# e-Science Activities in Thailand

2011-present

Kajornsak Piyoungkorn

National Electronics and Computer Technology Center, Thailand

With the great vision of **H.R.H. Princess Maha Chakri Sirindhorn** who saw the importance in building strong foundation for scientific research across the nation. Collaborating with CERN, National e-Science Infrastructure Consortium was formed with the objectives to support research projects in Thailand by providing the computing infrastructure service.

A group of Thai universities and research institutes that **collaborate** in this research infrastructure development.

National e-Science Infrastructure Consortium
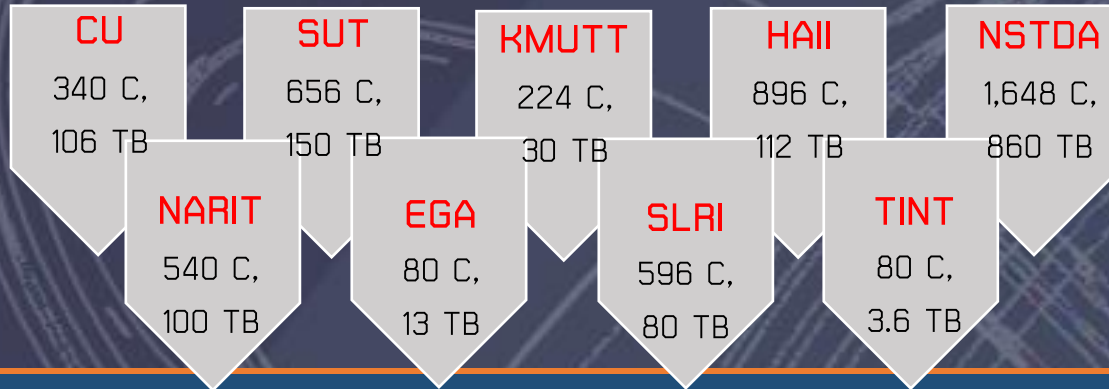
HPC
Develop computing

Sustainable infrastructure

Scientific applications

Data Storage

Networking
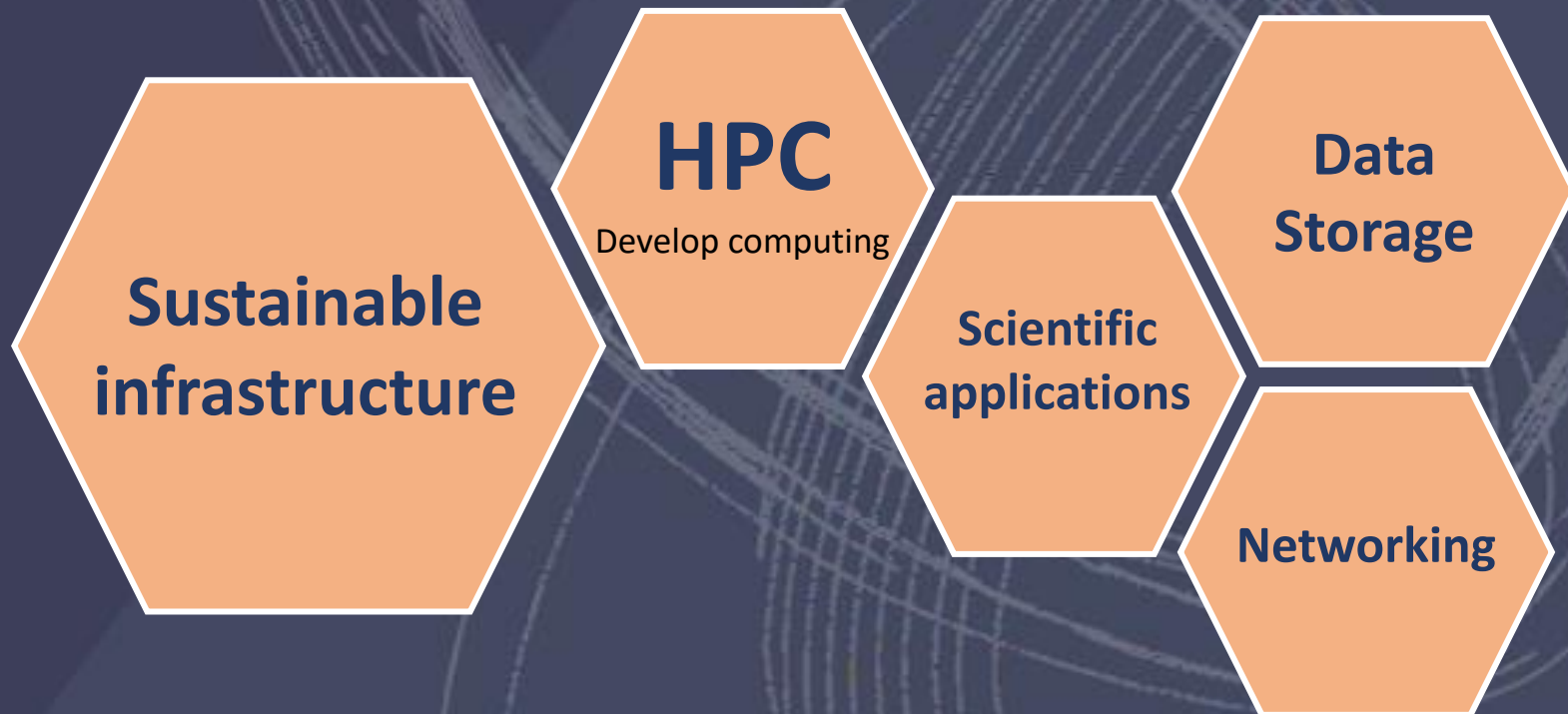
MEMBERS

Regular members
Provide computing resource to the consortium

Associated members
Contribute or Collaborate with the consortium

RESOURCES

National e-Science
Infrastructure Consortium

CU	SUT	KMUTT	HAII	NSTDA
340 C, 106 TB	656 C, 150 TB	224 C, 30 TB	896 C, 112 TB	1,648 C, 860 TB

NARIT	EGA	SLRI	TINT
540 C, 100 TB	80 C, 13 TB	596 C, 80 TB	80 C, 3.6 TB

5,060 CPU core; 1,454 TB
Support to 3 application areas

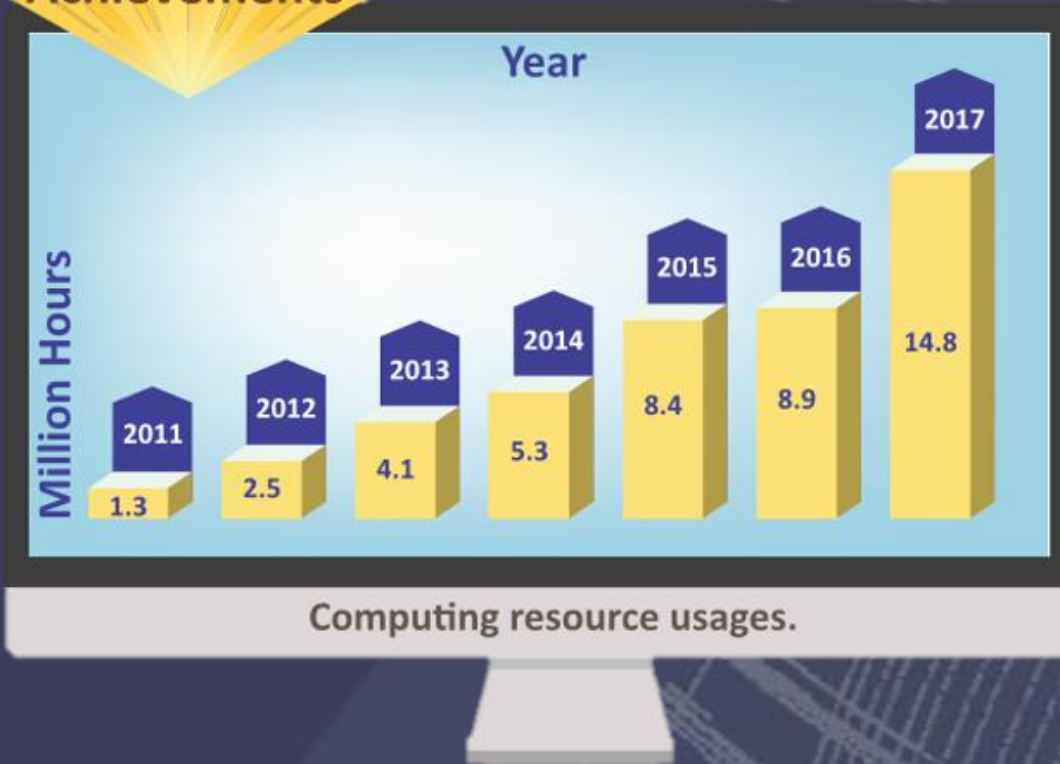High Energy Particle Physic

Computational Science & Engineering

Computer Science & Engineering

KitWai คิดไว

Collaboration with WLCG

CERN

Tier2 Computing sites:

T2-TH-CUNSTDA

- Production site for CMS experiment since Jun 2014
- Operate by CU and NSTDA
- Upgrading and testing a system (ready for operate again by Jul 2018)
- 260 CPU Cores, 300TB run on GlusterFS

T2-TH-SUT

- Production site of ALICE experiment since Oct 2014
- Operate by SUT
- 99-100% availability
- 256 CPU cores, 100TB on GPFS for stored ALICE data

National e-Science
Infrastructure Consortium

Salinity Intrusion for Lower Chao Phraya Basin

River simulation includes a prediction model for (1) water current (2) water level (3) salinity. Information from these simulations helps water management from upper river's dams, water gates, and reservoirs.

- ☐ 7-day prediction with daily automatic update
- ☐ Perform "what-if scenario" for water management

- ☐ Data assimilation for accurate prediction
- ☐ Based on deterministic, and potentially, on ensemble models

**Water Current Prediction**

Water Salinity Prediction

Contact: Dr. Sirod Sirisup, NECTEC

NECTEC

a member of NSTDA

สวทช
NSTDA

National e-Science
Infrastructure Consortium

Designing Smart Nanoparticles for Nanomedicine

➢ design the functionalized nanoparticles that can be applied in drug delivery and biosensor

➢ Researcher: 7 students, (2 PhD, 4 MSc & 1 undergraduate)

➢ The **undergraduate** student was winner from the research project competition in the Siam Physics Congress 2016 (SPC2016) in Ubonrachathanee and was awarded the royal cup from Her Royal Highness Princess Galyani Vadhana, Princess of Naradhivas.
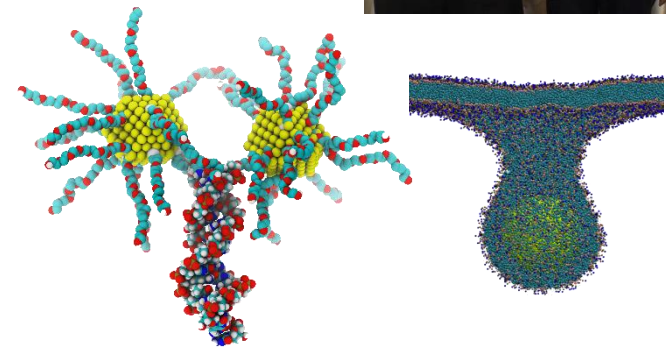
Materials Science and Nanotechnology
Program, Department of Physics,
Faculty of Science, Khon Kaen University

NATIONAL e-SCIENCE
INFRASTRUCTURE CONSORTIUM

Combination to develop solar cell efficiency: Structure of a Model Dye/Titania Interface

Siam Photon

- ➢ Used combination of synchrotron light and DFT to understand geometry of benzoate, dye molecule, on Rutile TiO_2
- ➢ Key to improve efficiency of dye sensitized solar
- ➢ The result may lead to smart electronics or higher efficiency solar harvest devices in the near future
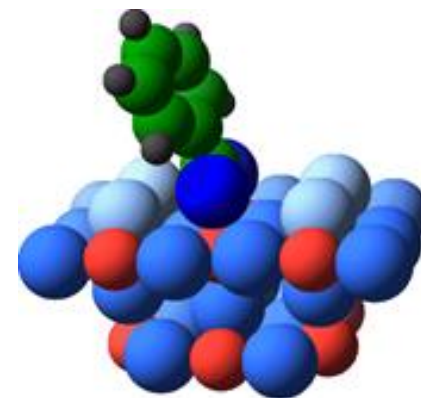
Thailand Supercomputer Center: ThaiSC

NEEDS

Computing infrastructure service to Thai researchers

Economic/Social Research

Comp. Sci. Research

Trend Big Data & AI

CURRENT LIMITS

In house HPC resources

Small/mid research scale

Lack of global competition

SOLUTIONS

Develop **ThaiSC**

National computing infrastructure

Large-scale/complex research problem on computational science and DA

BENEFITS

Enhancing national research capability

Increasing cost effectiveness in computational resource

Raising Thailand competitiveness among ASEAN

Thailand Supercomputer Center: ThaiSC

Vision
Leading HPC facility and computational science R&D center in ASEAN

Mission
1. Provide HPC computing service for Thailand R&D
2. Perform frontier computational science R&D
3. Promote development of HPC workforce
4. Develop HPC roadmap for Thailand
5. Establish partnership and visibility

Thank You