The Regents of the University of California

COMMITTEE ON OVERSIGHT OF THE
DEPARTMENT OF ENERGY LABORATORIES
May 12, 2016

The Committee on Oversight of the Department of Energy Laboratories met on the above date at the Sacramento Convention Center, 1400 J Street, Sacramento.

Members present: Regents Davis, De La Peña, Kieffer, Pattiz, Reiss, and Zettel; Ex officio members Brown, Lozano, Napolitano, and Varner; Advisory member Chalfant

In attendance: Regents Elliott, Gorman, Gould, Island, Lansing, Ortiz Oakley, Oved, Pérez, Sherman, and Torlakson, Regents-designate Ramirez and Schroeder, Faculty Representative Hare, Secretary and Chief of Staff Shaw, General Counsel Robinson, Provost Dorr, Executive Vice President and Chief Operating Officer Nava, Senior Vice Presidents Henderson and Peacock, Vice Presidents Budil, Duckett, and Sakaki, Chancellors Block, Blumenthal, Dirks, Hawgood, Khosla, Leland, Wilcox, and Yang, Acting Chancellor Hexter, and Recording Secretary McCarthy

The meeting convened at 8:45 a.m. with Committee Chair Pattiz presiding.

1. **APPROVAL OF MINUTES OF PREVIOUS MEETING**

    Upon motion duly made and seconded, the minutes of the meeting of March 23, 2016 were approved.

2. **UPDATE ON THE DEPARTMENT OF ENERGY LABORATORIES AND PRESENTATION ON PREDICTIVE MEDICINE USING COMPUTING**

    [Background material was provided to Regents in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

    Committee Chair Pattiz updated the Regents on negotiations regarding the contract for Los Alamos National Laboratory (LANL). Because of actions taken by the National Nuclear Security Administration (NNSA) and the Department of Energy (DOE), LANL did not receive an award-term extension in the current year, as it had not for the past four years. However, LANL was offered a one-year contract extension. The University negotiated the terms of that extension so it would not be in a disadvantageous situation with its employees. Negotiations were successful in achieving a favorable contract for the upcoming two years. This contract would reduce the portion of non-guaranteed compensation to the University. LLC partners agreed at the beginning of negotiation not to accept a contract that would disadvantage any partner in future negotiations. The Los

Alamos National Security Board of Governors' executive committee has agreed to a path forward, which was confirmed with the NNSA and the DOE. The agreement is being reviewed to determine the appropriate way forward that would be within University principles. The University and its partners would continue to manage LANL for the next two years. The same partners manage the Lawrence Livermore National Laboratory (LLNL), which has received award-term extensions. The LANL contract was more favorable to the University than had been anticipated under the circumstances. Should there be a competition for management of LANL following the current contract, the matter would be brought to the Regents to determine whether the University would participate.

Vice President Budil introduced a presentation about a new multi-institutional initiative to bring together high-performance computing and big data analytics with biology and medicine to drive forward the capabilities of predictive medicine and a new, revolutionary approach to biological modeling. This initiative shows the potential of leveraging the unique capabilities of the National Laboratories with the great strength and breadth of the UC system.

Dr. Mitchell Cohen, UC San Francisco Professor of Surgery and San Francisco General Hospital (SFGH) Associate Trauma Medical Director and Director of Trauma Research, gave an overview of this initiative on the biological applications of advanced strategic computing, which brings together the analytic and computational capabilities of LLNL and academic medicine centered at UCSF and SFGH. The initiative's goal is to use the combination of big data and understanding of the basic science underlying clinical patients to produce a predictive biology or advanced precision medicine. Time is ripe for this initiative because of advances in all these fields. Advances in predictive biology and advanced precision medicine could improve patient care and outcomes, by enabling physicians to know a patient's trajectory and how it could be altered toward health. The initiative would be built on four pillars: predictive physiology, meaning models and simulations of normal human physiology; predictive pathophysiology, analyzing and modeling "perturbed" physiology; predictive pharmacology, or simulating the interactions of drugs and therapies with human physiology; and predictive microbial biology, modeling microbiome and pathogen interactions.

LLNL Deputy Associate Director for Computation James Brase added that these first steps in creating a predictive biology included creating a partnership with the National Cancer Institute, which is beginning to study how to bring computing and new experimental methods together. Three pilot projects are being conducted with the National Cancer Institute. The first looks at how to use new large-scale data analytics to predict, given the genomics of a cancer tumor, the most effective combination of drugs. The second area, being led by LLNL, is to understand the basic mechanisms of how certain cancers are initiated, even at the atomic level, using large-scale computation to explore these mechanisms in great detail. The third pilot project would explore using the whole population to understand overall patterns in cancer and particular therapies to perform virtual clinical trials to develop predictive models for effective treatment.

Dr. Cohen added that another pilot project centered at UCSF would use high-performance computing to improve prediction and diagnosis of sepsis, the nation's leading cause of in-hospital death, to enable better estimation of a patient's clinical trajectory and targeting of individualized treatment. Another project would develop a comprehensive, analytic approach to collecting big data on patients from time of hospital admission through discharge, using computational capability of LLNL and other National Laboratories to make advances in predictive biology. This project would be in conjunction with UCSF's larger precision medicine initiative.

Mr. Brase added that UC and the UC-affiliated National Laboratories are leading a number of institutions across the nation in the Biological Applications of Advanced Strategic Computing (BAASiC) initiative, combining large-scale computing, advances in instrumentation and measurement, and the new knowledge and large amounts of data being gathered in the life sciences. The goal is to develop an open system of simulation and data analytic tools that can support a broad range of applications in both the public and private sectors. The BAASiC initiative is very much in line with other emerging national initiatives with which UC and the UC-affiliated National Laboratories would also be heavily involved, such as the Precision Medicine Initiative and the new National Cancer Moonshot Initiative. These exciting initiatives would bring together technologists, biologists, clinicians, and computer scientists to address the most challenging and potentially rewarding fields.

Regent Zettel emphasized the importance of this research for policy-makers in their efforts to provide affordable health care and avoid wasting limited monies on ineffective drug therapies and treatments. She asked how the Regents could assist these research efforts. Mr. Brase responded that distribution of resources among interagency programs could be improved. For example, it can be difficult for the DOE to work with the National Cancer Institute, even though the DOE has the best computing ability. Researchers would need to be able to work across agencies to bring the best capabilities together to solve important problems.

Regent Lansing added that part of the National Cancer Moonshot Initiative was to enable cooperation and sharing of data among various agencies. She asked if other UC hospitals were involved in the research discussed, since that would increase the patient database. Dr. Mitchell confirmed that these initiatives were being conducted across all UC hospitals. He added that the University was uniquely able to accommodate this type of large-scale research across disciplines such as clinical medicine and computation, with a large volume of available data. Regent Lansing requested future updates on the progress of this research.

Governor Brown asked for information about any specific milestones that have been achieved and near-term goals. Dr. Brase reported that early work had been started on high-resolution simulations of the heart and its interactions with particular drugs in the Cardioid Project, a LLNL collaboration with IBM. This would enable testing of drugs through computer simulations rather than through human trials. Governor Brown asked if simulations were done of a specific heart. Dr. Brase answered in the affirmative.

President Napolitano stated that she would be attending a meeting with Vice President Biden and U.S Secretary of Energy Moniz, and asked Dr. Brase and Mr. Cohen to provide her with specifics about interagency cooperation that would be helpful to their work. She asked how virtual clinical trials were considered by the Food and Drug Administration (FDA). Dr. Brase said that the FDA still required human trials, but was an active partner in this research. The FDA was forward-looking and would eventually establish the correct policy framework for future virtual trials. Much work was yet to be done to validate these approaches.

The meeting adjourned at 9:20 a.m.

          Attest:

          Secretary and Chief of Staff