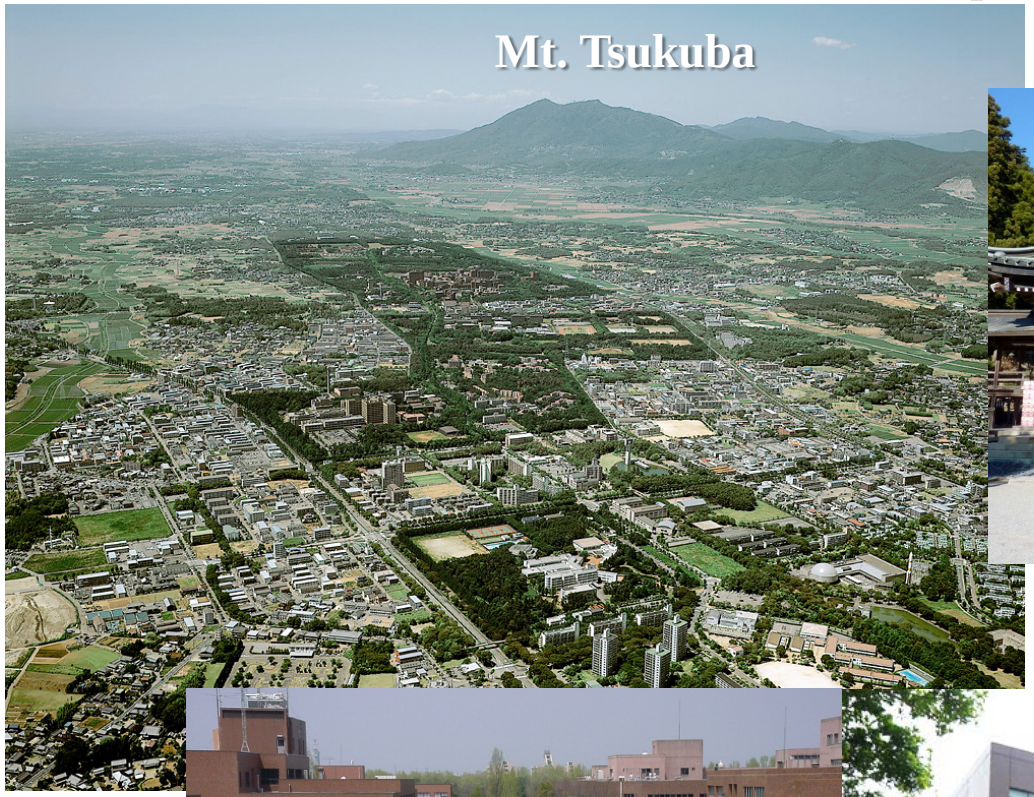
Center for Computational Sciences
University of Tsukuba

Masayuki Umemura
(Center for Computational Sciences, University of Tsukuba)

External Review Committee:

- Jeffery Vetter (Chair) Computer Science Professor
  Computer Science and Mathematics Division, Oak Ridge National Laboratory, USA
- Shinji Tsuneyuki (Vice Chair) Material Science Professor
  School of Science, The University of Tokyo, Japan
- Karl Jansen Particle Physics Professor
  John von Neumann Institut fur Computing (NIC), Germany
- Andreas Burkert Astrophysics Professor
  Theoretical and Computational Astrophysics, University Observatory, Munich Germany
- James Vary Nuclear Physics Professor
  International Institute of Theoretical and Applied Physics, Iowa State University, USA
- Joachim Burgdörfer Material Science Professor
  Vienna University of Technology, Austria
- Andrew Roger Biological Science Professor
  Dalhousie University, Halifax, Nova Scotia, Canada
- Jack Wells Computational Science Professor
  National Center for Computational Science, Oak Ridge National Laboratory, USA
- Takemasa Miyoshi Geoscience Professor
  Data Assimilation Research Team, RIKEN Advanced Institute for Computational Science, Japan
- Hiroshi Nakashima Computer Science Professor
  Academic Center for Computing and Media Studies, Kyoto University, Japan
- Xiaofang Zhou Computational Informatics Professor
  University of Queensland, Australia

Tsukuba Science City (built up in 1969)　Population ~0.2million, ~300 Institutes



Mt. Tsukuba Shrine

University of Tsukuba in 1972
from Tokyo University of Education (predecessor)

Center for Computational Physics in 1992
Center for Computational Sciences in 2004

Chronology of CCS

1992	April	Center for Computational Physics (CCP) founded. CP-PACS Project begins.
1996	September	CP-PACS (2048 PU) completed and installed
	November	Ranked as No. 1 on the Top 500 World Supercomputer List
2004	April	CCP is reorganized, expanded and relaunched as the Center for Computational Sciences (CCS)
2005	April	Development of Massively Parallel Cluster PACS-CS in the project begins
2007	April	Cosmo-Simulator FIRST completed and installed
2008	June	Operation of T2K-Tsukuba begins.
2010	April	Approved under the Advanced Interdisciplinary Computational Science Collaboration Initiative (AISCI)
		CCS is reorganized from five to seven divisions
2012	February	HA-PACS starts operation
2013	March	Joint Center for Advanced HPC established in alliance with the University of Tokyo
	August	Authorized as one of the two prime research centers in U. Tsukuba

Objective of External Review

- The objective of the external review is to receive the evaluation on the research activities and their outcomes in the Center in the period of FY2008 – FY2013 and recommendations for the future development of the Center.

Materials for the External Review

- Schedule
- Form of Review Report (tentative) (Final report by April 30)

- CCS Report
  PART I, Overview of Center for Computational Sciences
  Summary of Activities 2008-2013
  PART II, Research Activities, Results, Collaborations and Plan 2008-2013
  PART III: Strategy and Future Plans of Center for Computational Sciences

- Presentation Files on Web
- Brochures of CCS and U. Tsukuba
- Posters of CCS Researches (Lobby)
- Operating Supercomputers (Computer building)
- Display of the PACS Series of Supercomputers (Lobby)

CCS, University of Tsukuba

Mission of CCS

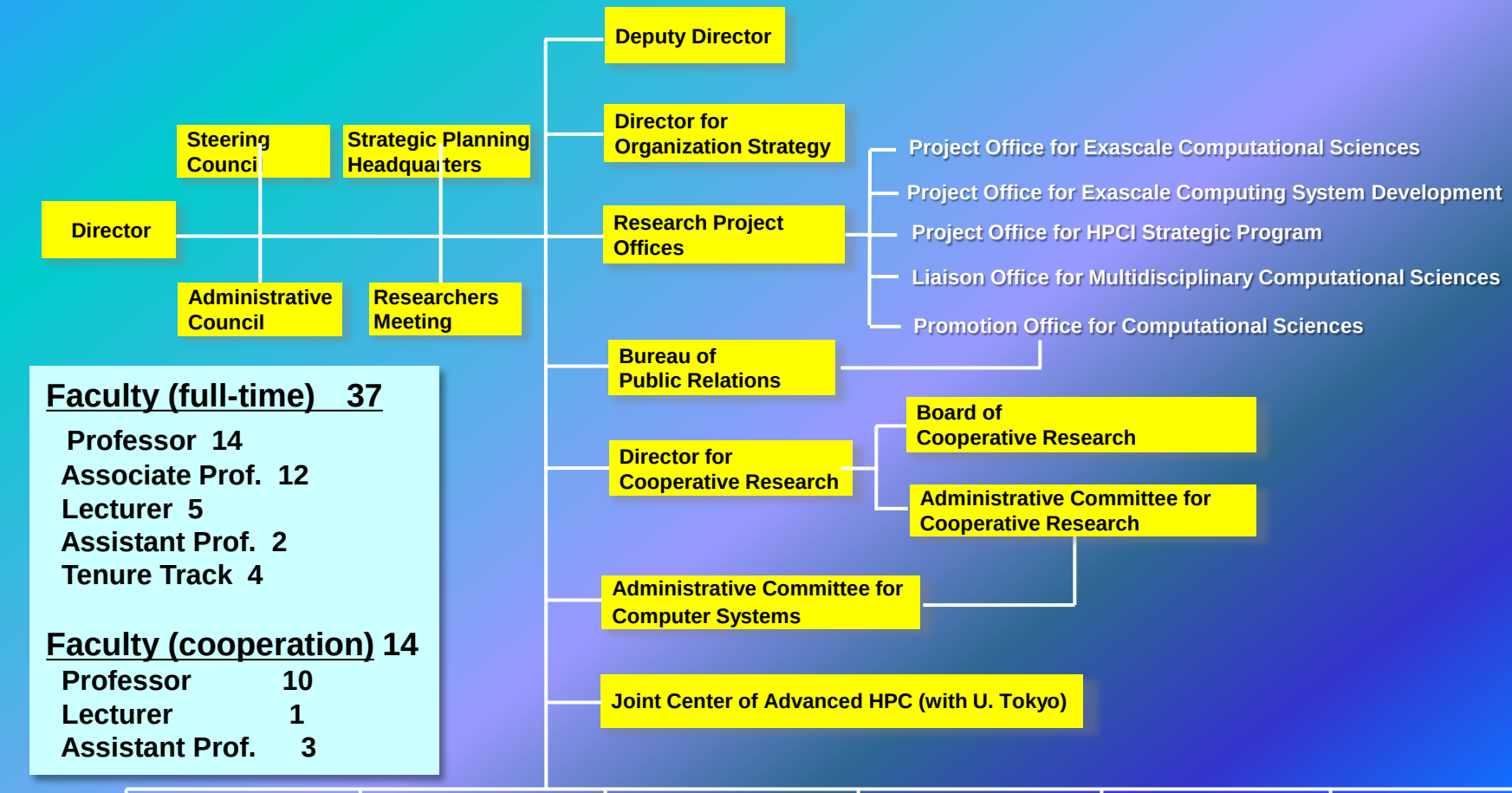
- Advance **scientific researches by computational science** through the application of advanced computing technologies
- Promote **Multidisciplinary Computational Science (MCS)** in Japan by the use of leading-edge advanced computing systems

Uniqueness

Collaborative researches between Computational Scientists (application) and Computer Scientists (system)

- Needs from applications and Seeds from systems
- More than 30 faculties and PDs, students: Particle Physics, Astrophysics, Nuclear Physics, Materials and Life Sciences, Global Environment and High Performance Computing System, Data base & Data Mining

Organization of CCS



Faculty (full-time) 37

- Professor 14
- Associate Prof. 12
- Lecturer 5
- Assistant Prof. 2
- Tenure Track 4

Faculty (cooperation) 14

- Professor 10
- Lecturer 1
- Assistant Prof. 3

Division of Particle Physics

Particle Physics Group

Division of Astrophysics & Nuclear Physics

Astrophysics Group

Nuclear Physics Group

Division of Quantum Condensed Matter Physics

Material Science Group

Division of Life Science

Biological Function and Information Group

Molecular Evolution Group

Division of Global Environmental Science

Atmospheric Science Group

Division of High Performance Computer Systems

High Performance Computing System Group

Division of Computational Informatics

Database Group

Computational Media Group

8 Positions Recruited in FY2013

"Organization for the Support and Development of Strategic Initiatives"

Particle Physics Group	Tenure Track*	
Astrophysics Group	Tenure Track*	
Nuclear Physics Group	Professor	Takashi NAKATSUKASA
	Tenure Track*	
Condensed Matter Group	Associate Prof.*	
Life Science Group	Professor	Yasuteru SHIGETA
Atmospheric Science Group	Tenure Track*	
Astrobiology	Professor*	

* new positions

➢ Research Divisions (in 2014)

- Division of Particle Physics: Particle Physics Group
  Leader: Yoshinobu Kuramashi
  Faculty 5
  Postdoc 4
- Division of Astrophysics and Nuclear Physics: Astrophysics Group
  Leader: Masayuki Umemura / Masao Mori
  Faculty 5
  Postdoc 4
- Division of Astrophysics and Nuclear Physics: Nuclear Physics Group
  Leader: Kazuhiro Yabana / Takashi Nakatsukasa
  Faculty 4
  Postdoc 1
- Division of Quantum Condensed Matter Physics
  Leader: Kazuhiro Yabana
  Faculty 3
- Division of Life Sciences: Biological Function and Information Group
  Leader: Masayuki Umemura / Yasuteru Shigeta
  Faculty 2
  Postdoc 1

➢ Research Divisions (cont'd)

- Division of Life Sciences: Molecular Evolution Group
  Leader: Yuji Inagaki
  Faculty 1
  Postdoc 1
- Division of Global Environmental Science: Atmospheric Science Group
  Leader: Hiroshi L. Tanaka
  Faculty 3
  Postdoc 3
- Division of High Performance Computing Systems:
  Leader: Taisuke Boku
  Faculty 7
  Postdoc 4
- Division of Computational Informatics: Database Group
  Leader: Hiroyuki Kitagawa
  Faculty 2
- Division of Computational Informatics: Computational Media Group
  Leader: Yuichi Ohta
  Faculty 3

➢ Director

Prof. Yoichi Iwasaki (particle physicist): April 1992 to March 1998,
Prof. Akira Ukawa (particle physicist): April 1998 to March 2007
Prof. Mitsuhisa Sato (computer scientist): April 2007 to March 2013.
Prof. Masayuki Umemura (astrophysicist): April 2013 -

➢ Steering Council

The council is held twice a year, and the chair is selected from outside of U. Tsukuba. The council reviews the research activities in each field and the collaborations based on the multidisciplinary joint-use program, and discusses the direction of research of the Center and matters related to joint-use of the Center facilities.

➢ Administrative Council

The Director of the Center chairs the council, which holds a meeting every month. The committee discusses significant issues for operating the Center, which include matters related to the organization of the Center, selection of faculty members, budget planning, and confirmation of expenditures.

➢ Strategic Planning Headquarters

The headquarters is planning the requests for budgetary appropriations and faculty members for the enhancement of research activities as well as international collaborations.

➢ Researchers Meeting

This meeting consists of the entire Center faculty and the Associated Research Fellows. This meeting is chaired by the Director of the Center and is held every month. At the meeting, all aspects of research are discussed, such as the status of ongoing projects, procurement of equipment and operation of the Center computer system.

➢ Research Project Offices

These offices propel the missions regarding the challenge to novel computer technology, the multidisciplinary collaborations, and the nationwide/worldwide promotion of computational science. The following offices are set up:

- Project Office for Exascale Computational Sciences
- Project Office for Exascale Computing System Development
- Project Office for HPCI **(High performance Computing Infrastructure)** Strategic Program
- Liaison Office for Multidisciplinary Computational Sciences (MCS)
- Promotion Office for Computational Sciences

➢ Administrative Committee for Cooperative Research

The CCS is calling for applications twice a year for the joint-use program of computer facilities. Since 2007, these activities have been reinforced by enhanced links with computer sciences through the promotion of the Multidisciplinary Cooperative Research Program (MCRP). Since 2010, the Center has been recognized as a national core-center under the Advanced Interdisciplinary Computational Science Collaboration Initiative (AISCI) by the MEXT. The administrative committee manages this joint-use program.

Budget in FY2013

Total	JP¥ 2,631 MM (US$ 26 MM)
Supercomputers (D&O)	JP¥ 539 MM
Electricity	JP¥ 182 MM
Personnel Expenses	JP¥ 292 MM
Operating Expenses	JP¥ 179 MM
Grant-in Aid (MEXT etc)	JP¥ 1,350 MM
Grant-in Aid (JSPS)	JP¥ 87 MM

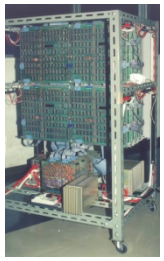
Development of Massively Parallel Computer Systems in CCS

- 1977 research begins (by Hoshino, Kawai)
- 1978 1st machine
- 1996 CP-PACS (top of Top500)
- 2006 7th machine PACS-CS
- 2012 8th machine HA-PACS

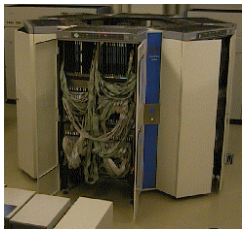
CP-PACS
- First large-scale general-purpose MPP system in Japan
  - Development supported by ``Research of Field Physics with Dedicated Parallel Computers'' funded by the Ministry of Education of the Japanese Government.
  - ranked as No. 1 system in the November 1996 Top 500 List.
- Collaboration by physicists and computer scientists
- Collaboration with industry, and released as Hitachi SR2201

1978
1st PACS-9

1980
2nd PAXS-32



1989
5th QCDPAX



1996
6th CP-PACS
(top of Top500 list in 1996)

2006
7th PACS-CS

2012
8th HA-PACS

Year	System	Performance
1978	PACS-9 (PACS I)	7 KFLOPS
1980	PACS-32 (PACS II)	500 KFLOPS
1983	PAX-128 (PACS III)	4 MFLOPS
1984	PAX-32J (PACS IV)	3 MFLOPS
1989	QCDPAX (PACS V)	14 GFLOPS
1996	CP-PACS (PACS VI)	614 GFLOPS
2006	PACS-CS (PACS VII)	14.3 TFLOPS
2012	HA-PACS (PACS VIII)	802 TFLOPS

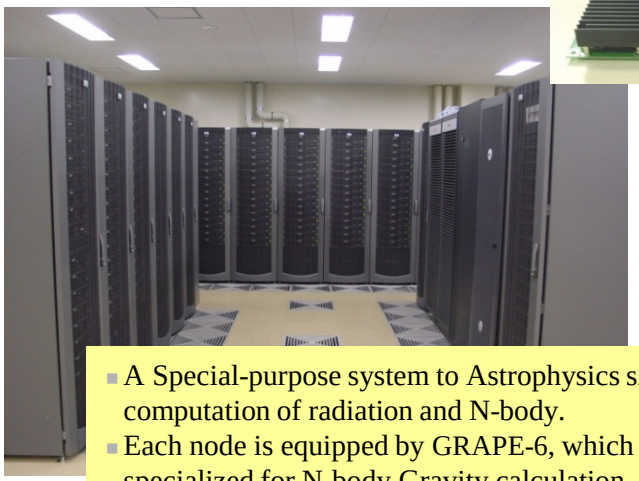
Computing resources in CCS

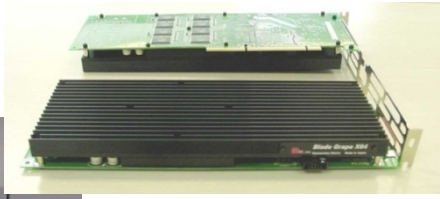
PACS-CS (2006～2011)

- #node 2560 node
  (Intel Xeon 2.8GHz, single core /node)
- peak performance 14.34 TF
- memory 5 TB
- network 250MB/s/link x 3 (3D-HXB by GbE)

FIRST (2007～2012)

Grant in aid by JSPS

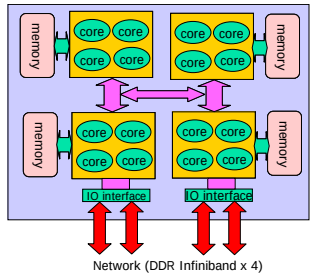


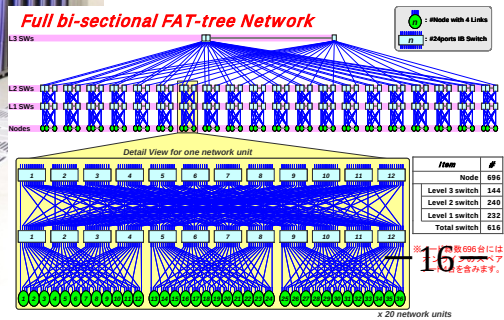


Blade-GRAPE

- A Special-purpose system to Astrophysics simulation by hybrid computation of radiation and N-body.
- Each node is equipped by GRAPE-6, which is an accelerator specialized for N-body Gravity calculation.
- 256 nodes
- performance: cluster 3.5TFLOPS＋Grape-6 35TFLOPS

T2K-tsukuba(2008～2014)





Designed by T2K Open Supercomputer Alliance (U. Tokyo and Kyoto U)

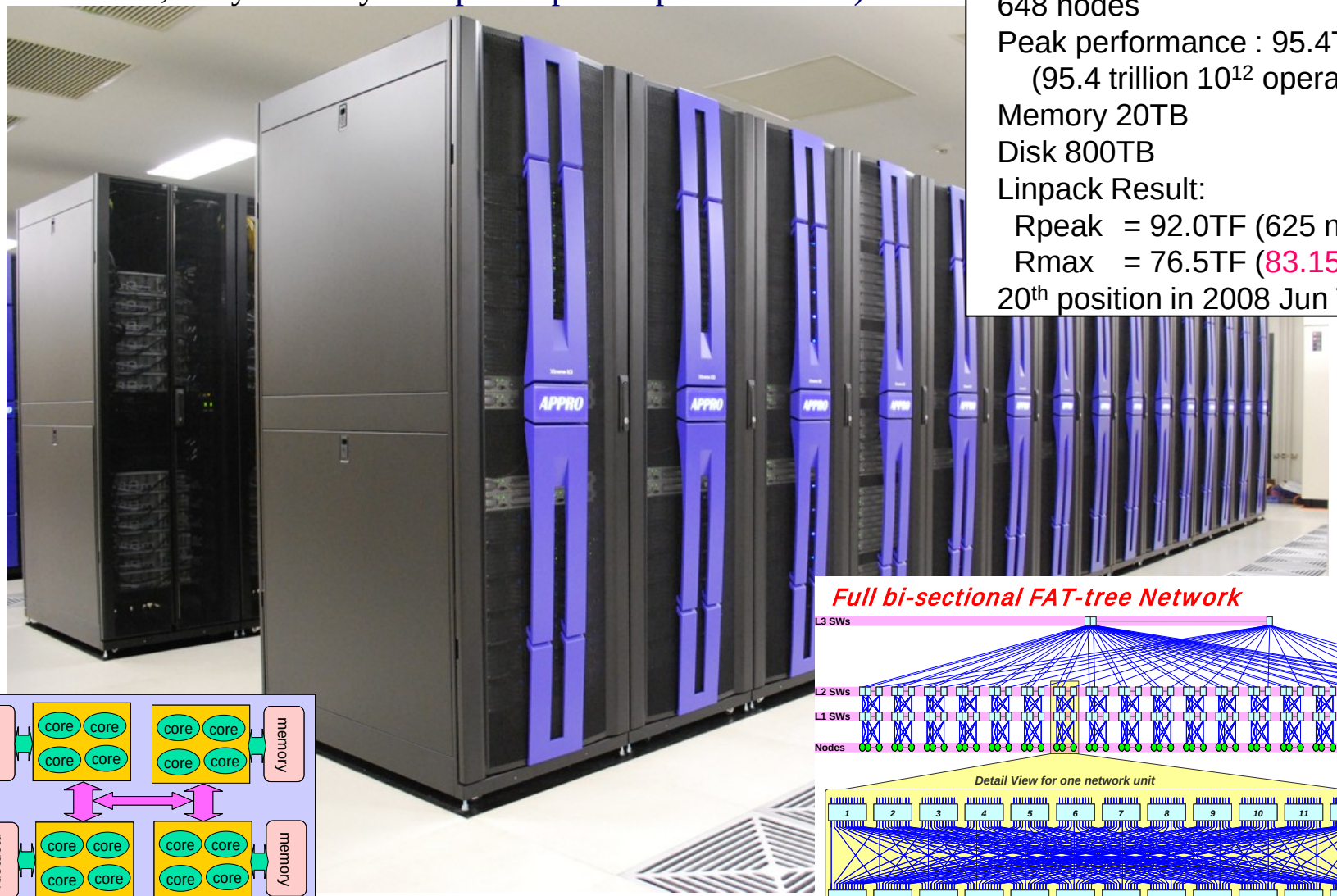
Spec;
- 648 nodes
  (quad Opteron, 4sockets/node)
- 10000 cores
- Peak performance 95.4TF
- total memory 20TB
- total disk capacity 800TB

(20th in top 500, June, 2008)

T2K Tsukuba System

(T2K: Tsukuba, Tokyo and Kyoto Open Supercomputer Alliance)

- 648 nodes
- Peak performance : 95.4TF
  (95.4 trillion 10^{12} operations/sec)
- Memory 20TB
- Disk 800TB
- Linpack Result:
  - Rpeak = 92.0TF (625 nodes)
  - Rmax = 76.5TF (83.15 %)
- 20th position in 2008 Jun Top500

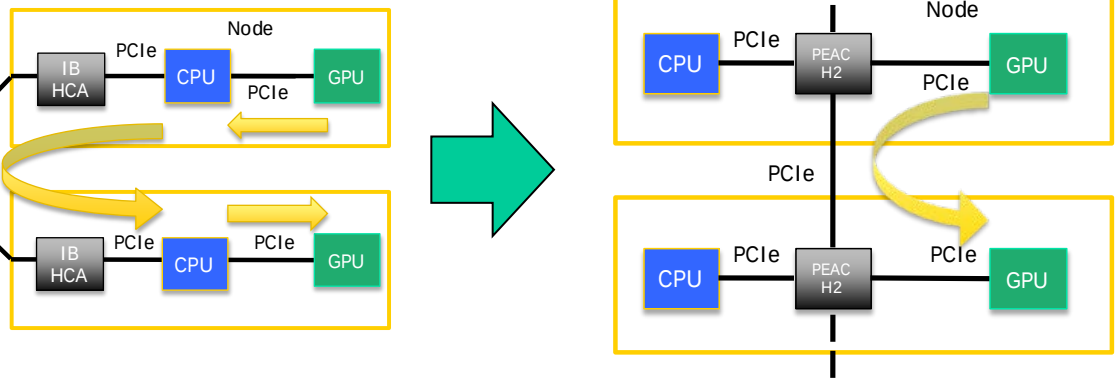


Item	#
Node	696
Level 3 switch	144
Level 2 switch	240
Level 1 switch	232
Total switch	616

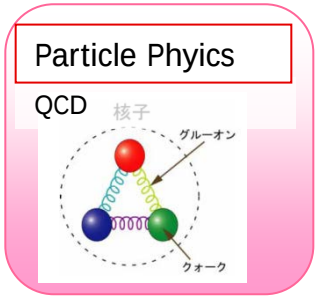
※ノード総数696台にはオンラインのスペアノード4台を含みます。

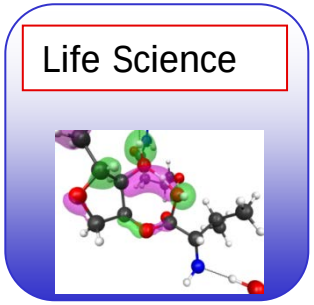
HA-PACS project

- HA-PACS (Highly Accelerated Parallel Advanced system for Computational Sciences)
- Funded by MEXT, The objective is exploiting technologies and applications for exascale computing
- Research topics
  - 1. Code development of the next-generation computational science applications for exascale (3 important area)
  - 2. Design of system architecture for exascale: Direct interconnect between GPU
  - 3. Programming environment for exascale (XcalableMP device extension)
- Project organization
  - Project Office for Exascale Computing System Development
  - Project Office for Exascale Computational Sciences



True GPU-direct
With cooperation of NVIDA

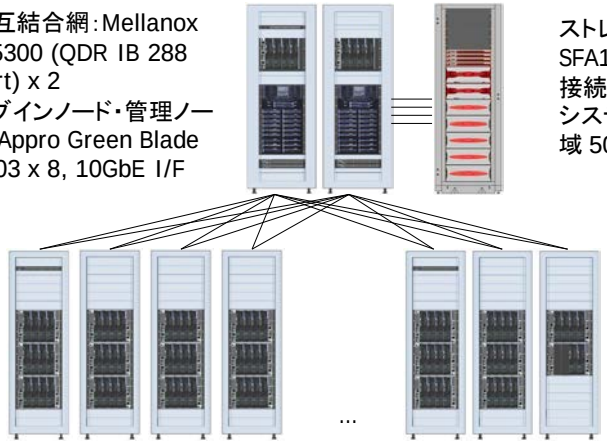




HA-PACS system

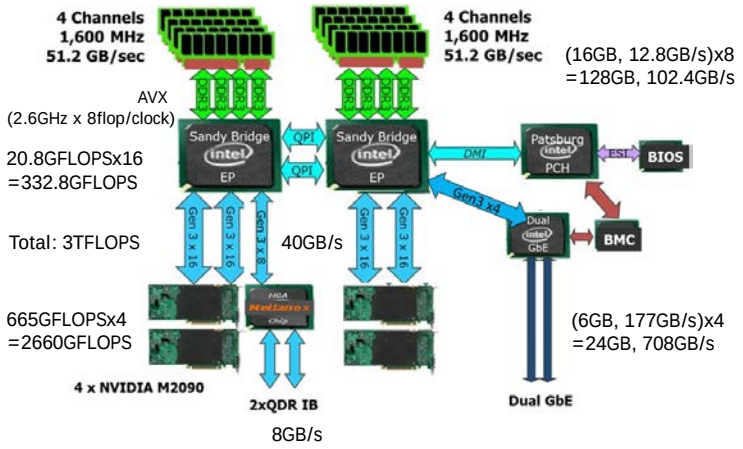
- System spec.
  - 268 nodes
  - CPU 89TFLOPS + GPU 713TFLOPS = total 802TFLOPS
  - Memory 34TByte、memory bandwidth 26TByte/sec
  - Bi-section bandwidth 2.1TByte/s
  - Storage 504TByte
  - Power　408kW
  - 26 ranks, Installed on Jan, 2012
  - Operation started from Feb, 2012

相互結合網：Mellanox IS5300 (QDR IB 288 port) x 2
ログインノード・管理ノード：Appro Green Blade 8203 x 8, 10GbE I/F



ストレージ：DDN SFA10000, QDR IB 接続, Lusterファイルシステム, ユーザ領域 504TB

計算ノード：Appro Green Blade 8204 (8U enc. 4 node) 268 node (67 enc./23 rack)



Computational Sciences by HA-PACS

Particle Physics

quark

proton

neutron

Nuclear Physics

Quantum Many-body System

Materials Science

Nuclear Reactions

Geoenvironment

NICAM glevel-10
2004060212 Z

Bioscience

Particle Reactions

13.7Gyr
1Gyr
0.1Gyr
Dark Age
0.38Myr
Big Bang
Cosmic Recombination
First Objects
Reionization
Galaxy Formation
Supermassive Black Holes
Star Formation
Solar system Planets

Astrophysics

Database

Dimensionality Reduction using PLSI / LDA

Hydrodynamics, Radiation, Chemical Reactions

Promotion of Multidisciplinary Computational Science (MCS)

- **Collaboration between Computational Science and Computer Science**
- **Collaboration among Computational Sciences**

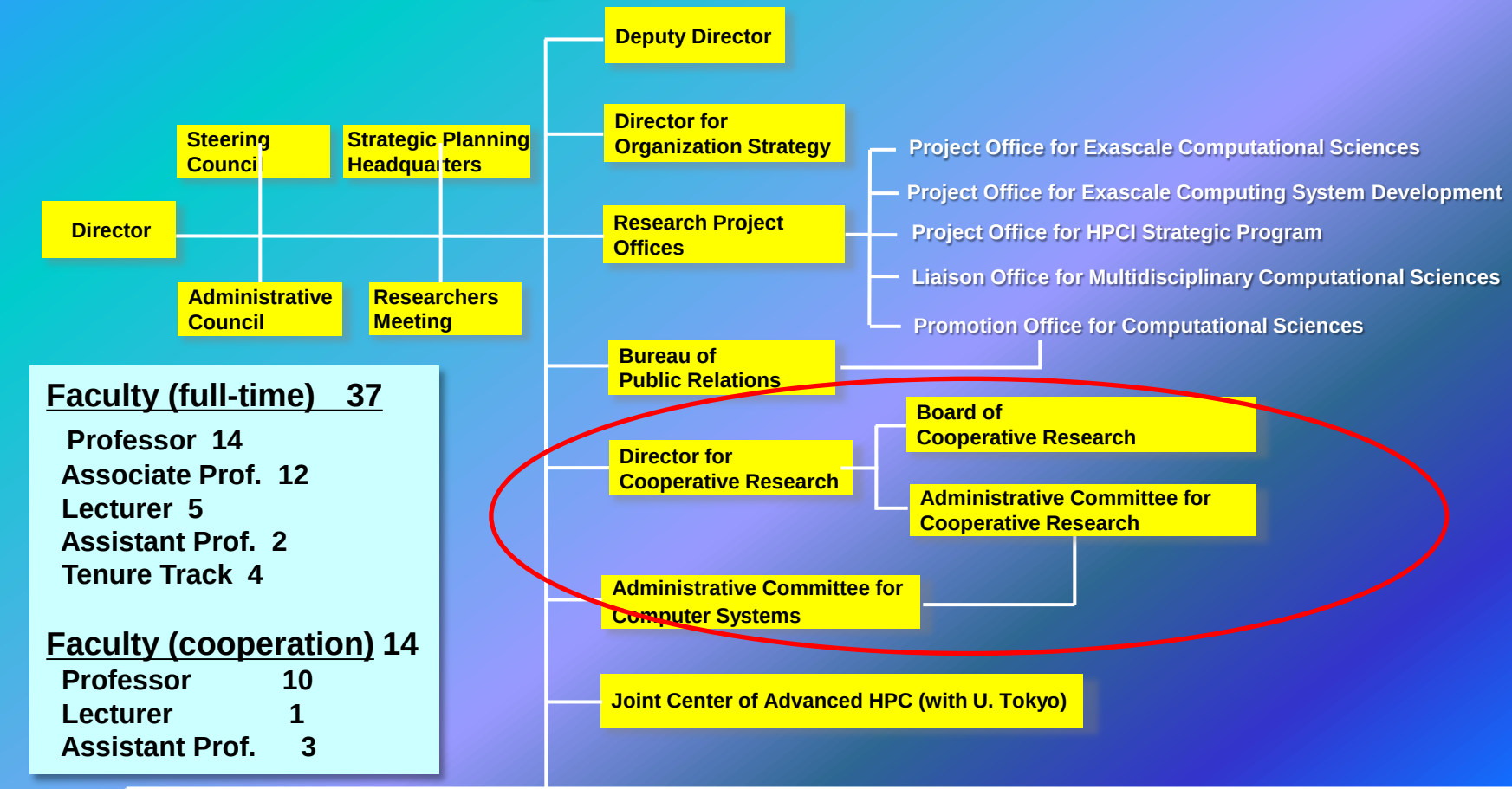
Project Office for Exascale Computational Sciences

Project Office for Exascale Computing System Development

- **Computational Science**
  - Division of Particle Physics
    - Particle physics – Lattice QCD
  - Division of Astrophysics and Nuclear Physics
    - Astrophysical Radiation Hydrodynamics
    - Quantum many-body systems, DFT
  - Division of Quantum Condensed Matter Physics
    - Materials science, Nano-science, DFT
  - Division of Life Sciences
    - Quantum mechanics, Molecular dynamics
    - Phylogenetic analyses
  - Division of Global Environment Science
    - Global environment, Urban climate

- **Computer Science**
  - Division of High Performance Computing Systems
    - System architecture
    - Grid computing
  - Division of Computational Informatics
    - Computational Intelligence - Data Mining & Knowledge Discovery, Large scale database
    - Computational Media - Visualization, Computer graphics

Organization of CCS



Faculty (full-time) 37

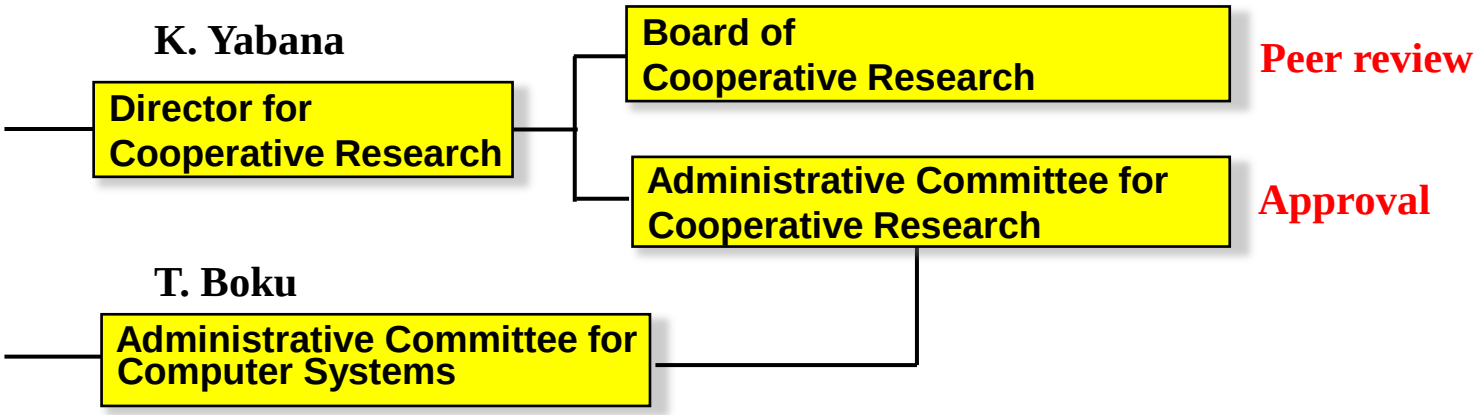
Professor	14
Associate Prof.	12
Lecturer	5
Assistant Prof.	2
Tenure Track	4

Faculty (cooperation) 14

Professor	10
Lecturer	1
Assistant Prof.	3

Division of Particle Physics	Division of Astrophysics & Nuclear Physics	Division of Quantum Condensed Matter Physics	Division of Life Science	Division of Global Environmental Science	Division of High Performance Computer Systems	Division of Computational Informatics
Particle Physics Group	Astrophysics Group Nuclear Physics Group	Material Science Group	Biological Function and Information Group Molecular Evolution Group	Atmospheric Science Group	High Performance Computing System Group	Database Group Computational Media Group

Multidisciplinary Cooperative Research
- Joint-use Program of Supercomputers -



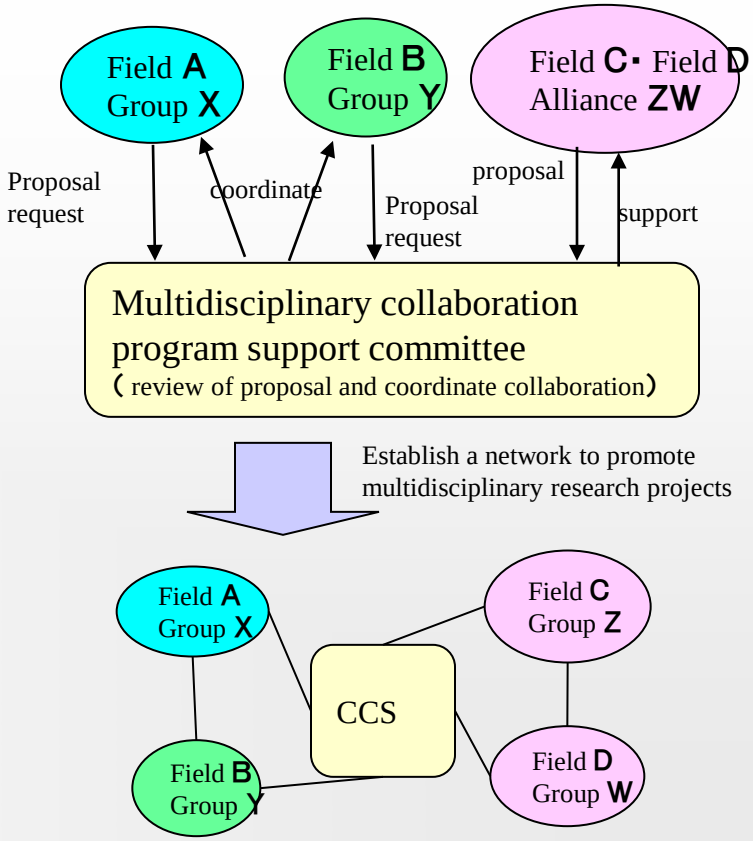
Since 2010, the CCS has been approved as a "national core-center" under the Advanced Interdisciplinary Computational Science Collaboration Initiative (**AISCI**) launched by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan, and has provided the use of its computational facilities to researchers nationwide as part of the multidisciplinary Joint-use Program.

FYear	2008	2009	2010	2011	2012	2013
Number of Projects	36	53	24	31	27(T2K) 21(HA-PACS)	26(T2K) 33(HA-PACS)
System	PACS-CS T2K	PACS-CS T2K, FIRST	PACS-CS T2K, FIRST	PACS-CS T2K, FIRST	T2K HA-PACS	T2K HA-PACS

CCS Inter-University Activity

Multidisciplinary Computational Science Promotion Programs

- Multidisciplinary collaboration program
  - Support to establish a network of multidisciplinary research projects and to encourage grand challenges of multidisciplinary computational science.
  - To promote multidisciplinary research projects of different disciplines.
    - Between Computer science and application fields（e.g. Applied Math and Particle Physics）
    - Between different application fields(e.g. Modeling of radiation in Astrophysics and Climate simulation)
  - Matchmaking of research groups from different fields
    - Review of Proposals by external reviewer of Multidisciplinary collaboration coordination committee
    - Coordinate research groups from different fields
    - Find partners to mach the request
    - Advice with expertise of different fields
  - Follow up the research activity produced by the multidisciplinary collaboration



- Large-scale scientific simulation program
  - Push forward the grand challenge of several fields in computational sciences by providing the computational facilities in CCS.
  - Review proposals and concentrate our computational power to make new scientific discoveries
  - Follow up the scientific results

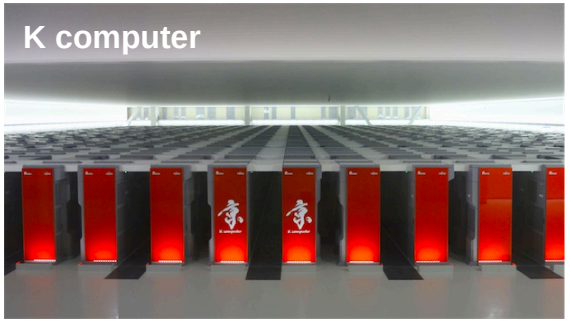
HPCI (High performance Computing Infrastructure)

Nation-wide computational science and next-generation supercomputing

- CCS was recognized as a national core-center for the collaborative research on the Multidisciplinary Computational Science from 2010
  - Advanced Interdisciplinary Computational Science Collaboration Initiative（AISCI）

- Collaboration with RIKEN on the next-generation system development
  - Formal agreement between U. Tsukuba and RIKEN signed in September 2006
  - Participation of several CCS faculty in the system design as a concurrent researchers

- Involvement to the national high performance computing infrastructure HPCI and the petascale system “K computer”
  - CCS was selected as a core organization for **“Field 5: The origin of matters and the universe”** in HPCI Strategic programs for K computer apps.
  - CCS is one of sites in the national HPCI



- In 2012, MEXT initiated the “**Feasibility Study on Future HPC Infrastructure**” projects to study the architecture of post-petascale systems following the K computer
  - As four projects have been accepted including CCS, we have been conducting the project “Study on exascale heterogeneous systems with accelerators

(→ 20th by M. Sato)

Highlights of Researches in CCS

- **CP-PACS Project(1992 – 1996): ** Developed the CP-PACS parallel computer (ranked as No. 1 in the Top 500 List of November 1996), which has produced ground-breaking results in computational particle physics, astrophysics and condensed matter physics.

- **Research for the Future Project "Development of Next-Generation Massively Parallel Computers" (1997-2001): *Heterogeneous Multi-Computer System (HMCS)*** to integrate different type of computers
  - The project was extended into **FIRST Project (2004 – 2012)** for pioneering large-scale astrophysical radiation hydrodynamic hydro-dynamics calculation.

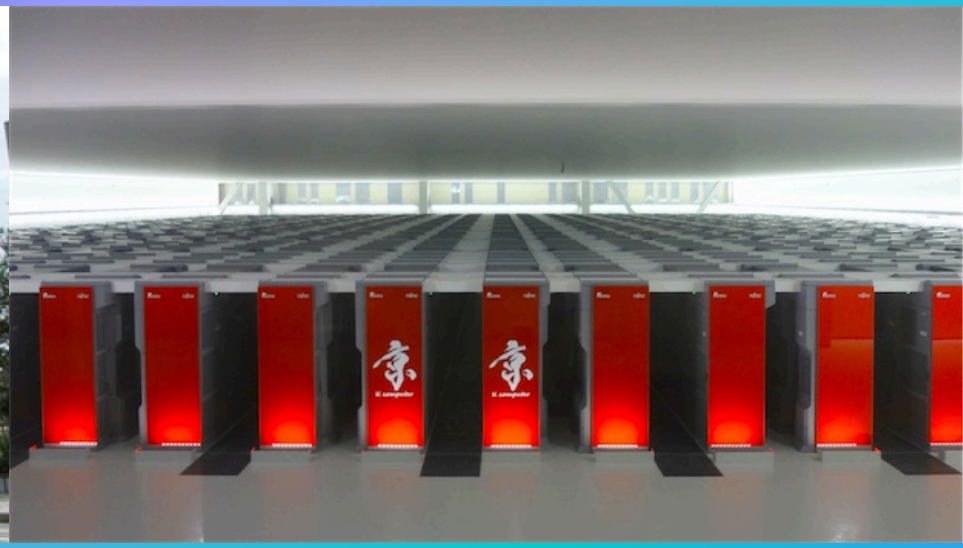
- **PACS-CS Project (2005 – 2007):** Developed a massively parallel cluster PACS-CS with a peak performance of 14.3 Tflops.

- **HA-PACS Project (2012 –):** Developed a accelerator (GPU)-embedded massively parallel cluster HA-PACS with a peak performance of 802 Tflops.

- **Gordon Bell Prize 2011 (K-computer)** Peak Performance
  (University of Tsukuba, University of Tokyo, RIKEN)
- **Gordon Bell Prize 2012 (K-computer)** Scalability and Sustained Performance
  (University of Tsukuba, RIKEN, Tokyo Institute of Technology)

京（K）computer

- SPARC64™ VIIIfx 2.0GHz octcore (128Gflops / core)
- 16 GB memory / core
- 6D torus network
- Total 82944 nodes (663552 CPU core)
- 1.3PB memory
- 10.6 Pflops peak speed



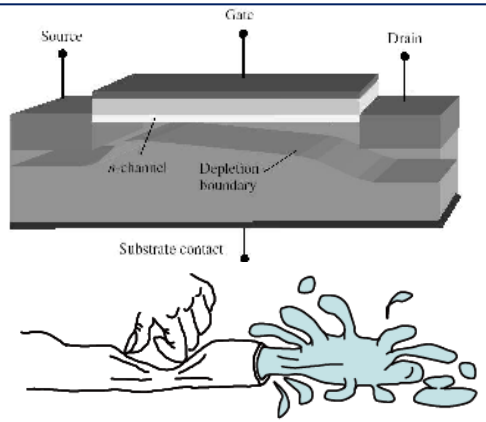
Prediction of Electron States of Si Nanowires with 100,000 atoms on K Computer

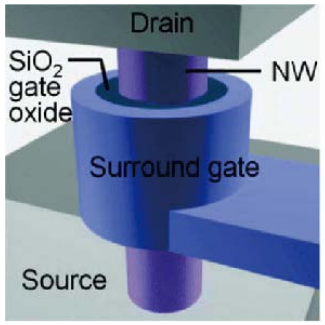
Gordon Bell Prize 2011

Si Nanowire, a booster
in the next-generation semiconductor technology

More Moore → More than Moore

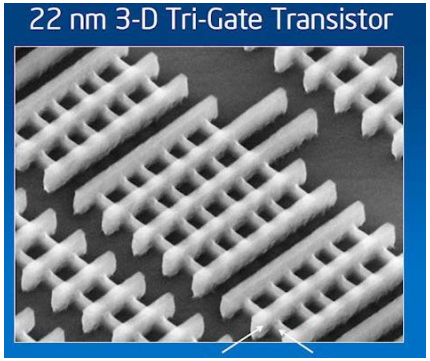
planar transistor





Surrounding gate transistor

Gate Controllability
→ Suppress short-channel effects
Suppress leaks at off state
→ save energy



Actually tri-gate by Intel in 2011

Number of atoms in SiNW channels
→ 10,000 - 100,000 atoms !

Collaborators

- Yukihiro Hasegawa (RIKEN)
- Jun-Ichi Iwata (The University of Tokyo)
- Miwako Tsuji (University of Tsukuba)
- Daisuke Takahashi (University of Tsukuba)
- Atsushi Oshiyama (The University of Tokyo)
- Kazuo Minami (RIKEN)
- Taisuke Boku (University of Tsukuba)
- Fumiyoshi Shoji (RIKEN)
- Atsuya Uno (RIKEN)
- Motoyoshi Kurokawa (RIKEN)
- Hikaru Inoue (Fujitsu Limited)
- Ikuo Miyoshi (Fujitsu Limited)
- Mitsuo Yokokawa (RIKEN)

Trillion-body Simulations of Dark Matter Universe

on K-Computer

Ishiyama (Tsukuba), Makino (TiTech), Nitadori (AICS, Riken)

Gordon Bell Prize 2012

Visualization by Takeda (CfCA, NAO)

Promotion Office for Computational Sciences

Educational Activities in CCS

- **HPC Seminar**
  - This seminar presents knowledge, methods and techniques for programming modern high performance computer systems, including recent microprocessors, and its performance turning, parallel programming.
  - Participants: researchers and users of computational science (including researchers in companies)
  - Periods: 2 or 3 days in summer season
    - Held since July 2007
  - Also broadcasted via internet

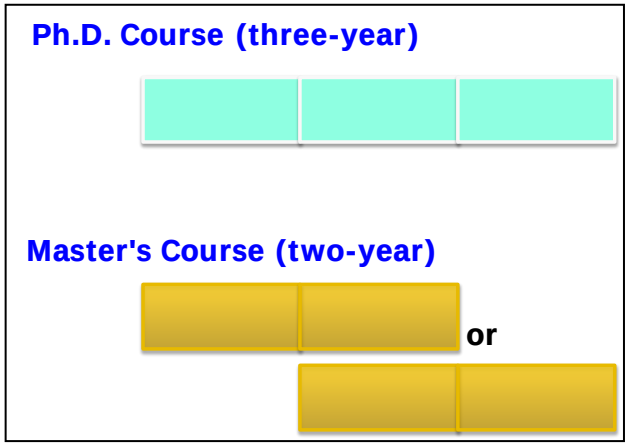
- Campus-wide courses on “computational sciences” for graduate students
  - Faculty members of CCS give lectures
  - Accredited as “unit” in graduate courses.
  - Courses
    - **Computational Science Literacy**
    - High Performance Parallel Computing Technology for Computational Sciences (overlapped with HPC Seminar)
  - Started from 2008

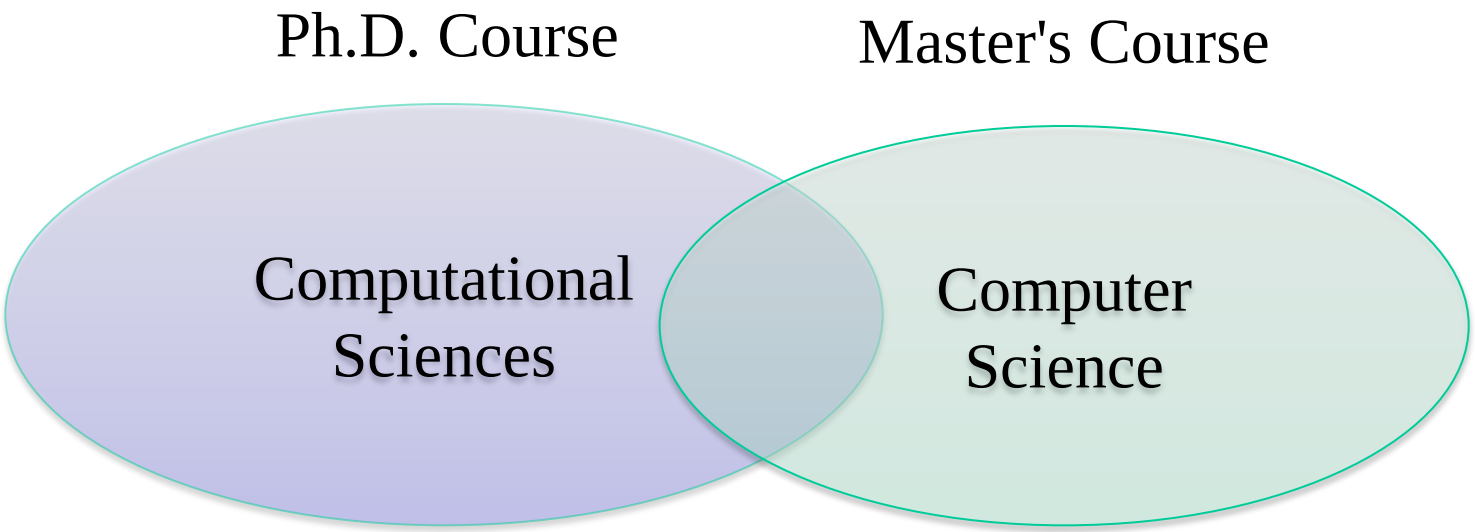
- Computational Science **Dual Degree (double major) Program**
  - Enables a graduate student in a doctoral program to simultaneously belong to a masters program of a different Graduate School, and receive both a doctoral degree in science and a masters degree in computer science, or *vice versa*, upon graduation.
  - Design of curriculum and courses for advanced computational science
  - Educate researchers who can push forward new multidisciplinary computational science from global viewpoints
  - Started in 2009 (Physics in Doctor course and Computer sciences in Master course)
  - To be expanded to “Environmental Science and Biological Science”

- Computational Science Courses in English in “Global 30 Program”
  - To accept International Students.

Computational Science Dual Degree Program

- **Computational Science Dual Degree Program**
  fosters qualified researchers in
  multidisciplinary computational science
  with research ability in both computational and computer sciences.
  - So far, 8 students have taken this course.





Liaison Office for Multidisciplinary Computational Sciences

Cooperation among Different Fields

Gordon Bell Prize 2011

RIKEN
The University of Tokyo
University of Tsukuba
Fujitsu Limited

International Collaborations

EPCC, University of Edinburgh, UK

Lawrence Berkeley National Laboratory, US

KISTI Supercomputing Center, Korea

Inter-university Activities

① Acquire (and development) and operate leading-edge advanced computing systems as inter-university facilities for large-scale computational science

② Symposium, workshop and colloquium organized by CCS

③ **Operation and support of scientific database and data Grid (e.g. ILDG/JLDG)**

④ Education, Outreach, and Public Relations

Agenda of External Review

18th February (Tuesday)

Morning

Overview of CCS (Workshop Room)

Afternoon

Activities & Collaborations of Divisions (Workshop Room)

19th February (Wednesday)

Morning

Activities & Collaborations of Divisions (cont'd) (Workshop Room)

Afternoon

Parallel Tracks for Divisions

Night

Committee Meeting with Dinner (Banquet)

20th February (Thursday)

Morning

Future Plans (Workshop Room)

Afternoon

Committee Meeting & Q & A to draft the report (Workshop Room)

Final Review Report

April 30, 2014

Schedule

18th February (Tuesday)

Overview of CCS (**Workshop Room**)

9:00-10:00 Welcome & Overview of CCS (M. Umemura, Director of CCS)
10:00-10:30 Activities and Results 2008-2013 (M. Sato, ex-Director of CCS)
10:30-10:45 Coffee Break
10:45-11:45 T2K-Tsukuba & HA-PACS Projects (T. Boku, Deputy Director of CCS)
11:45-12:10 Tour to HA-PACS
12:10-13:10 Lunch
13:10-13:30 ILDG/JLDG Project (T. Yoshie)

Activities & Collaborations of Divisions (**Workshop Room)**

13:30-14:00 Division of Particle Physics: Particle Physics Group (Y. Kuramashi)
14:00-14:30 Division of Global Environmental Science: Atmospheric Science Group (H. Tanaka)
14:30-14:45 Coffee Break
14:45-15:15 Division of Astrophysics and Nuclear Physics: Nuclear Physics Group (K. Yabana, T. Nakatsukasa)
15:15-15:45 Division of Astrophysics and Nuclear Physics: Astrophysics Group (M. Mori)
15:45-16:15 Division of Quantum Condensed Matter Physics (K. Yabana)
16:15-16:30 Coffee Break
16:30-17:00 Multidisciplinary Cooperative Research (K. Yabana)
17:00-17:30 Bureau of Public Relations (T. Yoshito)

Schedule

19th February (Wednesday)

Activities & Collaborations of Divisions (cont'd) (**Workshop Room)**

9:00-9:30 Division of High Performance Computing Systems: High Performance Computing Systems Group (T. Boku)
9:30-10:00 Division of Computational Informatics: Database Group (H. Kitagawa)
10:00-10:30 Division of Computational Informatics: Computational Media Group (Y. Kameda)
10:30-10:45 Coffee Break
10:45-11:15 Division of Life Sciences: Molecular Evolution Group (T. Hashimoto)
11:15-11:45 Division of Life Sciences: Biological Function and Information Group (K. Shiraishi, Y. Shigeta)
11:45-13:00 Lunch
12:45 Meeting Photo @Workshop Room

Parallel Tracks for Divisions

13:00-17:30

Division of Particle Physics	
Reviewer: Karl Jansen	**Room:D410,D411 (Physics)**
Division of Astrophysics and Nuclear Physics: Astrophysics Group	
Reviewer: Andreas Burkert	**Room: room A (CCS)**
Division of Astrophysics and Nuclear Physics: Nuclear Physics Group	
Reviewer: James Vary	**Room: D412 (Physics)**
Division of Quantum Condensed Matter Physics	
Reviewer: Joachim Burgdörfer, Shinji Tsuneyuki	**Room: D201 (Physics)**
Division of Life Sciences	
Reviewer: Andrew Roger	**Room: room B (CCS)**
Division of Global Environmental Science	
Reviewer: Jack Wells, Takemasa Miyoshi	**Room: room C (CCS)**
Division of High Performance Computing Systems	
Reviewer: Jeffery Vetter, Hiroshi Nakashima	**Room: SB911-1 (SysInfo)**
Division of Computational Informatics	
Reviewer: Xiaofang Zhou	**Room: SB911-2 (SysInfo)**

18:00- Committee Meeting with Dinner (A bus departs from CCS.)

Schedule

20th February (Thursday)

Future Plans (**Workshop Room)**
9:00-9:30 The Strategy of CCS (M. Umemura)
9:30-10:00 COMA (PACS IX) Project (T. Boku)
10:00-10:30 JCAHPC Project (M. Sato)
10:30-10:45 Coffee Break
10:45-11:15 Feasibility Study toward Exa-scale Computing (M. Sato)
11:15-11:35 Joint Institute for Computational Fundamental Science (JICFuS) (Y. Kuramashi)
11:35-11:55 Organization for Collaborative Research on Computational Astrobiology (CAB) (M. Umemura)

11:55-13:00 Lunch

Committee Meeting (**Workshop Room)**
13:00-14:00 Committee Meeting
14:00-15:00 Discussion, Q & A
15:00-16:00 Committee Meeting