

# e-Science Activities in Thailand

2011-present

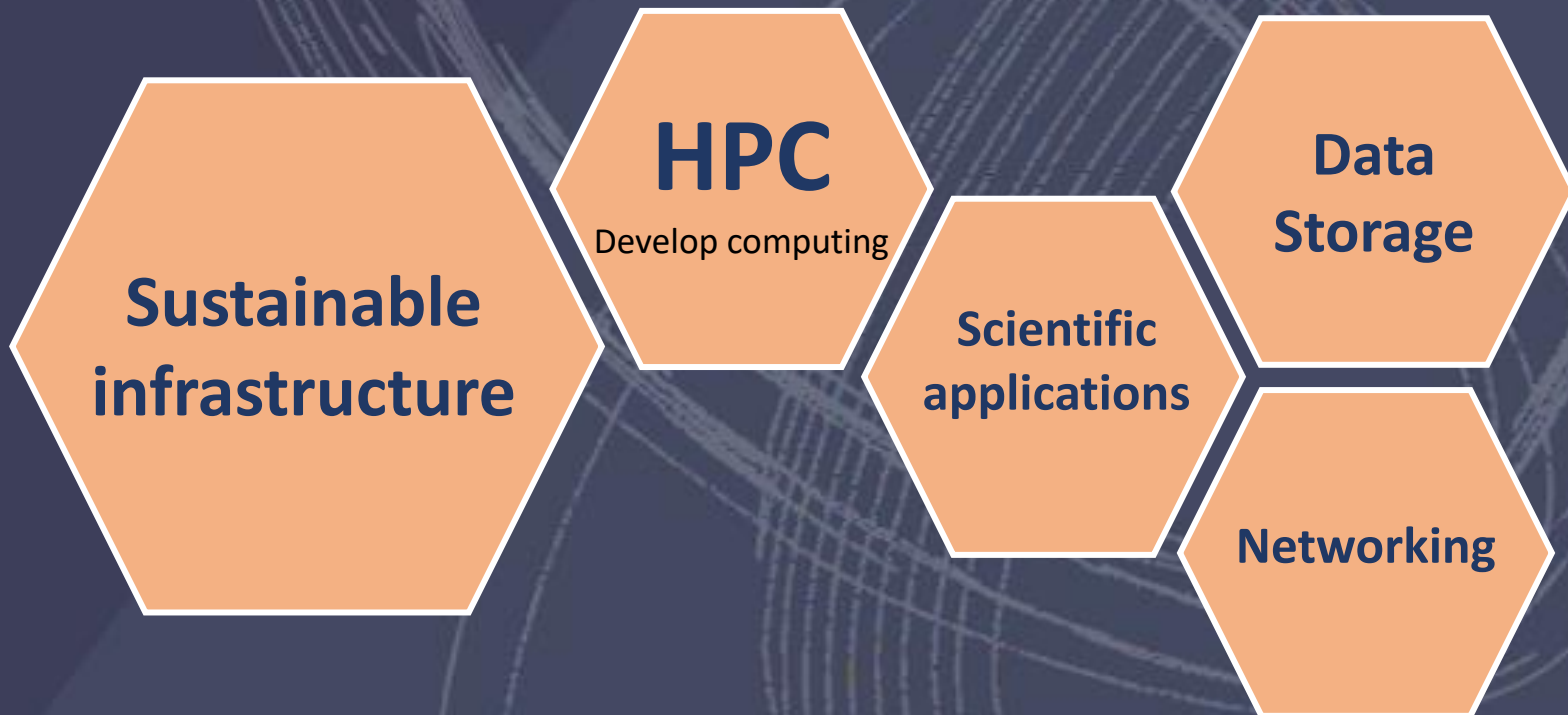
Kajornsak Piyoungkorn

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.





# MEMBERS



## Regular members

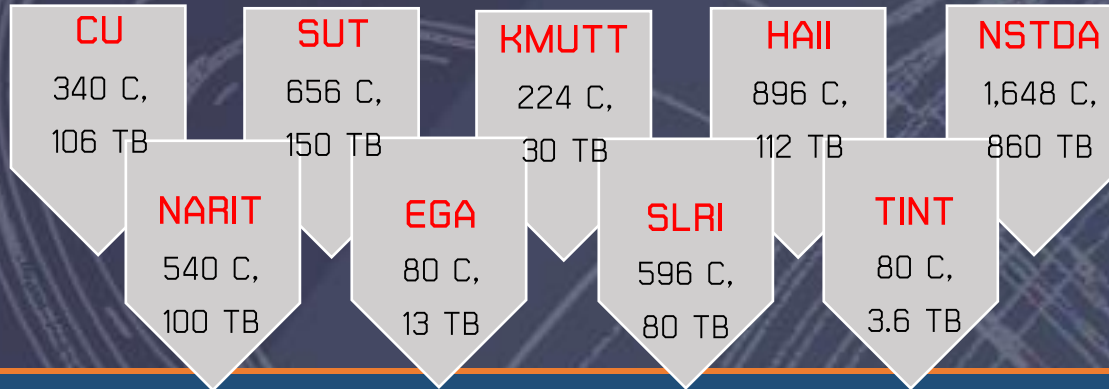
Provide computing resource  
to the consortium



## Associated members

Contribute or Collaborate  
with the consortium

# RESOURCES

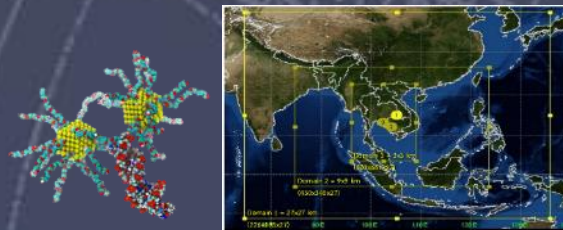


**5,060 CPU core; 1,454 TB**  
Support to 3 application areas

High Energy Particle  
Physic



Computational Science  
& Engineering

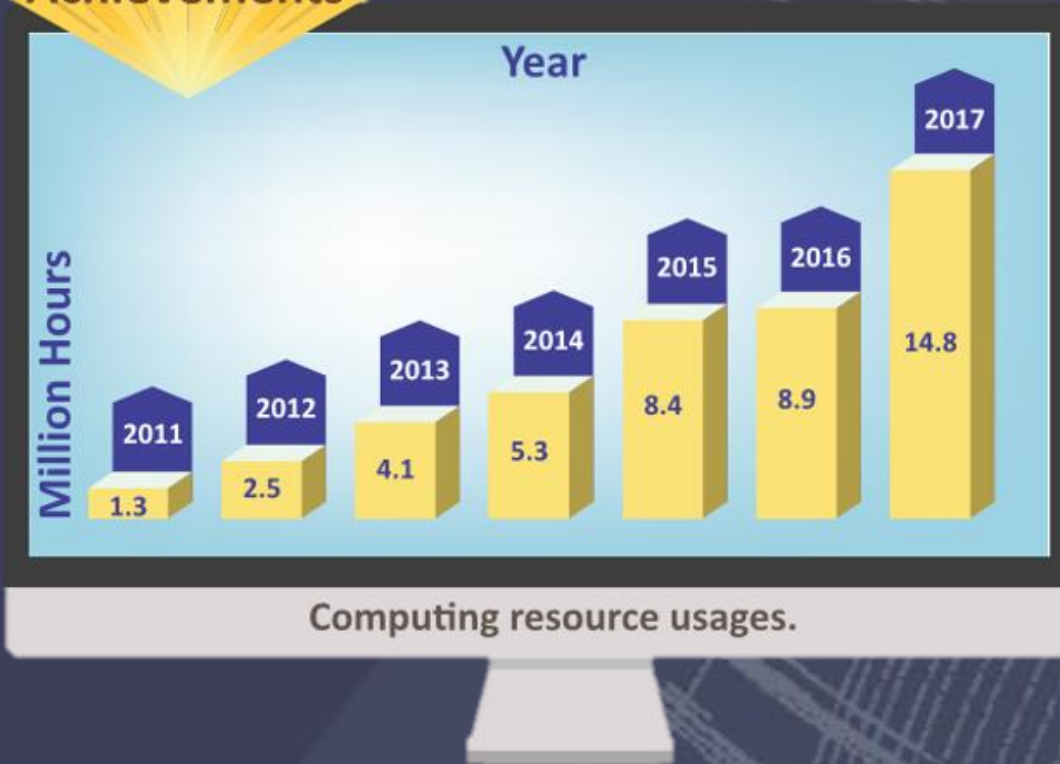


Computer Science &  
Engineering





Achievements



**506** Projects

**1035** Users

- 25% Research institutes
- 75% Educational institutes

**86%** Average Utilization

User from 31 Institutes



# Collaboration with WLCG



## 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



# Ex. of RESEARCH PROJECTS

## 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

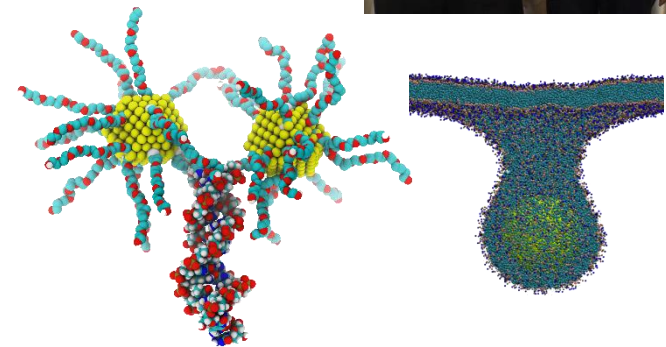
Contact: Dr. Sirod Sirisup, NECTEC



# Ex. of RESEARCH PROJECTS

## Designing Smart Nanoparticles for Nanomedicine

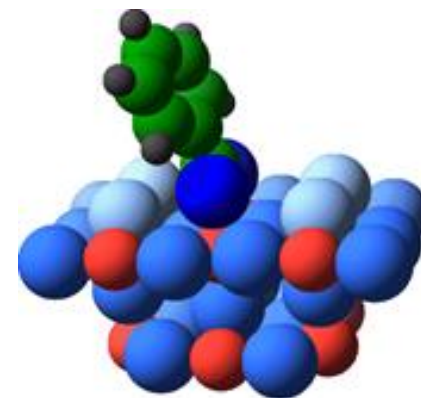
- design the functionalized nanoparticles that can be applied in drug delivery and biosensor
- Researcher: 7 students, (2 PhD, 4 MSc & 1 undergraduate)
- The **undergraduate** student was winner from the research project competition in the Siam Physics Congress 2016 (SPC2016) in Ubonrachathanee and was 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

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

- Used combination of synchrotron light and DFT to understand geometry of benzoate, dye molecule, on Rutile  $\text{TiO}_2$
- 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



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