

Appendix A. Faculty Members of CCS

Director: Mitsuhisa Sato
Deputy Director: Masayuki Umemura
Taisuke Boku

◆ Division of Particle Physics and Astrophysics (Division Manager: Masayuki Umemura)

Particle Physics Group (Group Leader: Sinya Aoki)

Faculty Members



Tomoteru Yoshie, Associate Professor

Graduate School:
Physics , Graduate School of Pure and Applied Sciences
Research topics:
Elementary Particle Physics



Naruhito Ishizuka, Associate Professor

Graduate School:
Physics , Graduate School of Pure and Applied Sciences
Research topics:
Computational studies on strong interactions
using lattice field theories



Yoshinobu Kuramashi, Associate Professor

Graduate School
Physics , Graduate School of Pure and Applied Sciences
Research topics:
Theoretical and computational studies
on strong interactions using lattice field theories



Yusuke Taniguchi, Assistant Professor

Graduate School:
Physics , Graduate School of Pure and Applied Sciences
Research topics:
Lattice gauge theory



Akira Ukawa, Professor, Executive Advisor to the President

Graduate School

Physics, Graduate School of Pure and Applied Sciences,

Research topics

Computational particle physics, in particular lattice QCD,
and development of computers for such studies

Collaborative researchers



Sinya Aoki, Professor

Graduate School:

Physics, Graduate School of Pure and Applied Sciences

Research topics:

Elementary Particle Physics Theory, Lattice Field Theory



Kazuyuki Kanaya, Professor

Graduate School:

Physics, Graduate School of Pure and Applied Sciences

Research topics:

lattice field theory, parallel computers

Research staff

- Kiyoshi SASAKI
- Noriyoshi Ishii
- Naoya Ukita
- Daisuke Kadoh

Astrophysics Group (Group Leader: Masayuki Umemura)

Faculty Members



Masayuki Umemura, Professor

Graduate School:

Physics , Graduate School of Pure and Applied Sciences

Research topics:

Theoretical Astrophysics.

In particular, the study with radiation hydrodynamics
on the formation of first generation objects and galaxies



Hiroyuki Hirashita, Assistant Professor

Graduate School:

Physics , Graduate School of Pure and Applied Sciences

Research topics:

Theoretical study of element production history
in galaxy formation and evolution



Kohji Yoshikawa, Assistant Professor

Graduate School:

Physics , Graduate School of Pure and Applied Sciences ,

Research topics

Astrophysics.

Theoretical studies on observational cosmology,
the formation of galaxies and galaxy clusters, and intergalactic medium



Junichiro Makino, Visiting Associate Professor

Graduate School:

Graduate School of Science, University of Tokyo

Research topics:

Computational Astrophysics,

Development of dedicated computers for computational science

Research Staff

- Yoshiaki Kato
- Tamon Suwa
- Takuya Akahori

◆ Division of Material and Life Sciences (Division Manager: Atsushi Oshiyama)

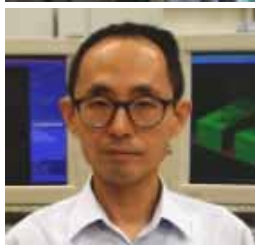
Material Science Group (Group Leader: Atsushi Oshiyama)

Faculty Members



Atsushi Oshiyama, Professor

Graduate School:
Frontier Science, Graduate School of Pure and Applied Sciences
Research topics:
Nanoscience and Theoretical Condensed Matter Physics



Kenji Shiraishi, Professor

Graduate School:
Frontier Science , Graduate School of Pure and Applied Sciences
Research topics:
Nanoscience and Theoretical Condensed Matter Physics



Susumu Okada, Associate Professor

Graduate School:
Frontier Science , Graduate School of Pure and Applied Sciences
Research topics:
Nanoscience and Theoretical Condensed Matter Physics



Susumu Saito, Visiting Professor

Graduate School:
Department of Physics, Tokyo Institute of Technology
Research topics:
Nanoscience and Theoretical Condensed Matter Physics

Research Staff

- Jun'ichi Iwata

Life Science Group (Group Leader: Masaru Tateno)

Faculty Members



Masaru Tateno, Associate Professor

Graduate School

Physics, Graduate School of Pure and Applied Sciences,

Research topics:

Computational analyses
of functional control mechanisms of biological macromolecules



Yasuteru Shigeta, Assistant Professor

Graduate School

Physics, Graduate School of Pure and Applied Sciences,

Research topics:

Theoretical studies on electron
and proton transfer reactions in biological systems

Collaborative researchers



Mauro Boero, Associate Professor

Graduate School:

Physics, Graduate School of Pure and Applied Sciences

Research topics:

First principles molecular dynamics simulations :
chemical and biochemical reactions of organic and inorganic materials
in liquid and solid phases

Research Staff

- Kamiya Katsumasa
- Yoshitaka Fujimoto

Quantum Many-Body Systems Group (Group Leader: Kazuhiro Yabana)

Faculty Members



Kazuhiro Yabana, Professor

Graduate School

Physics, Graduate School of Pure and Applied Sciences,

Research topics:

Nuclear physics, computational sciences on atomic, molecular, and optical sciences



Yukio Hashimoto, Assistant Professor

Graduate School

Physics, Graduate School of Pure and Applied Sciences,

Research topics:

Microscopic theory of nuclear collective motions



Hiroyasu Koizumi, Associate Professor

Graduate School:

Materials Science, Graduate School of Pure and Applied Science

Research topics:



Tong Xiao-Min, Associate Professor

Graduate School:

Materials Science, Graduate School of Pure and Applied Science

Research topics:

Atoms, molecules interaction with intense laser field and time-dependent density functional theory

Collaborative researchers

Kenichi Hino, Professor

Materials Science, Graduate School of Pure and Applied Science

- ◆ Division of Global Environment and Biological Science (Division Manager: Hiroshi Tanaka)

Global Environmental Science Group (Group Leader: Hiroshi Tanaka)

Faculty Members



Hiroshi L. Tanaka, Professor

Graduate School:

Geoenvironmental Sciences,
Graduate School of Life and Environmental Sciences

Research topics:

General circulation, dynamics and energetics of the atmosphere



Kusaka Hiroyuki, Assistant Professor

Graduate School:

Geoenvironmental Sciences,
Graduate School of Life and Environmental Sciences

Research topics:

Urban climate, Applied Meteorology,
Numerical simulation of mesoscale weather using the WRF model

Collaborative researchers



Fujio Kimura, Professor

Graduate School:

Geoenvironmental Sciences
Graduate School of Life and Environmental Sciences

Research topics:

Global Environmental Science Group (Group Leader: Tetsuo Hashimoto)

Faculty Members



Yuji Inagaki, Associate Professor

Graduate School:

Biological Sciences, Graduate School of Life and Environmental Sciences ,

Research topics

Molecular phylogeny of eukaryotes Investigation of lateral genetransfers

Estimation of protein functions by combining structural

and evolutionary parameters Artifacts in molecular dataanalyses

Collaborative researchers



Tetsuo Hashimoto, Professor

Graduate School:

Biological Sciences, Graduate School of Life and Environmental Sciences ,

Research topics

Molecular evolutionary studies

on the origin and early evolution of eukaryotes



Hideko Urushihara, Professor

Graduate School:

Functional Biosciences, Graduate School of Life and Environmental Science

Research topics

Studies on developmental programs described in the genome

◆ Division of High Performance Computing Systems (Division Manager: Taisuke Boku)

System Architecture Group (Group Leader: Taisuke Boku)

Faculty Members



Boku Taisuke, Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

High performance parallel computing,
cluster computing, hybrid parallel processing system,
grid computing



Daisuke Takahashi, Associate Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

High performance parallel computing,
High-performance numerical algorithms on parallel computers
and performance evaluation



Hiroshi NAKAMURA, Visiting Associate Professor

Graduate School:

Graduate School of Information Science and Technology, University of Toky

Research topics:

High-Performance and Low-Power Processor Architecture,
High-Performance Computing, Dependable Computer System

Collaborative researchers



Moritoshi Yasunaga, Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

VLSI Engineering, Evolvable Hardware, Dependable Systems



Kouichi Wada, Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

Numerical algorithms and simulation,
Mathematical software for GRID computing

Research Staff

- Toshihiro Hanawa

Grid Computing Group (Group Leader: Mitsuhsa Sato)

Faculty Members



Mitsuhsa Sato, Professor, Director

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

High performance parallel computing,
compilers and performance evaluation, grid computing



Osamu Tatebe, Associate Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

High performance parallel computing,
Grid Computing, Distributed File System

◆ Division of Computational Informatics (Division Manager: Yuichi Ohta)

Computational Intelligence Group (Group Leader: Hiroyuki Kitagawa)

Faculty Members



Hiroyuki Kitagawa, Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

Database systems, Data engineering Information integration,
WWW and databases, Knowledge discovery, XML databases,
Multimedia information retrieval, and DBMS architecture



Toshiyuki Amagasa, Assistant Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

Database Systems, Data Engineering.
XML Databases, Web Information Systems, Bioinformatics



Hideyuki Kawashima, Assistant Professor

Graduate School:

Computer Science, Graduate School of Systems and Information Engineerin

Research topics:

Database Systems and Data Engineering:
DBMS Architecture, Sensor Networks

Computational Media Group (Group Leader: Yuichi Ohta)

Faculty Members



Yuichi Ohta, Professor

Graduate School:
Advanced Engineering Systems,
Graduate School of Systems and Information Engineering
Research topics:



Yoshinari Kameda, Associate Professor

Graduate School:

Research topics:
Massive Sensing, Intelligent Video Making based on Scene Understanding,
Model Based Vision, Cooperative Distributed Vision, Lecture Archiving and
Distance Learning, Visual Surveillance, Human Interface to Virtual Reality



Itaru Kitahara, Assistant Professor

Graduate School:
Advanced Engineering Systems,
Graduate School of Systems and Information Engineering
Research topics:
Image media with ubiquitous sensor networks

Collaborative researchers



Tomonori Shirakawa, Professor

Graduate School:
Advanced Engineering Systems,
Graduate School of Systems and Information Engineering
Research topics:

Appendix B. Facilities of CCS

1. Computer Systems Overview

The computational facilities of the center mainly consist of a massively parallel cluster system PACS-CS and its front-end computer system, and the new generation of astrophysics simulator FIRST.

The front-end computer system consists of the system controlling servers to manage the PACS-CS cluster and the small-sized mini-PACS-CS for program development, Magellan (Hitachi SR11000J) for post-processing and analysis on generated data by PACS-CS, 100 TByte of large capacity file server to hold all data of these machines. There are additional medium to small size clusters for data analysis and general networking services. Beside of these main facilities in Computer Building, there are a number of graphic workstations and PCs to support daily research of researchers and students in Research Building. A central switch in Computer Building connects all computational facilities by Gigabit Ethernet for high-speed data exchange. It is also connected another central switch in Research Building via 10 Gigabit Ethernet to support high-speed data access among all resources in the center.

Main computational facilities in the center are shifting from vector machines to large scale high-end clusters including PACS-CS and FIRST to support various fields of computational sciences and computer science in all research divisions in the center.

Since the PACS-CS system is the main central facility in the center, the operation, job status and detailed system temperature such as CPU, chassis and network interfaces of each computational node are monitored in real-time. The status of the machine and air conditioners in Computer Building are remotely monitored to detect any failure.

New generation of astrophysics simulator

FIRST

Performance(256 nodes): Blade-GRAPE 33Tflops /
General purpose CPU 3.1Tflops



The massively parallel cluster

PACS-CS

Performance(2560 nodes): 14.34Tflops



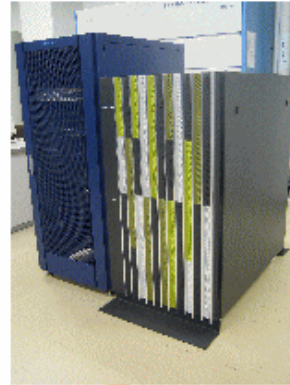
Perseus cluster
201.6Gflops



SR11000J1 Magellan
480Gflops



FileServer
100TB



Center LAN



10Gbps Network



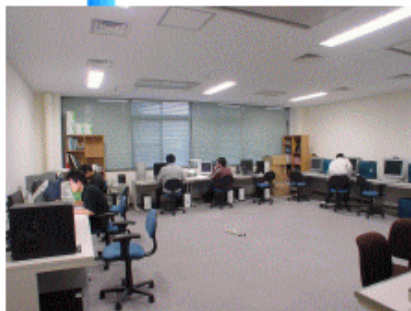
Mini PACS-CS



Post-processing cluster
Flare



General-purpose
Workstations



Graphic Server room



PACS-CS pilot system
Corona



UPS
800KVA 5min

2. Network Environment

University of Tsukuba has been connected 10 Gbps of nation-wide network for research and education named SINET3 under MEXT since April 2007. In addition, the university is also connected to major research institutes in Tsukuba City by a high-speed WAN with 20 Gbps bandwidth named TSUKUBA-WAN. Our center is connected to SINET3 with 2 Gbps of general purpose network and three of 1 Gbps special purpose research network. Moreover, we are also connected to the nation-wide research network JGN2 with 10Gbps link to stimulate various research activities in the center. In such network environment, we share the valuable data computed by PACS-CS and other center facilities as well as high-performance Grid computing research toward new generation of computational sciences.

