

MEMORANDUM OF UNDERSTANDING

between

The University of Tokyo,
Information Technology Center

and

The University of California, as Management and Operating
Contractor for Lawrence Berkeley National Laboratory

PREAMBLE

This Memorandum of Understanding (MOU) is entered into by and between the University of Tokyo, Information Technology Center, hereafter “Todai”, with a registered address at 2-11-16 Yayoi, Bunkyo-ku, Tokyo 113-8658, Japan, and the University of California, as Management and Operating Contractor for Lawrence Berkeley National Laboratory, hereafter “LBNL”, with a registered address at One Cyclotron Road, Berkeley, CA 94720, USA. Todai and LBNL are referred to collectively, as “Parties” or individually as “Party.”

1. Purpose

The Parties recognize the benefits to be derived from increased collaboration, cooperation and interaction for the further promotion and understanding of high performance computing (HPC), computational science and engineering (hereafter, collectively referred to as the “Field”).

The purpose of this MOU is to define the areas for fundamental, academic research in which the Parties desire to work together in the future for their mutual benefit to foster a collaborative framework between Todai and LBNL in the Field with a view to benefiting from each other’s initiatives and working procedures and to support collaboration among the researchers associated with both Parties.

2. Scope

This MOU sets forth the intentions of the Parties for increased collaboration, cooperation and interaction and does not create any legally binding commitments. If the Parties later agree to undertake specific joint projects with legally binding obligations, they will develop separate written agreements for such projects, setting out each Party’s contributions, deliverables, and budgets. It is also understood that LBNL is a Federally Funded Research and Development Center (FFRDC) operated by the University of California (UC) pursuant to a written contract with the United States Department of Energy (DOE); and, therefore, any work or activities undertaken by LBNL under this MOU, or any subsequent agreements, must be in accordance with the UC/DOE contract.

The Parties intend to:

- 2.1 Pursue collaboration on fundamental, academic research, related to HPC, computational science and optimization of applications performance on HPC systems, for example:
 - 2.1.1 Numerical libraries for scientific computation
 - Install “E-Science Libraries” developed by Today and the ones in the “DOE ACTS collection” in facilities of the Parties.
 - Evaluate performance and robustness of those libraries in both facilities.
 - 2.1.2 Couplers for multi-physics simulations
 - Exchange information on couplers for multi-physics simulations, especially in geophysics area.
 - 2.1.3 Scientific computing benchmarks
 - Exchange information on scientific computing benchmarks for research of performance of HPC systems
 - 2.1.4 Parallel programming models for peta/exascale systems
 - Exchange information on future parallel programming models for peta/exascale systems, such as flat MPI, OpenMP/MPI hybrid and others.
 - Develop models for performance analysis and estimation on scientific applications using various types of parallel programming models.
 - 2.1.5 Auto-tuning technologies on scientific computing
 - Exchange information on auto-tuning technologies for optimization of sparse matrix computation kernels, and algorithmic parameters on sparse and dense matrix libraries.
 - 2.1.6 Parallel algorithms for eigenvalue calculations and sparse direct/iterative solvers for systems of linear equations
 - Exchange information on parallel algorithms for sparse and dense eigenvalue calculations.
 - Exchange information on parallel direct algorithms for the solution of sparse linear systems.
 - Exchange information on parallel iterative preconditioning methods for the solution of sparse linear systems.
 - 2.1.7 Runtime System for Peta/Exascale Systems
 - Exchange information on communication and parallel file I/O systems.
- 2.2 Provide mutual access to facilities for the purposes of fundamental, academic research related to numerical libraries and scientific applications. Any such activities, including any employee exchanges outlined in 2.4 below, must comply with the access requirements of the respective Party.
- 2.3 Encourage collaboration and cooperation of projects involving scientists, engineers and personnel from the user communities associated with each Party.
- 2.4 Offer an employee exchange opportunity with the aim of sharing and furthering the scientific and technical know-how of both Parties.

- 2.4.1 The Hosting Party is the Party at whose site the collaboration will occur. The Visiting Party is the Party whose researchers travel to the Hosting Party's site for scientific collaborations. The Visiting Party's researchers are employees of the Visiting Party and shall remain so at all times during any collaborations. Under no circumstances will researchers of the Visiting Party be considered to be employees or agents of the Hosting Party.
- 2.4.2 All proposed visits must be documented in a signed written agreement, which specifically sets forth all of the requirements, commitments and obligations of the Visiting Party and the Hosting Party, including any issues regarding visits addressed in this MOU.
- 2.4.3 The Hosting Party will be responsible for naming a collaborator within its institution as well as providing space and equipment for the researchers of the Visiting Party. The Hosting Party will assist in making necessary administrative arrangements for the researchers of the Visiting Party, including arrangements for living accommodations.
- 2.4.4 Any collaboration results obtained during a visit will be set forth in a report that will be accessible to both Parties.
- 2.4.5 Both Parties may freely use any collaboration results for publication or other research purposes. Any such use by either Party must make explicit reference to the report as well as to both Parties involved in this MOU.
- 2.4.6 At the end of the visit, the researchers of the Visiting Party will give a seminar at the site of the Hosting Party on the results of the collaboration.
- 2.4.7 The Visiting Party will comply with all of the requirements, rules and regulations of the Hosting Party, including safety, health, security, access and operational practices.

3. Costs

- 3.1 Each Party will be responsible for its own costs in connection with all matters relating to collaborations under this MOU. Where possible and appropriate, the Parties may also seek funding for collaborations from United States and Japanese research agencies.

4. General Provisions

- 4.1 As stated above, any specific joint projects with legally binding obligations will be set forth in separate written agreements.
- 4.2 Treatment of intellectual property rights developed through collaborations under this MOU will be determined between the Parties through mutual consultation and separate written agreements on a case-by-case basis.

5. Confidentiality

- 5.1 The parties agree that there is no intention to share any confidential or proprietary information in any collaboration under this MOU. If either Party wishes to disclose information it considers to be confidential or proprietary to the other Party, the Parties will enter into a written non-disclosure agreement. It is

also understood and agreed that no information will be exchanged or disseminated under any collaborations pursuant to this MOU which is export controlled pursuant to the export control laws of each government, including The Export Administration Regulations and the International Traffic in Arms Regulations for USA or the Foreign Exchange and Foreign Trade Act and its relevant legislations for Japan.

6. Duration

6.1 This MOU shall be effective for a period of three (3) years from the date of final signature. It may be modified or extended by mutual written agreement by the Parties. This MOU may be terminated by either party upon six (6) months advance written notice.

The Parties to this Memorandum of Understanding hereby confirm their agreement to its terms by the following signatures:

University of Tokyo,
Information Technology Center

University of California, Management
and Operating Contractor for
Lawrence Berkeley National Laboratory

By _____
Prof. Akinori Yonezawa
Director
Information Technology Center
University of Tokyo

By _____
Dr. Horst Simon
Associate Laboratory Director
Computing Sciences, Lawrence
Berkeley National Laboratory

Date _____

Date _____