PRAGMA 39: Overview and Updates

Shava Smallen
Co-chair, PRAGMA Steering Committee
University of California, San Diego

June 22, 2023

Pacific Rim Applications and Grid Middleware Assembly

PRAGMA seeks to address these challenges to improve *CI and scientific impact via practical implementation.* We focus on international *collaborations that uniquely team technology specialists and domain scientists*

- Science is **inherently international** and **requires collaboration**.
- Cyberinfrastructure is only one dimension; **people and trust are also essential**
- Collaboration is **enabled by sharing and exchanging data, algorithms and tools.**
- There are fundamental challenges in matching existing CI to hundreds of communities. **Deep interactions with long-tail communities has the potential to transform both science domains and CI development**

Screenshot of 2019 PRAGMA collaborative overview publication

PRAGMA

Founded in 2002

Focused on researchers and institutions on the Pacific Rim

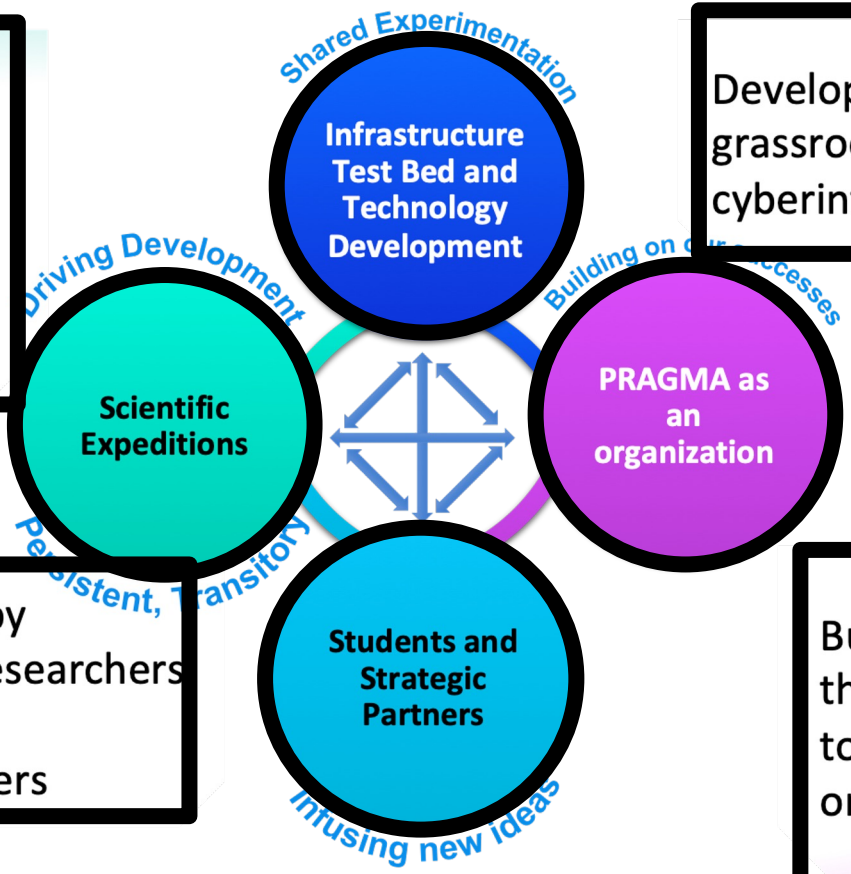
Open Community of Practice

Engages "Long Tail" science communities

Building Trusted Community of Practice through four strategies of collaborating

Fostering international **scientific expeditions** by forging teams of domain scientists and CI researchers

Developing and improving a grassroots, international cyberinfrastructure



Infusing new ideas by developing young researchers and by engaging with strategic partners

Building and enhancing the essential people-to-people trust and organization

Multi-institution collaborative leadership

PRAGMA as an organization

Operating Principles and Procedures

Working Groups

Student Committee

PRAGMA Steering Committee (23 representatives)

Co-chairs

Shava Smallen

(Shinji Shimojo retired from Osaka University)

Functional Area Roles

- Communications
- Membership
- Mentoring
- Workshop Engagement

Heru Suhartanto

Fang-Pang Lin

Kum Won Cho

Jason Haga

Prapaporn Rattanatamrong

Kohei Ichikawa

PRAGMA

Scientific Expeditions

Pre-COVID Expeditions: A Model of Collaboration

Domain Scientists

Long-Term sustained effort to answer scientific question(s) through co-design

Technology Developers

Expeditions

Lake Ecology:
understand the processes that govern lake eutrophication and predict water quality

ACTIVE

Biodiversity:
understand spatial patterns of biological diversity and how they emerged

ACTIVE

PRAGMA Experimental Network Testbed (ENT):
understand impact of software defined networking in international context

RETIRED

Lake Expedition: Predicting Water Quality in Lakes

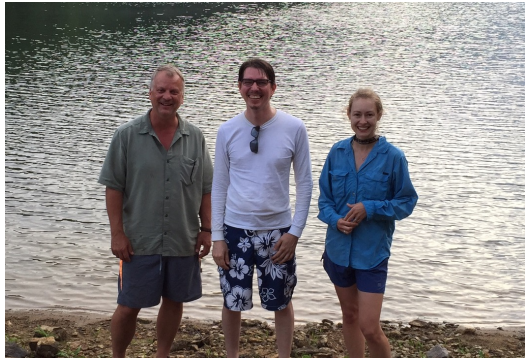
Paul Hanson (U. Wisconsin), **Cayelan Carey** (Virginia Tech), **Renato Figueiredo** (U. Florida)

Scientific Expeditions

- **Eutrophication:** excessive richness of nutrients in a lake or other body of water, frequently due to run-off from the land, which causes a dense growth of plant life.
- **Lake eutrophication** is global issue, results in **degraded water quality**
- **Goal**: Integrate sensor data as inputs to **computational lake models** → science goal is to ***predict*** **water quality**

GLEON

global lake ecological observatory network



Lake Expedition: Developing Predictive Models using High-Throughput Computing and Overlay Networking

Scientific Expeditions

- **Sensor gateways** link sensors to internet (connecting to storage and models)
- **IPOP overlay network** create virtual private network for sensor data and computation
- **GRAPLE**
- **computi**
- to allow e
- distribute
- **Educatio**
- future ge
- computat
- 12 univer

Prof Carey teaching students to use GRAPLer at VaTech

Outputs from model runs are aggregated and returned to user

PRAGMA

Infrastructure Test Bed and Technology Development

PRAGMA Cloud Testbed

RETIRED

(But CloudBank could replace if interest)

Edge Computing Testbed

24 Raspberry Pi 3B+ nodes on three sites:
16 Nodes at University of Florida, USA
8 Nodes at NAIST Japan
4 nodes at Thammasat University

Nara Institute of Science and Technology NAIST

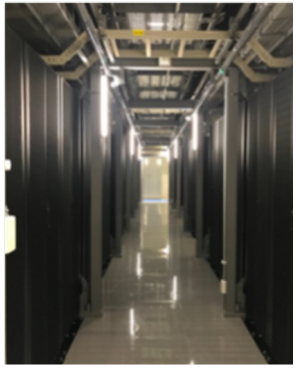
NAIST

UF UNIVERSITY of FLORIDA

มหาวิทยาลัยธรรมศาสตร์ THAMMASAT UNIVERSITY

AIST
NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

AI Bridging Cloud Infrastructure

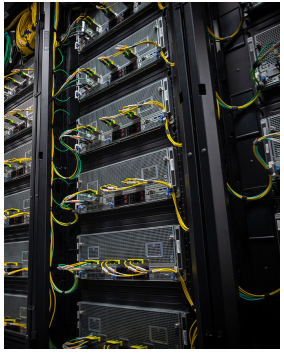


NCHC

Taiwania 2 & 3

UCSD
SDSC

Voyager



Preparing the next-generation of researchers

Students and Strategic Partners

PRAGMA Student Committee

Kundjanasith (Tem) Thonglek

NAIST

International Research Experiences

PRIME

Pacific Rim Experiences for UCSD Undergraduates (2004-2015)

MONASH University

MURPA (2008-current)

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

QURPA (2014-current)

AIST NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

Internship Program (2014-current)

THAMMASAT UNIVERSITY

Undergraduate projects (2016-current)

CNU 충남대학교 CHUNGNAM NATIONAL UNIVERSITY

Undergraduate internships (2017-current)

PRAGMA

Outline

- PRAGMA Introduction and Overview
- Updates Since our Last Meeting
- Our Future

Thank you to HKU

- PRAGMA 38 cancelled in February due to COVID spread
- However, it was a still a lot of work to prepare for the conference and our arrival
- Special thank you to Lilian Chan and Wing Keung KWAN

2021: PRAGMA Reconnect Symposium

1. May 28, 2021
    - David Abramson (Univ of Queensland): Scalable Distributed Infrastructure for Data Intensive Science
    - Renato Figueiredo & Ken Subratie (Univ of Florida): EdgeVPN.io: Software-Defined Overlay Virtual Private Networks for Edge Computing
2. June 11, 2021
    - Nurul Hashimah Ahamed Hassain Malim (USM): Collaboration Opportunities With CSUSM
    - Sri Chusri Haryanti (YARSI): Update from Universitas YARSI and Chandra Prasetyo Utomo (YARSI): YARSI and PRAGMA Partnership

2021: PRAGMA Reconnect Symposium (cont.)

3. June 25, 2021
    - Jason Haga (AIST): AIST's new Digital Architecture Research Center
    - Putchong Uthayopas (Kasetsart University): Thailand's National AI Strategic Plan

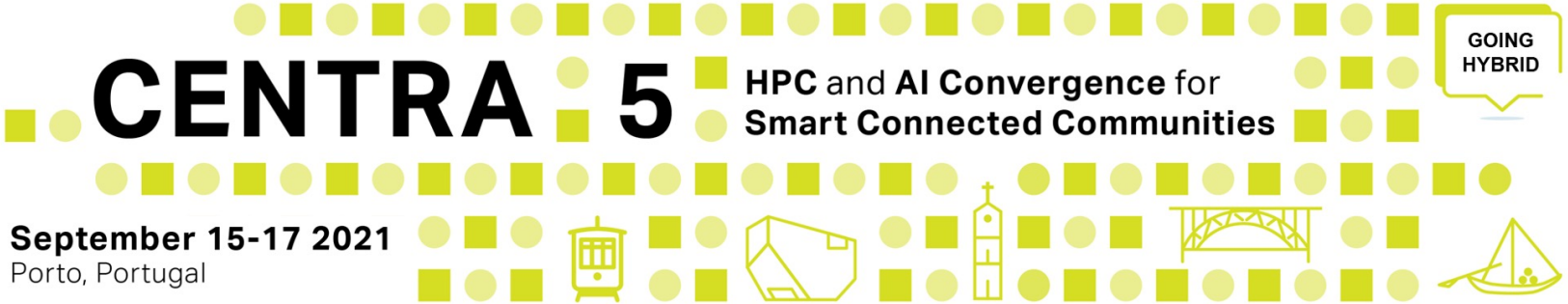
4. July 23, 2021
    - Jim Chen (Starlight Exchange Consortium): Data Mover Projects and the Global Research Platform (GRP)
    - Edward Moynihan (Indiana University): TransPAC and The Engagement and Performance Operations Center (EPOC)

2021: PRAGMA Reconnect Symposium (cont.)

5. August 6, 2021
    - Weicheng Huang (NCHC): AIoT, Federated Learning (FL), Data Market
    - Kohei Ichikawa (NAIST): Edge machine learning, Programmable networking with SRv6

6. August 27, 2021
    - Prapaporn Rattanatamrong (Thammasat) and Jason Haga (AIST): immersive visualization applications
    - Jason Leigh and Luc Renambot (Univ of Hawaii): Sage 3 Demo

Related Workshops in 2021



PRAGMA Steering Committee Meeting @ SC'22 (November)

Topics:

- Areas of Collaboration
  - Data
  - Edge/IoT
- What are missing?
  - Student Exchanges
  - Testbed Infrastructure

SEAIP 2022 (December)

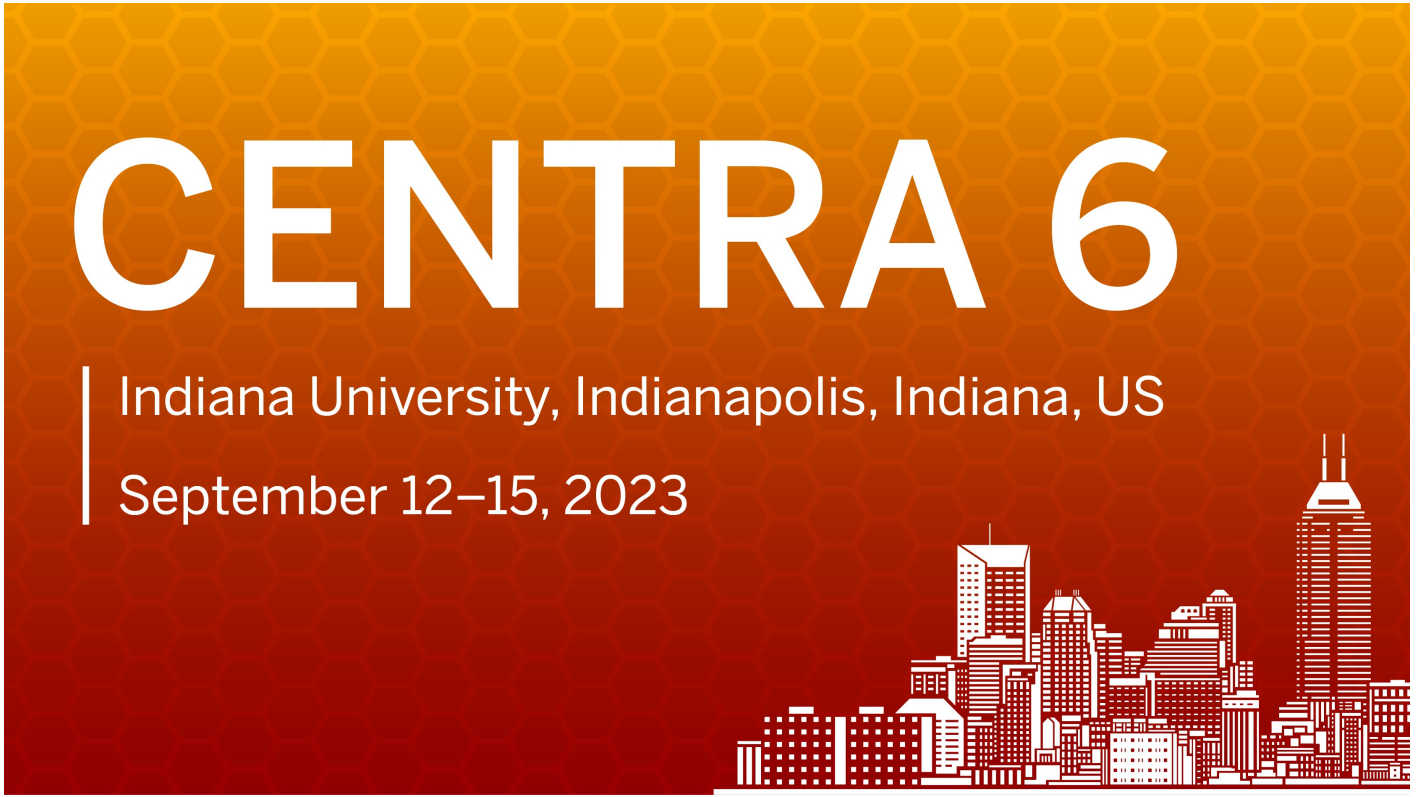
- Organized by NCHC
- Applications:
  - Rubber Tree Disease Detection (Yeni),
  - Typhoon damage assessment / Rice crop health, Tea plantation health, Cloud Forest Health (Hui-Ping)
  - iDigBio (Jose)
  - Society 5.0 (Shimojo-sensei)
  - Smart Building Digital Twin (Nan/Jason)
  - Noise Pollution (Kritika, Thapana)
  - Coral Reef Health (Indra)

Technologies

- Knowledge Networks
- Public Cloud tools
- Green HPC
- ABCI
- Taiwania 3
- Sage 3

PRAGMA

Coming Soon: More details follow this talk



Update from Univ of Queensland

- **David Abramson** was awarded (in 2021) the ACM/IEEE Ken Kennedy Award for "innovation in parallel and distributed computing tools with broad applications, as well as leadership contributions to professional service, creating international technical communities, and mentoring”.

Rest in Peace: Prof. Putchong Uthayopas

December 2021

“I always remember Putchong's effervescent personality. One could not be sad or unhappy when he was in the room. So many good memories of him and the wonderful things he accomplished. A true loss that is difficult to put into words. I will miss you very much, Putchong!” -- Phil Papadopoulos

Retirement of Arun Agarwal (Univ of Hyderabad)

- June 2022
- PRAGMA 9 held at University Hyderabad in October 2005

Updates at AIST

Satoshi Sekiguchi retired and is now leading an industry/government institute.

Yoshio Tanaka is now AIST's Director General, Department of Information Technology and Human Factors

Jason Haga is now Chief Senior Research Scientist, Continuum Computing Architecture Research Team, Digital Architecture Research Center

Updates at NCHC

- **Fang-Pan Lin** and **Steven Shiau** are now Deputy Directors at NCHC (with Director General **Chau-Lyan Chang)**

Steven Shiau

Fang-Pang Lin

Chau-Lyan Chang

Update at Indiana University

- **Beth Plale** named executive director of Pervasive Technology Institute at IU, after serving at NSF for several years

Update at Universitas Sains Malaysia

- **Habibah Binti A. Wahab** named Deputy Vice-Chancellor (Research and Innovation)

PRAGMA

香 港 大 學
THE UNIVERSITY OF HONG KONG

Update from HKU

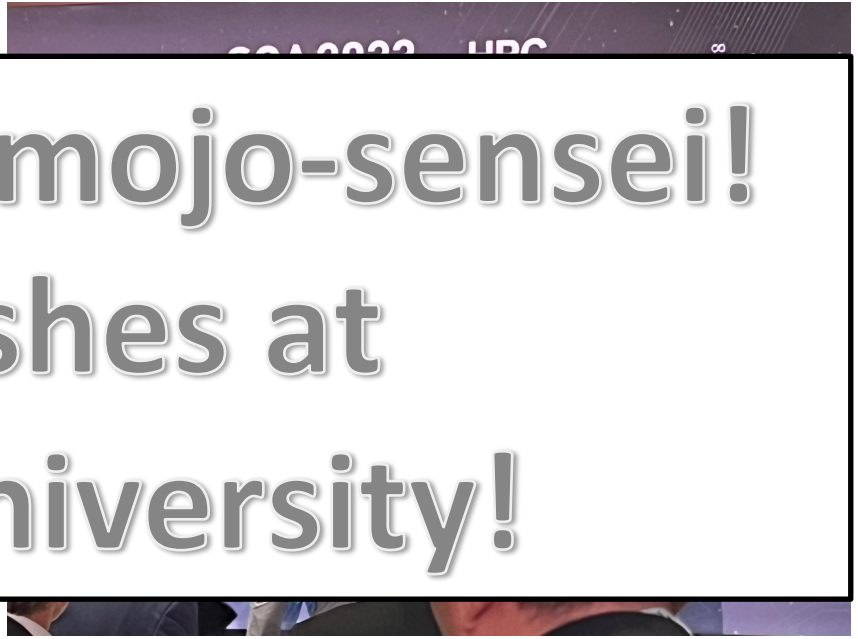
- **Wing Keung KWAN** retired after staying in HKU for 49 years. After COVID joined the "Beijing - HK Academic Exchange Centre" as an honorary HPC/AI Consultant, enabling to have frequent contact with HK/GBA/China scholars of different academic interests. Technical knowledge still well maintained. HPC, AI, Medical Computing, and Big Data analytics.

Shinji Shimojo Retires from Osaka University

- Retired from Osaka
- Working Group
- Co-chair of the PRAGMA Steering Committee

Thank you Shimojo-sensei!
Best wishes at Aomori University!

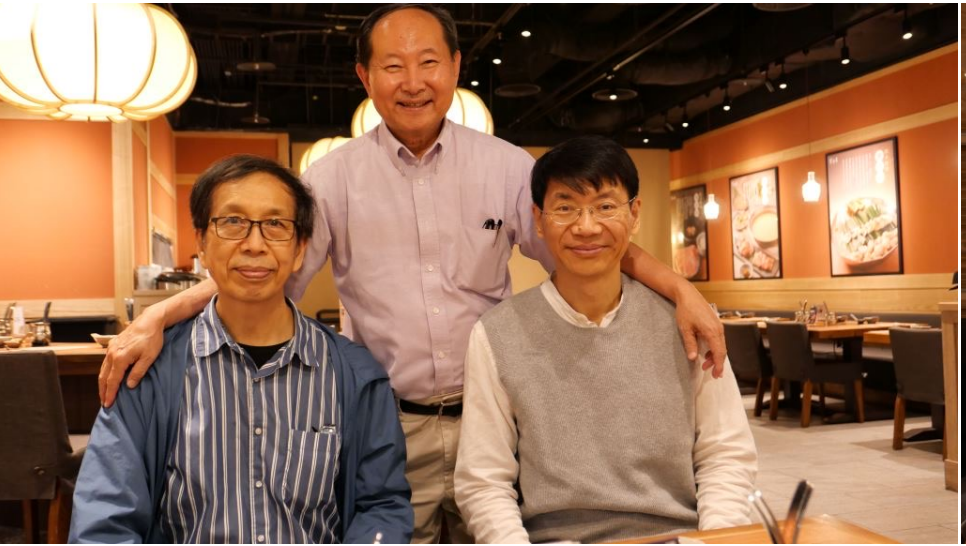
Shimojo-sensei hard at work at PRAGMA 10 (Australia - 2006)



Shimojo-sensei accepting "SCA HPC Distinguished Service Award" award at SC'Asia – Feb 2023

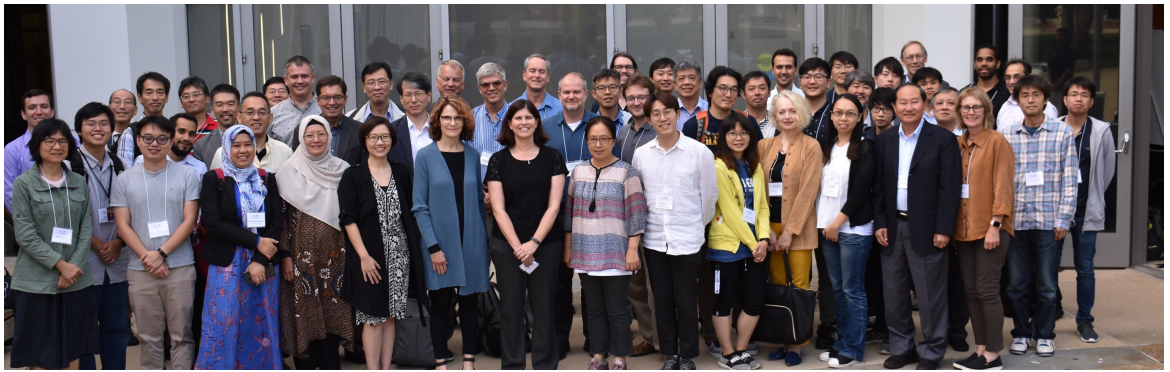
Updates from our PRAGMA founder

- **Peter Arzberger** is the Chair of the University of Texas – Portugal Program's External Review Committee (from 2020) and is starting a new career.



Peter Arzberger and Bill Chang recently travelled to Taiwan for CPS workshop and US/Taiwan annual science meeting (pictured with Fang-Pang Lin and Whey-Fone Tsai).

Power of our PRAGMA Collaboration



- “The bonds of collaboration and friendship are deeply rooted, having been nurtured over two decades. They survived the pandemic and [are/will be] strengthened again [with each visit]“

- “At this PRAGMA workshop (#39), cultivate your connections by contributing **ideas**, **expertise**, and then **action** to rekindle projects that show the value of this unique organization!”

PRAGMA

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Call to action:

Steering Committee Members (and attendees)

1. Identify something you will **DO**, based on the discussions.
2. This might motivate other members to do somethings too.
3. Then monitor and publish the progress.

Small steps lead to other small steps.

PRAGMA

Add qualifiers to action, such as the following:

Visible: An action or next step others can see

Tangible: An action that is felt by others

Meaningful (impactful): An action that changes what others can do

Beneficial: Others benefit, with knowledge, access to resources, use of software or data

Topics for Discussion

Working Groups

How: Organizes collaborative activities; Review progress and decide on action items for next meeting

Workshops

When: Twice a year

Regular check-ins drives progress

Working Groups: Organizing our activities, goals, and structure (in transition)

PRAGMA as an organization

Topic for past several PRAGMA meetings:

Resources too large, *Telescience* is an old name, *Bioscience* not consistently well-attended, *Cyber-Learning* very small so merged into Resources.

Resources and Data / Cyberlearning

At PRAGMA 36, decided to break into smaller focus groups:

- AI Focus Group
- DTN and data transfer focus group
- Edge computing focus group
- EDISON focus group

Hsiu-Mei Chou

Ruth Lee

Telescience

Making and improving access to or use of remote equipment (e.g., tiled-display walls or sensors**). Current application areas** of the group include environmental monitoring and traffic flow.

Fang-Pang Lin

~~**Biosciences**~~

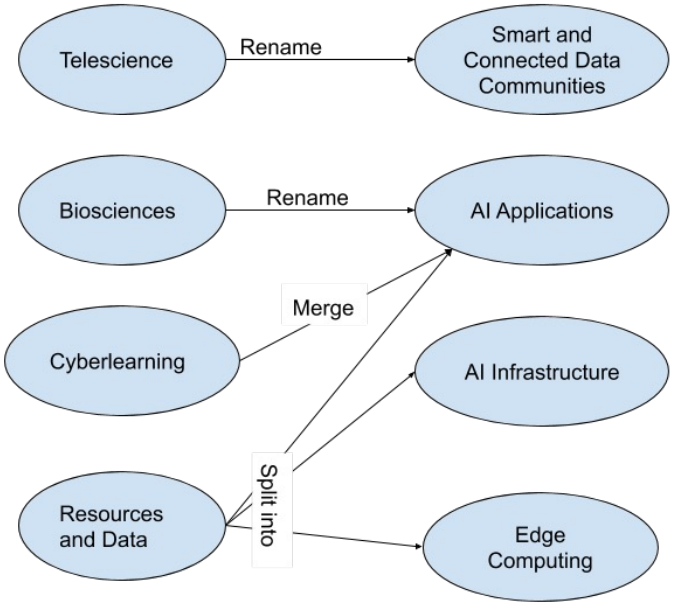
Shinji Shimojo

~~**Biosciences**~~

Working Groups: Organizing our activities, goals, and structure (in transition)

PRAGMA as an organization

Pre-PRAGMA 37



PRAGMA 37

Simplify working groups to:

- Applications and Data
- Integrated Infrastructure and Testbeds

PRAGMA

Options for this PRAGMA

1. Don’t do anything
2. Rebrand
3. Modify groups – add/delete

How to we drive forward progress?

Deadlines can be helpful.

Workshops: Driving progress and fostering new ideas, launching new activities

PRAGMA as an organization

Question: Should we meet once a year and leverage related workshops to drive forward progress? Do we have a PRAGMA 40 host candidate?

PRAGMA

PRAGMA as an organization

Steering Committee Items this meeting

- Membership updates
- PRAGMA Co-chair nominations
- PRAGMA Working Groups
- PRAGMA Workshops

Steering Committee members will meet tomorrow during lunch

Terima Kasih Universitas YARSI!

- Paramaresthi Windriyani
- Sri Chusri Haryanti
- Ummi Azizah Rachmawati
- Heru Suhartanto

And

- Kohei Ichikawa (FAR Workshop Engagement)

Terima Kasih!

Next Meeting PRAGMA 40 TBD

Software: https://github.com/pragmagrid
Web: www.pragma-grid.net
Info: pragma-discussion@googlegroups.com