Platform.

Nadya has been a PRAGMA member from 2007 working on the PRAGMA cloud infrastructure and biodiversity expedition. She is currently a PRAGMA Co-PI and a Co-lead of the Resources working group.

The NSF funded The Pacific Research Platform (PRP) to the UCSD for 5 years starting October 1, 2015. It emerged out of the unmet demand for high-performing bandwidth to connect data generators and data consumers. The PRP is in its 3rd year of successfully bringing new, unanticipated science applications, as well as test new means to dramatically improve throughput. The PRP was scaled to be a regional program by design, mainly focusing on West Coast US institutions, although it now includes several long-distance US and transoceanic Global Lambda Integrated Facility (GLIF) partners.

There is demand from the high-performance networking and scientific communities to extend the PRP nationally, and indeed worldwide. The goal: to prototype a future in which a fully-funded multi-national Global Research Platform emerges

**Aimee Stewart**

## Visualizing Biodiversity Analyses with Lifemapper

Research Software Architect

University of Kansas Biodiversity Institute

Aimee Stewart is a Research Architect in the Biodiversity Institute of the University of Kansas with a background in Computer Science, GIS, and Remote Sensing. Stewart is the lead developer on the Lifemapper project, an evolving software platform that models individual species distribution and analyzes species diversity in multiple dimensions. Stewart is also a collaborator on the Biotaphy Project, which executes scalable workflows integrating biogeographic modeling from Lifemapper with species data from the iDigBio project and phylogenetic trees from the Open Tree of Life project. She has been actively involved in PRAGMA collaborations leading to the improved stability and reach of Lifemapper through packaging, virtualization, and scientific partnerships.

Lifemapper is a high-throughput, open-source modeling environment that enables biologists to create custom species distribution models for specimen occurrence data and multi-species Presence-Absence Matrices for biogeographic and community diversity analyses. Our latest Lifemapper module “Meta-Community Phylogenetic Analysis” or MCPA, integrates phylogenetic (evolutionary) trees derived from character and DNA analysis to test hypotheses for the determinants of present-day patterns of diversity by discriminating between ecological and evolutionary factors.

Our collaboration in PRAGMA led to packaging the software for the Rocks cluster toolkit, developed at SDSC, which in turn led to virtualization and consistent deployment for a variety of configurations and datasets, a shorter development cycle, and stronger software. We have deployed Lifemapper on a variety of virtual clusters, from small virtual clusters for testing at KU, to special-purpose virtual clusters for research or training at PRAGMA partner sites in Indonesia and Taiwan, to HPC environments such as the XSEDE resource Comet at SDSC.

With improved software and testing, we developed two new Lifemapper interfaces. The first is a web application for user-submission of single- or multi-species jobs. This web app submits a researcher-initiated analysis, then outputs the results of the analysis in the second, a downloadable “Results Package”, containing all data outputs and linked visualization tools for those outputs, that operates within a web browser.

Next steps will expand a) functionality, with new environments and dimensions for analyses, b) visualization options, by developing a native application for SAGE2, for data-intensive, local and remote collaborative visualization, and c) deployments with new collaborations and streamlined Comet deployment.



**Cayelan Carey**

## Novel test case of PRAGMA-enabled water quality forecasting

Assistant Professor

Virginia Tech

Dr. Cayelan Carey is an Assistant Professor in the Department of Biological Sciences at Virginia Tech, USA. Dr. Carey's research program broadly examines how humans are altering freshwater ecosystems, and in turn, how changing water quality alters human decision-making and management. Her lab strives to advance our understanding of freshwaters in a changing world by cultivating collaborative and interdisciplinary teams of scientists, managers, and other community members. Dr. Carey integrates a suite of different research approaches, including intensive field monitoring, data science, and modeling to understand the feedbacks between human activities and lake and reservoir ecosystems. Since 2015, Dr. Carey has been a proud member of the PRAGMA Lake Expedition and GRAPLE (GLEON Research And PRAGMA Lake Expedition) team. Dr. Carey received her A.B. in Environmental Biology from Dartmouth College and Ph.D. in Ecology from Cornell University and was a Fulbright Fellow at Uppsala University, Sweden.

Freshwater lakes and reservoirs around the globe are facing unprecedented levels of anthropogenic stress, resulting in increased toxic phytoplankton blooms, metal contaminants, and low oxygen concentrations that threaten water quality. To ensure safe drinking water in the face of global change, managers need real-time ecological forecasts to detect and predict when water quality thresholds will be exceeded so they can act rapidly to mitigate potential threats. In response, we have developed a forecasting system by embedding a secure, wireless sensor network in Falling Creek Reservoir, a drinking water reservoir in Roanoke, Virginia, USA, to improve freshwater management. High-frequency data on reservoir hydrodynamics, chemistry, and chlorophyll update daily simulations of a water quality model running in the cloud to create 15-day water quality forecasts for managers. These forecasts are being co-designed with reservoir managers to ensure that they provide useful decision support tools. Initial forecasts developed with an ensemble Kalman filter demonstrate that forecasts can successfully capture changes in water temperature and thermal stratification, which has provided important information to managers on which depths to withdraw water from the reservoir for treatment. By integrating virtual private networks (VPNs) for connecting distributed sensors and the cloud with automated model-data fusion, we envision that our system could serve as a prototype for ecological forecasting systems in other drinking water supply lakes and reservoirs globally.

Other authors: Renato J. Figueiredo, Paul Hanson, R. Quinn Thomas, Vahid Daneshmand, Bethany J. Bookout.



## IoT Technology and Service for Smart World



**DoHyeun Kim**

Professor

Jeju National University

Do Hyeun Kim received the B.S., M.S. and P.D degrees in Electronics Engineering from Kyungpook National University, Taegu, Republic of Korea, in 1988 and 1990, 2000 respectively. He joined the Agency of Defense Development (ADD), Korea, in 1990. Since 2004, he is currently a professor at the Department of Computer Engineering at Jeju National University, Republic of Korea. He also has collaborated with ETRI(Electronics and Telecommunications Research Institute) to develop novel IoT platform and applications. Current projects of interest include an optimization of problem and intelligent IoT orchestration for smart environments. His research interests include IoT(Internet of Things), optimization algorithm and context prediction.

Recently, IoT (Internet of Things) technology will continue to grow for autonomous connectivity, any spaces and user demand in smart world. New sensors and actuators are being developed and incorporated into everyday objects. We introduce current IoT technology and service trends. Also, we explain representative IoT technology and service of domestic and foreign industries will be examined. Moreover, the intelligent IoT technology and service development based on artificial intelligence are introduced for the future. The key elements of intelligent IoT are discussed, and future of IoT technology and service development will be discussed.



**Hongsuk Yi**

## **Urban Traffic Congestion Prediction using Deep Learning for Smart City**

Principal Researcher  
KISTI, Supercomputing Center

### CURRENT POSITION/INSTITUTION

Principal Research Scientist, Korea Institute of Science and Technology Information, Supercomputing Applications Center

Dr Hongsuk Yi has crucial contribution in Deep Learning application and AI computing at KISTI supercomputing center. He was director of KISTI intelligence infrastructure of technology research center. He is project leader for Development of deep learning urban traffic congestion prediction and traffic signal control solution system. His current research areas are :

1. Deep learning, AI, algorithm and applications
2. Smart cities and Traffic congestion Problem
3. Heterogeneous and distributed computing

### POTENTIAL COLLABORATION TOPICS

Big data analytics in Intelligent Transportation System (ITS) is becoming an emergent research which makes ITS safer, more efficient, and profitable. The aim of this study is to analyze big data-based traffic patterns for an urban city in ITS. Specifically, by using data visualization techniques for data mining, we propose a Deep Learning (DL) model for predicting traffic flow. In particular, the initial dataset has collected and generated from Vehicles Detection Systems (VDS) which are located in Daejeon, South Korea. Then, an LSTM-Recurrent Neural Network (LSTM-RNN) has been implemented for predicting traffic flow. Specifically, we customize 24 hours look-back as the size of window with 2 hours of the prediction. Experiments show promising result that is worth continuing to work on.

**Hyojin Kang**

## Challenges and Opportunities of Next-Generation Sequencing: a High Performance Computing Perspective

Principal Researcher

KISTI

Dr. Kang received his Ph.D. in Bioinformatics from the Korea Advanced Institute of Science (KAIST) and post-doctoral training at Baylor College of Medicine. His main research field is next generation sequencing based genome and transcriptome analysis. He recently collaborated with IBS to present a study that explains the difference in autism rates between men and women through autism model mouse transcriptome analysis. He is currently participating in the PCAWG project, international collaboration to identify common patterns of mutation in more than 6,000 cancer whole genomes from the International Cancer Genome Consortium (ICGC).

Due to the development of high throughput sequencing technology and the dramatic decline in sequencing costs, the rate of genomic data production has increased exponentially, and accumulated genomic data is expected to continue to increase in the future. However, the evolution of sequencing technology goes beyond Moore's Law, but the speed of computing performance and storage technology has not kept pace. Therefore, future bottlenecks in genomic data analysis for precision medicine will be data analysis cost using high performance computing (HPC), not production costs of sequencing data. There are a variety of HPC solutions depending on the requirements for analyzing genomic data; clusters, graphics processing units (GPUs), cloud computing platforms, and field-programmable gate arrays (FPGAs). Each approach differs in terms of technology, cost, performance, scalability, and ease of implementation. In order to create the era of precise medicine with personal genome sequencing data, experts from various fields should work together to find solutions in HPC that minimize bottlenecks in the NGS data analysis.



**JunWeon Yoon**

## Introduction to KISTI-5 Supercomputer, NURION

Senior Researcher  
KISTI

JunWeon Yoon is a senior researcher in the Department of Supercomputing Center at Korea Institute of Science and Technology Information (KISTI) since 2005. Also, he received M.S. and Ph.D. degrees in Department of Computer Science from Korea University.

High Performance Computing (HPC), a supercomputer, is composed of complex and diverse systems and software. He has been managing the hardware and system software in this field for several years. He also played a role in the introduction and construction of Nurion supercomputer, and he is still the operator of this system. His research interest fields are distributed computing, supercomputing, parallel filesystem, scheduling, etc.

The KISTI National Supercomputing center provides the supercomputers and expertise that help keep Korean science at the forefront of scientific development around the world. Supercomputers are the tools of today's inventors. This allows researchers to demonstrate science that was impossible only with theory and experimentation.

The world's 13th fastest performance supercomputer NURION has been launched at KISTI. The new version's computation speed amounts to 25.7 petaflops, which means it is capable of handling, within one hour, computation that requires seven billion people and 420 years. Its data storage capacity is 33.8 petabytes, meaning it is capable of storing 6.75 million HD films. In addition, it has a total of 570,020 cores and the total length of its system connection cables amounts to 132 kilometers. 12.37 million liters of water circulates through the entire system to cool it.

**Sa-kwang Song**

## Korea Research Data Platform

Principal Researcher

KISTI

Dr. Sa-kwang Song is a principal researcher and working for Research Data Sharing Center at Korea Institute of Science and Technology Information (KISTI), and also a professor at Dept. of Data & HPC Science at University of Science and Technology (UST), Korea. He received his Ph.D. degree in Computer Science at Korea Advanced Institute of Science and Technology (KAIST), Korea in 2011. He is currently responsible for building National Research Data Platform, which is a S/W platform for gathering, preserving, sharing, and utilizing research data especially in government-funded research institutes in Korea. His current research interest includes Deep Learning, Big Data, Artificial Intelligence, Text Mining, Natural Language Processing, Information Retrieval, and Semantic Web.

Recent evolutions in science and technology can be explained due to the large amount of research data and collaborative research activities between different disciplines. These are known as open data, open source, open access and open collaboration, which are the key factors of Open Science. The Open Science is the movement to make scientific research and its dissemination accessible to all levels of an inquiring society, amateur or professional. In order to lead the trend of Open Science, KISTI has been focusing on research data policy as well as technology for several years. As a result, KISTI has developed a Korea research data platform of efficiently and effectively sharing and utilization of research data. Those activities include legal system improvement, development of human resources & research communities, and construction of research data platform. In this talk, the functionalities of Korea research data platform as well as the related approaches to make it more extensible are covered.



**Junehawk Lee**

## **Parallel distributed genome analysis pipeline and large-scale genome data researches in KISTI**

Senior Researcher

KISTI

Dr. Junehawk Lee is currently a senior researcher of the Center for Supercomputing Applications in the Korea Institute of Science and Technology Information (KISTI). Dr. Lee has interests in bioinformatics and bioinformatics related computational algorithms and large-scale computing. Past research includes the development of biological research environments for HPC and the analysis of a large amount of genome sequence data from large-scale domestic and global genome projects like The Cancer Genome Atlas (TCGA) project. Currently, Dr. Lee is working on developing genome analysis pipelines and researching on large-scale genome analysis projects including Korean autism spectrum disease genome study in collaboration with Institute of Basic Science (IBS), Seoul National University Hospital (SNUH), and Korea Advanced Institute of Science and Technology (KAIST).

Dr. Lee earned a bachelor's degree in computer science from KAIST, Daejeon and a Ph.D. in bioinformatics from the same institute. He currently lives in Daejeon, Korea.

Genome sequences of life-beings harbor complex mechanisms of life including vital functions of a cell, the mechanisms of disease and etc. For the last 6 years, KISTI is working on supporting and collaborating with domestic and global researchers for analyzing an overwhelming amount of genome sequence data from various biological and medical sources. In this talk, I will briefly describe the characteristics of genome sequence data and its analysis pipeline. Then, I'll discuss our successful attempt to accelerate one of the most time-consuming steps of genome analysis pipeline, genome sequence alignment step, by parallelizing computation with a big-data framework and parallel distributed filesystem. And also, I'll briefly present our collaborative large-scale genomics researches at KISTI including cancer genome analysis and neurological disease genome analysis.



# List of Participants



## Muhammad Reza Aditya

Student  
Universitas YARSI



## Sebastian Aguirre Master Student, Osaka University

Sebastian is a Master student in Osaka University. He is affiliated to the Applied Information Systems Research Division under supervision of Professor Shinji Shimojo, at the Cybermedia Center. His research work is in the area of programmable computer networks. He also has interest in parallel programming, high-performance computers and computer graphics.



## Sang Un Ahn Senior Engineer, KISTI

I am a senior engineer in Global Science experimental Data hub Center at Korea Institute of Science and Technology Information. My responsibility is to manage and operate grid services for WLCG



## Sunil Ahn

Senior Researcher  
KISTI



## Peter Arzberger PRAGMA Steering Committee Member, UCSD

Peter Arzberger is the founding Chair of the PRAGMA Steering Committee and a founding member of the GLEON Steering Committee. He is interested in having students engaged in PRAGMA, GLEON and CENTRA activities.



## Arina Nurul Azizah

Student  
Universitas Indonesia



## Corey Baker Assistant Professor, University of Kentucky

Professor Baker is in the Computer Science department at the University of Kentucky where he leads the Network Reconnaissance (NetRecon) Lab. Dr. Baker's research interests are in the area of cyber physical systems, particularly, pragmatic applications and fundamental issues related to real-world resource availability in today's operating systems for D2D communication for IoTs and smart cities.



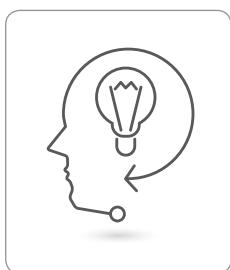
## Susana Barbosa Senior Researcher, INESC TEC

Susana Barbosa is a senior researcher at INESC TEC (Porto, Portugal). Her research is highly interdisciplinary in the general domain of geosciences and climate, with a strong emphasis on data science and time series analysis of environmental records.



## Maxine Brown Director, Electronic Visualization Lab, University of Illinois at Chicago

Maxine Brown, a member of CENTRA's Advisory Board, has research interests in visualization, collaboration, human-computer interfaces, high-performance computing, and international network infrastructure. As Director of the UIC Electronic Visualization Laboratory, she is responsible for fundraising, project management, documentation, and promotion of its research activities.



## Novian Gilang Bujana

Student  
Universitas YARSI



## Cayelan Carey Professor, Virginia Tech

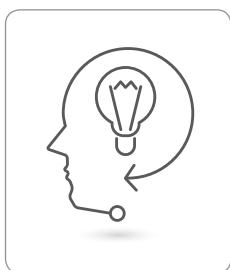
Dr. Carey's research integrates population, community, and ecosystem ecology to examine how natural and anthropogenic perturbations affect freshwater systems. A current research focus is on understanding how feedbacks between microbial and plankton taxa, food webs, and nutrient cycling can mediate ecosystem resilience to eutrophication and climate change.



## Huiseung Chae

Researcher

KISTI



## Lilian Chan

IT Manager

HKU



## Bill Chang Special Advisor, University of Hawaii

Special Advisor in the Office of Vice President for Research and Innovation, the University of Hawaii System. He served as the Head of East Asia and Pacific at the National Science Foundation and the Director of NSF China Office in Beijing and as the Science Counselor for Basic Science at the U.S. Embassy Beijing. He also served as the Professor of Aquatic Ecology at the University of Michigan.



## Thidapat Chantem Assistant Professor, Virginia Tech

Tam Chantem is an assistant professor in ECE at Virginia Tech. Her primary areas of research are embedded systems and cyber-physical system security, with focuses on hardware/software co-design of real-time embedded systems, energy-aware and thermal-aware system-level design, and cyber-physical systems (especially intelligent transportation systems). She received her Ph.D. and Master's degrees from the University of Notre Dame in 2011 and her Bachelor's degrees from Iowa State University in 2005. Before joining Virginia Tech, Chantem was an assistant professor in ECE at Utah State University. Chantem received a U.S. Air Force Research Lab Summer Faculty Fellowship, Utah State University's 2016 ECE Advisor of the Year, and 2011 Outstanding Research Assistant Award from University of Notre Dame. She has also served as the TPC co-chair (ISVLSI, ICESS, RTSOPS, and LPDC) and technical program committee for premier conferences such as RTSS, RTAS, ECRTS, DAC, and DATE.



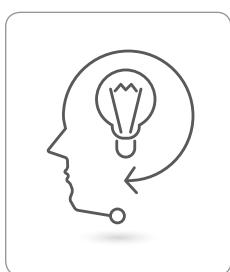
## Jim Chen Associate Director, iCAIR/Northwestern University

Jim Chen, Associate Director, International Center for Advanced Internet Research (iCAIR) at Northwestern University and Co-PI of NSF IRNC StarLight SDX project. Recently his focus areas include P4/SDN in network testbed and cloud testbed, Scalable AI testbed, high performance data transfer node(DTN), international data intensive science DTN, and Research Platform Integration.



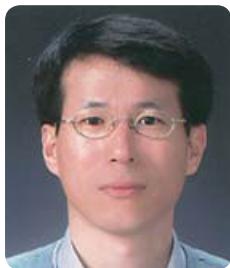
## Ling-Jyh Chen Professor, Academia Sinica

Ling-Jyh Chen is the PI of the AirBox project, which is a participatory IoT system for PM2.5 sensing. The project has deployed more than 4500 sensors in more than 35 countries. He is looking for collaboration on IoT, AI, security, and other exciting and related problems.



## Hajeong Cho

Senior Researcher, Student  
Chungnam national university



## Kum Won Cho Vice President, KISTI

Dr. Cho is the Vice President of Korea Institute of Science and Technology Information (KISTI). He has also been leading various initiatives at KISTI Supercomputing Center and National Institute of Supercomputing and Networking (NISN).



## Cheol Ho Choi Professor, Kyungpook National University

Dr. Cheol Ho Choi is currently a professor of chemistry at Kyungpook National University. For over 20 years, he has performed various researches including the developments of quantum chemical theories and their applications. Past research includes new methods of the multiscale quantum theories for condensed phase chemical reactions. With this, he investigated the surface chemical reactions on semiconductors. His current research interests are the descriptions of photon energy conversion processes by developing new quantum theories for electronically excited states and their dynamics. In addition, he recently got interested in the modulations of quantum mechanical software for the web platforms. Dr. Choi earned a PhD on Physical Chemistry from the Georgetown University, and did postdoctoral work at Iowa State University. He currently lives in Daegu, South Korea.



## HSIU-MEI CHOU Researcher, NCHC

Hsiu-Mei Chou is an associate research scientist at National Center for Highperformance Computing. Her research is mainly focus on data resources management and sharing. Hsiu-Mei has been working with scientific community such as GLEON (Global Lake Ecological Observatory Network) for building data sharing infrastructure since 2013.



## Chiao-Ning Chuang Student, National Chiao Tung University

Student, Institute of Data Science and Engineering, National Chiao Tung University, Taiwan. Research interests: Image Processing; Deep Learning.



## Susumu Date Associate Professor, Osaka University

Susumu is based at Osaka University. He is currently in charge of administration and management of supercomputing systems and services in the Cybermedia Center Osaka University. His current research interests are in the area of Grid and Cloud computing, networking and their applications.



## Nova Eka Diana

Faculty Member  
Universitas YARSI



## Michael Elliott

Graduate Assistant  
ACIS



## Arata Endo

Ph.D Student  
Osaka University



## Renato Figueiredo Professor, University of Florida

Renato Figueiredo is a Professor at the ECE Department, University of Florida, USA. His interests are in the areas of virtualization, distributed systems, overlay and software-defined networks, cloud and edge computing, as well as applications in support of smart and connected communities.



## Jose Fortes Professor, University of Florida

José Fortes is the AT&T Eminent Scholar and Professor of Electrical and Computer Engineering at the University of Florida where he is the Director of the Advanced Computing and Information Systems Laboratory. He is the principal investigator and Steering Committee Chair of the NSF-funded CENTRA project in the USA. His research focuses on the science and applications of smart cyberinfrastructure.



## Xava Grooms PhD Student, University of Kentucky

Xava Grooms is a first year PhD student at the University of Kentucky majoring in Computer Science and working in the Network Reconnaissance (NetRecon) Lab. Xava's research interests are networks, unmanned aerial systems, software defined networks, and delay tolerant networking. I am very driven, team oriented, and can think outside of the box.



## Gibeom Gu

Senior Researcher  
KISTI



## Jason Haga Senior Researcher, AIST

Jason Haga is a Senior Research Scientist at AIST. His past interdisciplinary, collaborative research work involved the design and implementation of applications for grid computing environments, tiled display walls, and cultural heritage institutions. Currently, his research interests include immersive visualization technologies for data analytics in a variety of domain sciences.



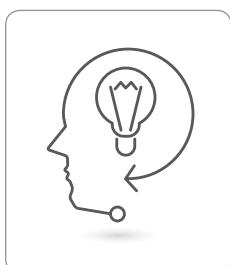
## Soonhung Han

Professor  
KAIST



## Paul Hanson Professor, University of Wisconsin

Paul is the co-chair of Global Lake Ecological Observatory Network (GLEON) and Distinguished Research Professor at U. of Wisconsin. His research interests include the role of lakes in carbon cycling at the regional watershed and global scales, ecosystem variability such as phytoplankton dynamics and lake modeling.



## henny febriana harumy

Student  
University Sains Malaysia



## Sri Chusri Haryanti Lecturer n Researcher, Universitas YARSI

Sri Chusri Haryanti is an academic and research staff of Faculty of Information Technology, Universitas YARSI, Jakarta, Indonesia. Her research interest are in the area of grid and cloud computing and also mobile ad hoc network.



### **Toto Haryanto** Student, Universitas Indonesia

I am Toto Haryanto. My bachelor's and master's degree were obtained from IPB University, Bogor. I am currently a doctoral student at the Faculty of Computer Science, University of Indonesia (UI). My current research interest is histopathological image processing using a deep learning approach and the use of GPU to accelerate histopathology image processing under the direction of Prof. Heru Suhartanto, PhD. During my time as a student I actively participated in research and seminar activities. One of the activities that I have participated in is the student mobility program funded by Erasmus + at University of Pardubice, Czech Republic from July to October 2018.



### **Courtney Hill** PhD Candidate, University of Virginia

Courtney Hill is a Ph.D. candidate in environmental engineering at the University of Virginia who focuses on low-cost ways to treat water in rural South Africa. Specifically, her research investigates the relationship between human health and access to silver embedded ceramics as well as other mechanisms by which silver can be used to treat water in low income areas. Previously, Courtney served as a Mirzayan Science and Technology Policy Fellow at the National Academy of Science through the InterAcademy Partnership, an organization that brings academies of science from all over the world together to make scientific recommendations to international bodies like the UN. Prior to her graduate studies, Courtney taught English at a high school in South Korea as a Fulbright Scholar. She is a National Science Foundation Graduate Research Fellow, a Jefferson Fellow, and a Ford Fellow.



### **Grace Hong** Research Coordinator II, University of Florida

Grace is the Research Programs Coordinator at the ACIS Lab, University of Florida. She coordinates various activities, social media outreach, webinars, meetings, membership/partnership development support for the Global CENTRA network ([globalcentra.org](http://globalcentra.org)) and other research administration processes for the ACIS Lab. She has been involved in PRAGMA, PRIME and GLEON activities since 2003.



### **YuChun Hsu** Student, NCHU

I am a research assistant at National Chung Hsing University, Taiwan. I am researching on UAV and Agriculture to identify the crop growth stage by machine learning.



### **Weicheng Huang** Research Fellow, NCHC

Research Fellow, National Center for High-performance Computing, Taiwan. My specialty includes parallel processing, grid, cloud, and big data.



### **Youngju Hur**

Senior Researcher  
KISTI



## Gyuhyun Hwang

Researcher

KISTI



## Kohei Ichikawa Associate Professor, NAIST

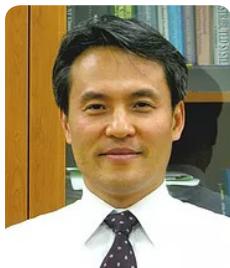
Kohei Ichikawa is an Associate Professor in Nara Institute of Science and Technology, Japan. His past research work involved middleware and applications for Grid, virtualized infrastructures and Software Defined Network testbed. He is currently working on the PRAGMA project, developing an international Software Defined Networking Testbed for use by the PRAGMA researchers.



## Inho Jeon

Researcher

KISTI



## Karpjoo Jeong

Professor

Konkuk University



## Jang jihoon

Senior Researcher

KISTI



## SUN JINGTAO Senior Researcher, National Institute of Informatics

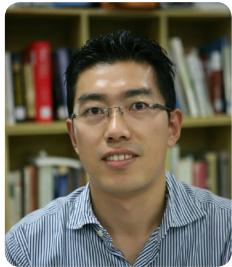
Jingtao Sun joined National Institute of Informatics(NII) of Japan and became a project researcher at the Information Systems Architecture Research Division since 2016 to now. He also hold the post of Lecturer in department of computer science in Tokyo University of Technology. His current research interests include distributed systems, inter-cloud, and IoT, privacy protection.



## Hyojeong Kang

Student

Chungnam national university



## Hyojin Kang Principal Researcher, KISTI

Dr. Kang is a principal researcher at the National Supercomputing Division in KISTI. His main research field is next generation sequencing based genome and transcriptome analysis by using high-performance computing (HPC).



## JI SUN KANG

Senior Researcher

KISTI



## Eiji Kawai Laboratory Director, NICT

Eiji Kawai has been conducting research and development of advanced networking technologies as director of Network Testbed R&D Laboratory. He is now interested in deployment of SDN/SDI technologies on large-scale network infrastructure for IoT applications.



## Hana Khamfroush Assistant Professor, University of Kentucky

Hana Khamfroush is an assistant professor at the computer science department of University of Kentucky, where she is leading the NETSCIENCE lab. Dr. Khamfroush's research includes mathematical modeling, analysis, and design of reliable and secure cyber-physical-social networks. Dr. Khamfroush also works on realization of mobile edge computing for future cyber-physical-social systems and IoT.



## Yoshiyuki Kido Associate Professor, Osaka University

Yoshiyuki Kido is an Associate Professor of the Cybermedia Center, Osaka University. His research field is computer science with bioscience and his current research interests include visualization, software defined networking, cluster computing and related information technologies. He is a member of IEEE CS and IPSJ.



### HanGi KIM

Senior Researcher  
KISTI



### Jaesung Kim

Researcher  
KISTI



### Joobum Kim Senior Researcher, KISTI

Joobum Kim is a senior researcher in the Advanced KREONET Center at the Korea Institute of Science and Technology Information (KISTI). He received his Ph.D. in Telecommunications Engineering at the University of Texas at Dallas in August 2016. His research areas of interest are Optical Networks, Queueing Analysis, Routing and Spectrum Allocation, and Internet of Things (IoT).



### Kihyun Kim

Researcher  
KISTI



### Kiwook Kim Senior Researcher, KISTI

Kiwook works in the Division of KREONET, Korea Institute of Science and Technology Information. He is interested in security and edge computing in IoT.



### Kyoungsook Kim Team leader, AIST

Dr. Kyoung-Sook Kim is the team leader of Data Platform Research Team at the Artificial Intelligence Research Center (AIRC) of AIST in Japan. I served as a researcher of National Institute of Information and Communications Technology (NICT) in Japan from Nov. 2007 to Mar. 2014. I received my B.S., M.S., and Ph.D. Degrees in Computer Science from Pusan National University in Korea in 1998, 2001, and 2007, respectively. She currently serves a co-chair of Moving Features SWG of the Open Geospatial Consortium (OGC). Her research interests are in Geo-enabled Computing Framework based on GIS, Location-based Services, Spatiotemporal databases, Big data analysis, Cyber-Physical Cloud Computing, etc.

**Nam-Gyu Kim** Senior Researcher, KISTI

Nam-Gyu Kim obtained his bachelor's degree and master's degree in computer science and engineering at Chung-Ang University in 2000 and 2002 respectively. And now he is a Ph.D candidate in management of technology at Sungkyunkwan university. And he has serving as senior researcher of Korea Institute of Science and Technology Information (KISTI) in Korea. He performed lots of SW R&D projects including the national e-Science project, the AMGA development project, and etc. Also he was the collaboration member of LIGO and KEK Belle projects as the site administrator to construct and manage the data grid site in Korea. Besides he participated in planning the second 5-year national supercomputing in 2017. At present he participates in EDISON (ED-ucation-research Integration through Simulation On the Net) project which is a web-based simulation service for education and research. He is interested in technical policies for HPC and computational science and engineering.

**Myoungju Koh**

Researcher  
KISTI

**Yejin Kwon**

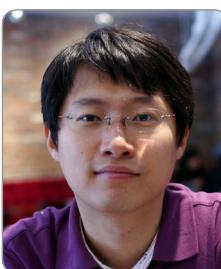
Researcher  
KISTI

**Eunsol Lee** Student, Konkuk University

I am Eunsol Lee. I am studying in Konkuk University, Seoul.  
I'm a member of the Smart Infrastructure Stream Lab. Thank you.

**Jeongcheol Lee**

Senior Researcher  
KISTI

**Joong-Youn Lee**

Principal Researcher  
KISTI



### **Junehawk Lee** Senior Researcher, KISTI

Juenhawk Lee is currently a senior researcher of the Center for Supercomputing Applications in the Korea Institute of Science and Technology Information (KISTI). Lee has interests in bioinformatics and bioinformatics related computational algorithms and large-scale computing.



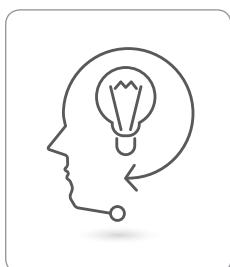
### **Minsun Lee** Professor, CNU

Minsun Lee is currently an Industry Cooperation Professor at the Chungnam National University in Korea. Her research interests include high-speed network applications, federated testbeds and advanced collaborative cyber-environments.



### **Ruth Lee** Director, KISTI

Ruth Lee is a Director of Center for Computational Science Platform at Korea Institute of Science and Technology Information (KISTI) since 2002. She is also an Adjunct Professor of Department of High Performance Computing at University of Science & Technology of Korea since 2005. Her research interests are Simulation based Cyber-Learning System for computational science and engineering, platform for computational science and engineering and so on.



### **Sang Gwon Lee**

Student  
KISTI



### **SANG MIN LEE**

Principal Researcher  
KISTI



### **Sehoon Lee**

Senior Researcher  
KISTI



## Inda Dwi Lestantri

Researcher  
Universitas YARSI



## Hongliang Li Associate Professor, Jilin University

Jilin University  
China



## Chengkui Liang

Student  
Konkuk university



## FANG-PANG LIN Senior Research Fellow, NCHC

Fang-Pang is based at the National Center for High Performance Computing. He is the division director for Cloud Computing and System Integration. His research interests are in the areas of distributed and parallel computing and numerical methods.



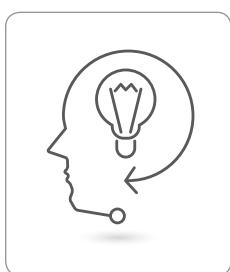
## Jason Liu Associate Professor, Florida International University

Jason Liu is an Associate Professor at Florida International University. His current research interests include parallel discrete-event simulation, performance modeling, computer systems, network infrastructures and testbeds, data analytics and machine learning. In particular, his research focuses on designing effective models and developing parallel simulation of large-scale systems.

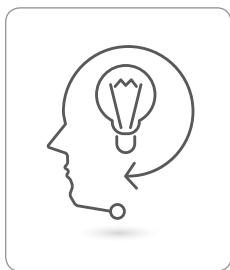


## Te-Lung Liu Research Fellow, NARLabs/NCHC

Dr. Te-Lung Liu works at National Center for High-Performance Computing (NCHC), Taiwan. He is a member of TaiWan Advanced Research and Education Network (TWAREN), with 100G domestic backbone and 20G international network links. Current research activities of TWAREN include SDN, DTN, and cloud networking.



**Yu Luo** Ph.D student, Indiana University Bloomington  
Indiana University, Bloomington



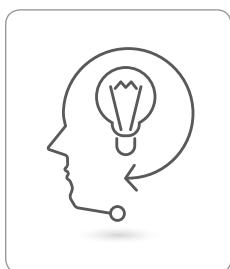
### **Suchanat Mangkangjaroen**

Master student  
Thammasat



**Yoshiyuki Masuda** Researcher, Osaka University

I'm a researcher at Osaka University. My interest is applying AI and IoT to equipment in office building for energy saving.



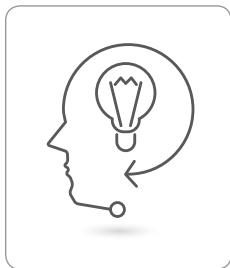
### **Kazuki Miyagoshi**

Student  
Osaka University



**Jeonghoon Moon** Senior Researcher, KISTI

- Leader of Network Development Team of KREONET Center, KISTI.  
Jeonghoon Moon is a senior researcher of Korea Institute of Science and Technology Information (KISTI), especially, working for Dept. Advanced KREONET Center which is Korea Research Environment Open Network as well as Network Engineering/Operation Center. Interested research areas include in ScienceDMZ & PRP, Network QoS & Network Engineering, Software Defined Network & Future Internet, Cloud Computing & Network Virtualization, Remote Collaboration and so on. Over the past decade, major research projects have focused on Network Resource Management & NSI implementation, StarLight & GLORIAD project in Korea, Cloud Computing & Remote Collaboration. Since 2015, focusing on ScienceDMZ & PRP/NRP project for development & deploy, expansion & activation in Korea. For especially, collaboration with NERSC/ESnet for Peta Scale DTN transfer project based on the 100GE environment between international. And also currently chair of APRP(Asia Pacific Research Platform) WG at APAN Meeting



### **Jeremy Musser**

Student  
Indiana University

**Hidemoto Nakada**

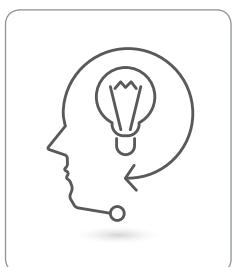
Engineering Researcher  
AIST

**Tho Nguyen**

Research Scientist  
University of Virginia

**HyunJi NOH**

Researcher  
KISTI

**Muhamad Nuh**

Student  
YARSU UNIVERSITY

**Rui Oliveira** Professor, INESC TEC

Rui Oliveira is Associate Professor at University of Minho and member of the board of INESC TEC. His main research contributions have been in the field of fault-tolerant agreement, epidemic algorithms and replicated database systems. He coordinates the H2020 SafeCloud project on secure processing in the Cloud. He serves on the SC of Global CENTRA and the Atlantic Interactions Research Centre.

**Noori On**

Researcher  
KISTI



### **Hyung Seon Park** Senior Researcher, KISTI

Early Ph.D majored in Immunopathology and Virology at University of Queensland, Australia. Served for more than 15 years as Korea national delegation and national Node Manager for OECD Global Biodiversity Information Facility. Professor in Data Science at University of Science and Technology Korea.



### **Parth Patel** Student, Parth

I'm an undergraduate student from the University of Florida working in the ACIS Lab. I currently work on projects concerning data visualization and image processing.



### **Joao Paulo** Senior Researcher, INESC TEC

Dr. João Paulo is currently a Researcher at INESC TEC. He obtained a PhD degree in Computer Science from University of Minho in 2015. His research focuses on large scale distributed systems with an emphasis on storage systems and data management. He has several publications on journals and international conferences, and has participated in various European and national projects.



### **Beth Plale** Professor, Indiana University

Dr. Plale is a Professor of Informatics and Computing at Indiana University where she directs the Data To Insight Center and serves as Science Director of the Pervasive Technology Institute. Research interests are in Big Data, long-term preservation and curation of scientific and scholarly data, large-scale data management, metadata and provenance, data trustworthiness and security, data-driven cyberinfrastructure and cloud computing.



### **Ummi Azizah Rachmawati** Researcher, Universitas YARSI

Dean of Faculty of Information Technology, Universitas YARSI Jakarta, Indonesia. Her main research interests are e-Health, Grid Computing, Social Network Analysis and e-Government. She has won some research grants on e-Commerce, e-Learning, e-Government, Social Network Analysis and e-Health.



### **Prapaporn Rattanatamrong**

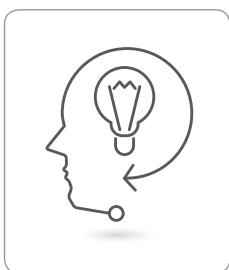
Lecturer

Thammasat University



### **Glenn Ricart** Founder and CTO, US Ignite

Glenn Ricart is PI for Smart Gigabit Communities working in 25 smart and connected communities to provide dozens of advanced technology applications and services. A key is advanced networking capabilities including low-latency and real-time communications coupled with edge computing capabilities. US Ignite also works with Northeastern U. on Platforms for Advanced Wireless Research (PAWR).



### **Rosini Rosini**

Researcher, Lecturer  
Universitas YARSI



### **Gimyeong Ryu**

Researcher  
KISTI



### **Woojin Seok** Principal Researcher, KISTI

Woojin Seok works for Korea Institute of Science and Technology Information(KISTI), and is the director of Advanced KREONET center. He is a committee member of Future Internet Forum(FIF) Korea and Asia Pacific Network Operation and Management(APNOM). His interesting research areas are ScienceDMZ, Software Defined Infrastructure, IoT Network, and so on.



### **Shinji Shimojo** Professor, Osaka University

Shinji Shimojo received the M.E. and Ph.D. degrees from Osaka University in 1983 and 1986, respectively. He has been a Professor with the Cybermedia Center at Osaka University since 1998 and since 2015, he had been the director of the Center.



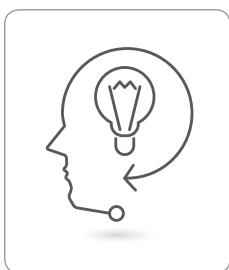
### **James Junghun Shin** Senior Researcher, KISTI

Dr. James Junghun Shin is an engineering researcher of computational science in KISTI. His concerns are computational and data driven works in the mechanical and aerospace domain.



### **Shava Smallen** Research Specialist, University of California, San Diego

Shava Smallen is a programmer at the San Diego Supercomputer Center at UC San Diego. Her research areas are cloud and distributed computing. She currently works on the international Pacific Rim Application and Grid Middleware Assembly (PRAGMA) project, developing a Cloud test bed scheduler and support tools to enable scientists to run application virtual clusters on PRAGMA cloud resources.



### **Annika Smith**

Graduate Student Research Assistant  
iDigBio



### **Sa-kwang Song**

Principal Researcher  
KISTI



### **Yeongheon Song** Student Researcher, M.Eng. Student, UST-KISTI

Yeongheon Song is a master's student at University of Science and Technology (UST), Korea, and he works as a student researcher at Korea Institute of Science and Technology Information (KISTI). His research interests include Blockchain technology, research data management and big data processing.



### **Aimee Stewart** Senior Software Developer, University of Kansas

Aimee Stewart (Kansas University) is the technical lead on the Lifemapper project, an open-source modeling environment that allows researchers to model species distribution or habitat suitability with species occurrence data from biological collections around the world, together with climatological and geological data, and most recently with phylogenetic (evolutionary) data derived from DNA sequencing studies.



### **Kensworth Subratie** PhD Candidate, ACIS University of Florida

PhD student at the ACIS Lab, University of Florida. My research interests are distributed storage systems, virtual networks, and software system design within the context of IoT and edge networks. My goal is to identify the computing infrastructure and platform necessary to support next-generation IoT and edge computing applications with their inherent requirements for low latency data access.



### **Heru Suhartanto** Professor, Universitas Indonesia

Heru Suhartanto is a Professor in the Faculty of Computer Science, Universitas Indonesia (UI). His research interests are distance learning, Cloud-Grid-High Performance Computing, particularly its application in computer drug design, image based cancer detection, and big data management. He is currently a member of Indonesian National Research Council, Assessor of National Accreditation Body and UI Senat. He is also the coordinator of Promotion and Demotion committee of UI Professor council.



### **Arie Surachman** Student, Universitas YARSI

A Fresh graduate student from YARSI University, Indonesia.



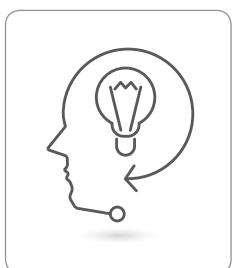
### **Ryousei Takano** Group Leader, AIST

He received his Ph.D. degree from Tokyo University of Agriculture and Technology in 2008. He joined AXE, Inc. in 2003. He joined Institute of Advanced Industrial Science and Technology (AIST) in 2008. He is currently a research group leader of AIST. His research interests include operating systems and distributed parallel computing.



### **Yoshio Tanaka** Director, AIST

Yoshio Tanaka is the director of Information Technology Research Institute of AIST, Japan. He is a member of PRAGMA steering committee and his research interests include distributed computing and security.



### **Yusuke Tanimura**

Senior Researcher  
AIST



### **Jelina Tetangco** Senior Science Research Specialist, DOST-ASTI

Senior Science Research Specialist and Project Manager, the Department of Science and Technology, Advanced Science and Technology Institute (DOST-ASTI), Philippines.



### Kundjanasith Thonglek Student, NAIST

Kundjanasith Thonglek, a member of the Software Design and Analysis Laboratory at Nara Institute of Science and Technology, has research interests in the computational graph, distributed computing and high-performance computing. I worked on optimizing resource utilization using Long Short-Term Memory.



### HUI PING TSAI ASSIST. PROFESSOR, NCHU

I am interested in studying vegetation patterns based on remotely sensed data to evaluate long-term natural system response to climate change. In addition, using UAV image for practical agriculture applications combining AI techniques is another research field that I am excited about. Currently Assistant Professor, National Chung Hsing University.



### Hsin-Hung Tseng Student, NCHU

Graduate student, National Chung Hsing University. Now working on the AI project founded by MOST, Taiwan. Main idea is using RGB+NIR+Thermal camera equipped UAV to monitor the growth of crops, damage after disasters. Our end goal is to provide a platform that allow farmers to upload images to classify the situation of crops, detect the diseases, or estimate crop yield.



### Wardiyono Wardiyono

Lecturer  
Universitas YARSI



### Wassapon Watanakesuntorn Graduated Student, NAIST

Currently, I am a graduate student at Nara Institute of Science and Technology. I am working on monitoring OpenFlow network and DDoS detection in the OpenFlow network.



### Yasuhiro Watashiba Associate Professor, Osaka University

Yasuhiro Watashiba is an Assistant Professor in the Graduate School of Information Science at Nara Institute of Science and Technology, Japan. He received his Ph.D. degrees from Osaka University in 2015. His current research interests include Resource Management on computing environment and related information technologies.



### Nadya Williams Systems Architect, UCSD

Nadya is a specialist in enabling applications and software stacks in integrated environments. Currently Nadya serves as the functional lead in the design, specification and evaluation of software architecture scalable and reusable for current and future environments for use by the NBCR community and a member of PRAMGA cloud infrastructure developers team at University of California at San Diego.



### S. Felix Wu Professor, University of California

Prof. S. Felix Wu is currently a Professor of Computer Science and Associate Dean of Engineering at University of California, Davis. His current research interests include Computational Journalism, Social Computing, and Cyber Security.



### Satoshi Yamanaka

Student  
Osaka University



### Chu-Sing Yang Professor, National Cheng-Kung University

Chu-Sing Yang is a Professor of Electrical Engineering in the Institute of Computer and Communication Engineering at National Cheng Kung University, Tainan, Taiwan. His research interests include software defined networking, network security, cloud computing, Internet of thing, and intelligent computing.



### Ming-Der Yang Distinguished Professor, NCHU

Professor, National Chung Hsing University. My research interests include image processing, remote sensing, geographic information system, environmental monitoring, and disaster assessment. Recent research efforts have been put on using AI techniques for agriculture applications and developing 3D reconstruction technology for disaster assessment.



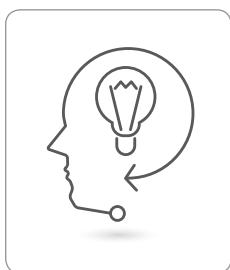
### JunWeon Yoon

Senior Researcher  
KISTI



### **Seok Kyu Yoon** Resident (Student), Asan Medical Center

I am the resident of Clinical pharmacology department from ASAN medical center. I am interested in applying pharmacokinetic, pharmacodynamics through computers.



### **LAN ZHENG**

Student

Konkuk University



### **Hiroaki Harai** Director General of ICT Testbed Research and Development, NICT

Director General at NICT's ICT Testbed R&D Promotion Center. Working in R&D on Future Networks and Optical Networks for more than 20 years.



### **Kwang Soo Kim** Professor, Seoul National University

Kwang Soo Kim is an associate professor in the Department of Plant Science at Seoul National University, where he has developed computing systems for crop growth simulations and climate change impact on crop production since 2010. His research interests lie in the area of crop models ranging from an integrated modeling system to distributed computing systems for crop yield prediction. He has collaborated actively with researchers in several other disciplines of computer science, agricultural engineering, and meteorology on problems at site-specific and regional prediction of crop yield. He has served as the editor in chief for the Korean Journal of Agricultural and Forest Meteorology. He also served on the editorial board for Journal of Crop Science and Biotechnology and Korean Journal of Crop Science. Email: luxkwang@snu.ac.kr



### **Kyungbaek Kim** Associate Professor, Chonnam National University

Kyungbaek Kim is an associate professor of department of electronics and computer engineering, Chonnam National University, South Korea. His interesting research area includes data center network for bigdata platform, software defined infrastructure, highly reliable network, AI based IoT network analysis and issues of various distributed systems.



### **Hyuk-Jae Lee** Professor, Seoul National University

Professor at Department of Electrical and Computer Engineering of Seoul National University. Research interest: Video processing, parallel computer architecture, SoC design.



### Nguyen Tuan Nghia

MS Student

Seoul National University



### Sangheon Pack Professor, Korea University

Sangheon Pack is a professor in School of Electrical Engineering, Korea University. He is a committee member of Future Internet Forum (FIF) in Korea and Asia Future Internet Forum. He is a senior member of IEEE and an editor of IEEE IoT Journal. His research interests include network softwarization, network automation, B5G/6G, and vehicular networking



### Martin Swany

Professor

Indiana University



### Nguyen Duy Thanh

Ph.D. Student

Seoul National University

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# MEMO



# MEMO

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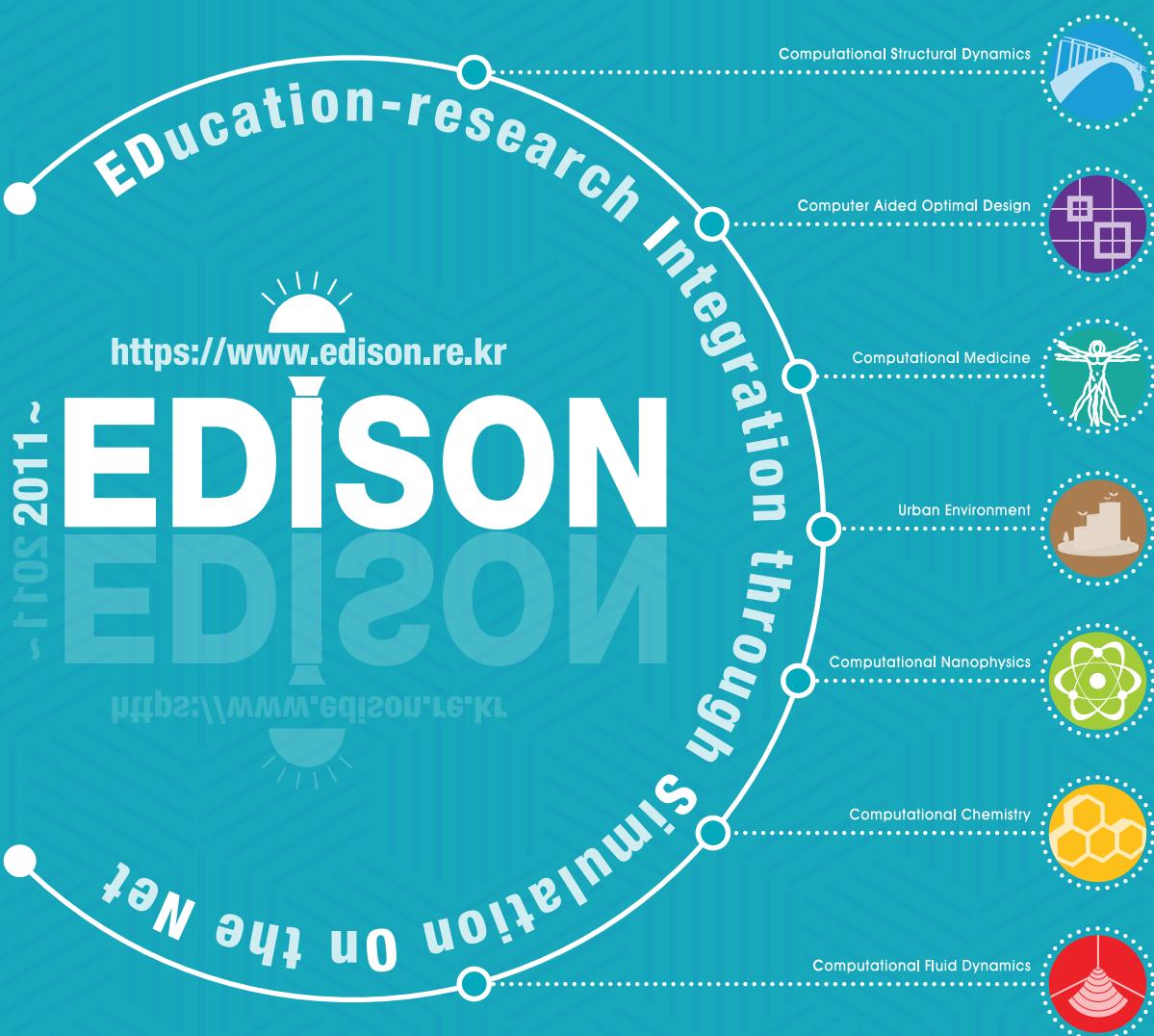
# MEMO

## **EDISON** (EDucation-research Integration through Simulation On the Net)

EDISON is the well-known e-Science platform which stands for “EDucation-re-search Integration through Simulation On the Net”

Computational science and engineering ecosystem development and user service development for the purpose of education, research, industrial use in the cyber environment by integrating the latest achievements of various specialized fields of advanced research results.

The number of disciplines and users have increased annually, and currently there are the modules for seven academic disciplines and more than ten thousand users annually.



Ministry of Science and ICT



# CENTRA4 & PRAGMA36

Collaborations to ENable TTransnational cyberinfrastructure Applications & Pacific Rim Application and Grid Middleware Assembly

