

The Regents of the University of California

**NATIONAL LABORATORIES COMMITTEE**

January 23, 2020

The National Laboratories Subcommittee met on the above date at UCSF–Mission Bay Conference Center, San Francisco.

Members present: Regents Kieffer, Ortiz Oakley, Reilly, Sures, and Zettel; Advisory member Gauvain

In attendance: Assistant Secretary Lyall, Managing Counsel Shanle, Senior Vice President Holmes, Vice President Leasure, and Recording Secretary Li

The meeting convened at 9:10 a.m. with Committee Chair Zettel presiding.

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

Upon motion duly made and seconded, the minutes of the meeting of September 18, 2019 were approved.

**2. ANNUAL REPORT ON FISCAL YEAR 2019 NATIONAL LABORATORY PERFORMANCE RATINGS**

[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.]

Vice President Leasure reviewed the performance ratings for the University's three National Laboratories for fiscal year (FY) 2019, beginning October 1, 2018 through September 30, 2019. At the time of the meeting, the U.S. Department of Energy (DOE) Office of Science had released the ratings for Lawrence Berkeley National Laboratory (LBNL), but the ratings for Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL) were still embargoed.

Mr. Leasure reported that LBNL earned a rating of 94 percent in FY 2019. This score placed LBNL in the top third of all DOE Office of Science laboratories. Among its successes, the Office of Science noted LBNL's world-class science and technology across its broad portfolio, leadership, financial management, and cybersecurity. LBNL completed construction of the Integrative Genomics Building at the end of the fiscal year, and UC demonstrated value in its stewardship. The Office of Science also noted that LBNL could improve its chemical management, work planning and control, and capital project management. Lessons were learned when LBNL completed its latest construction project.

Committee Chair Zettel asked whether capital project management issues were related to the contractor or change orders. Mr. Leasure replied that there were issues with staying on schedule with the subcontractor and that there were change orders that the LBNL legal

team was still discussing with the contractor. He projected that the change orders would be completed in the next few months. LBNL has learned to proceed differently in its next project. Committee Chair Zettel congratulated LBNL on its earned fee and successes.

Mr. Leasure reported that the LLNL earned fee for FY 2019 was still embargoed. He stated that LLNL has been well regarded by the National Nuclear Security Administration (NNSA) for sustained excellence in science, technology, and engineering. He predicted that the NNSA would view the Stockpile Stewardship Program as a success. LLNL's work in furthering its global nuclear security mission has been well received by the NNSA. Laboratory Director William Goldstein has continued to receive very good marks for his leadership. LLNL has improved its capital project management. The LLNL-UCSC partnership's laser guide star approach was also noted. LLNL would need to improve its worker safety, work planning, and control.

Regent Sures asked about the length of the University's contract with LLNL. Mr. Leasure responded that, assuming UC receives an award term for FY 2019, the contract term would end in 2024, with a possible addition of two more eligible years. Regent Sures asked whether Mr. Leasure was confident that, despite embargo, the award would be within range of what UC normally received. Mr. Leasure replied that the University was not aware of any issues that would lead to the NNSA not granting an award term to UC.

Mr. Leasure explained that this was the first year of the contract for Triad National Security, LLC (Triad), which began in November 2018. The earned fee for FY 2019 was not yet available, and the earned fees for prior years were associated with the previous contract. The DOE has continued to recognize LANL's sustained excellence in science, engineering, and technology; its Strategic Partnership Projects; Triad's governance system; and improvements in its safety culture. Issues from FY 2019 included a cesium-137 contamination event in Seattle involving one of LANL's subcontractors. LANL must also improve its conduct of operations, worker safety, and capital project management. The earned fees and award terms for LLNL and LANL were expected to be released in the next month, but the exact date was uncertain.

Regent Sures asked whether the Office of the President (UCOP) had control over issues such as conduct of operations and capital project management. Mr. Leasure responded that the LANL was run by Triad and that UCOP had equity on Triad's board. UCOP has worked directly with LANL Director Thomas Mason and his management team, and UCOP has membership in Triad committees that oversee functions of the Laboratory. UCOP has provided advice and roughly quarterly reviews of LANL's work. Mr. Leasure's office has a representative working at the Laboratory nearly every week. Regent Sures asked whether UC's partners in Triad were in agreement about learning from past mistakes. Mr. Leasure responded in the affirmative, adding that UC has had a good relationship with its partners.

Committee Chair Zettel praised the number of Regents who have visited the National Laboratories and commented that the visits have helped Regents appreciate the work being done. She congratulated Mr. Leasure and his team for their excellent work.

3. **UPDATE ON ACCELERATING THERAPEUTICS FOR OPPORTUNITIES IN MEDICINE**

[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.]

Vice President Leasure introduced James Brase, Deputy Associate Director for Computation at Lawrence Livermore National Laboratory (LLNL), and Michelle Arkin, professor in the Department of Pharmaceutical Chemistry and Co-director of the Small Molecule Discovery Center (SMDC) at UCSF. Several years ago, the Regents voted to provide \$3 million in Laboratory fees to fund the Accelerating Therapeutics for Opportunities in Medicine (ATOM) initiative. Mr. Brase added that that he co-lead ATOM with partners from GlaxoSmithKline (GSK), UCSF, and the Frederick National Laboratory for Cancer Research (FNLRCR).

Ms. Arkin stated that the SMDC was a drug discovery center for UCSF that worked closely with other campuses. ATOM has sought to address innovation gaps and challenges in converting innovation to medicine. The drug discovery process was linear, complex, time-consuming, and error-prone. Complex functions had to be encoded into small, non-complex compounds, and molecules that reached clinical development had a 95 percent failure rate. ATOM was trying to determine how to shorten the drug discovery process and work in parallel rather than linearly.

Mr. Brase stated that, several years ago, the National Strategic Computing Initiative explored how Department of Energy (DOE) capabilities could be used in partnership with federal and State governments to address important issues. Drug development could benefit tremendously from advances in computing, artificial intelligence, large-scale data science, and other areas. LLNL has joined UCSF, FNLRCR, the National Cancer Institute (NCI), and GSK to establish an open public-private partnership to ascertain whether it was possible to accelerate the drug discovery process, which typically took six to seven years, to one year or several months. Researchers needed to work in a smaller time frame for emerging diseases such as the new coronavirus. This partnership has brought together the best in capabilities from government, universities, and industry. Research and development began in February 2018. ATOM had 25 full-time equivalents and was based in the Mission Bay region in San Francisco.

ATOM's partners wished to fundamentally transform the current approach to drug discovery, which was experimentally driven and sequential, to one that was computationally driven and integrated. They sought an approach that considered efficacy, safety, pharmacological parameters, and whether a molecule reached its target and stayed there. Computational models and large-scale computing have allowed a parallel optimization approach. While ATOM was leading with computation, experiments were still important for validation. ATOM has used an open platform in which software, models, and data were available openly. This has invited the formation of new partnerships interested developing drugs for the public good rather than sustaining companies. With

Oak Ridge, Argonne, and Brookhaven National Laboratories joining ATOM, it would have access to the two fastest computers on the planet.

Ms. Arkin used a study on Aurora kinase A and B, enzymes involved in cancer and cell cycle progression, to demonstrate ATOM's computing capability. There were 550 types of kinase and they were very similar, so selectivity was a key challenge. Using multi-parameter optimization, ATOM took GSK's initial data and designed molecules within hours instead of weeks or months. The team was currently creating and testing these compounds. Mr. Brase added that this was the first real demonstration of this method's success. What ATOM could achieve in 16 hours on a supercomputer after modeling bolstered that partnership's confidence. He believed this could truly change drug discovery.

Mr. Brase stated that ATOM was in its second year of a five-year process of becoming ready to develop new medicines. In the next year, it would be adding more computational human-level models. Translating a drug to human effectiveness was also a challenge, and animal and cell models were insufficient. Automated chemistry and biology experiments were being integrated. In addition to three National Laboratories joining ATOM, Neurocrine Biosciences would be joining as well.

Ms. Arkin thanked Chancellor Hawgood for starting the partnership, which was ready to invite other UC campuses. UCSF has worked with other UC medical schools on drug discovery and clinical medicine, and SMDC has collaborated with other UC campuses. These campuses could contribute computational or drug discovery technologies, or they could present new drug discovery programs for testing in order to reduce risk and increase biological understanding before using them for drug development.

Regent Ortiz Oakley expressed his concern about combining the public good with pharmaceutical companies. He asked what the industry partners' expectations were, as well as what public benefit would result from the University improving GSK's ability to generate more profit. Mr. Brase replied that private partners benefited from access to and participation in the open-source software. As the world's largest pharmaceutical company, GSK had its own drug discovery program, but it lacked the advanced artificial intelligence (AI) of the National Laboratories or the biological expertise of UCSF. This open, rapid AI-driven drug development would help UC create new partnerships and design medicines without necessarily collaborating with pharmaceutical companies. Ms. Arkin added that UC could build better models from the data generated from pharmaceutical companies. These companies could afford to experiment with capital equipment, and the improved methodologies they devise could eventually bring down drug prices. She underscored that UC was working with these companies on common technology, not drug discovery. Regent Ortiz Oakley cautioned that the University must be able to articulate how this partnership benefits the people of California.

Faculty Representative Gauvain asked about ownership of patents in this open-source platform. Mr. Brase stated the technology was kept open in order to accelerate progress and build community. The intellectual property would be generated at the molecular level, and there has been a strong tradition of keeping molecule development open. Academic

programs could partner with pharmaceutical companies and still hold the intellectual property (IP). UCSF was taking the lead in determining the business aspects of the partnership.

Regent Sures emphasized how disappointing it would be if a major drug resulted from this partnership and UC was unable to benefit from it. He suggested that UC should have some level of protection and that UC should be compensated for its resources and effort. Chancellor Hawgood responded that there was a yearlong process in 2017 to work with NCI through the issues that Regent Sures raised. Chancellor Hawgood believed that ATOM was in a good place in this regard. He thanked the Regents for approving the \$3 million funding in 2017. Several aspects of this project were paradigm-shifting, such as the relationship between the public and private sectors. Societal problems such as climate change and healthcare costs transcended any single public institution and the private sector. ATOM was a small but significant experiment in creating such a partnership. Twenty-five scientists from different groups were working together in a University-owned space on a problem that would generate many complex IP and data security issues, which was why it took a year to work through the issues. Chancellor Hawgood expressed excitement about the progress made. This was an opportunity for the University to determine how to move its discoveries to human proof of concept before licensing, which lowered risk for the private sector and meant higher potential return for the public sector. Since the original funding commitment was for three years, Chancellor Hawgood planned to seek additional funding from the Regents. Committee Chair Zettel thanked him for his leadership.

Regent Kieffer noted that pharmaceutical companies provide curative drugs but also face criticism for what seemed like unnecessary overcharging, with UCLA and Xtandi as an example. He suggested that either the National Laboratories Committee or the Academic and Student Affairs Committee receive a briefing on the history of open research among U.S. universities, how discoveries are leveraged, and who controls the discoveries. The Regents should be comfortable with answering questions about these issues. Committee Chair Zettel stated that the Academic and Student Affairs Committee would be consulted on how to proceed. Chancellor Hawgood suggested coordinating with the Regents Working Group on Innovation Transfer and Entrepreneurialism.

Committee Chair Zettel asked how this partnership would affect UC's pre-clinical trials. Ms. Arkin replied that making changes in the pre-clinical phase would require close interaction with the U.S. Food and Drug Administration (FDA). UCSF has communicated with the FDA via its partnership with Stanford at the Center of Excellence in Regulatory Science and Innovation on reducing the number of animals used, as well as increasing drug safety while decreasing time and cost. After developing models, ATOM would ask the FDA how to implement them.

Committee Chair Zettel thanked the presenters and stated that the Regents looked forward to future presentations about ATOM's work. Mr. Brase invited visitors to ATOM and LLNL.

4. **APPROVAL OF USE OF CAPITAL AND CAMPUS OPPORTUNITY FUND MONIES FOR SOUTHERN CALIFORNIA HUB PILOT PROGRAM**

The President of the University recommended that the President, or her delegate, be authorized to expend up to \$500,000 of Capital and Campus Opportunity Fund funds to support the Southern California Hub pilot program.

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Committee Chair Zettel stated that this program would help UC campuses in Southern California have a closer relationship with the National Laboratories. Vice President Leasure stated that the Office of the President (UCOP) worked with a vice chancellor at UC Irvine to find a better way to include southern campuses in the work of the National Laboratories. Los Alamos National Laboratory would lead the program. UCOP proposed technical workshops at UC Irvine, UCLA, and UC San Diego to develop research areas that could be future areas of collaborations between campuses and National Laboratories. There would be process workshops to find improved methods for participation of undergraduate students, graduate students, postdoctoral researchers, and professors with joint appointments at the National Laboratories. The requested funds would be spent over six months.

Faculty Representative Gauvain asked whether UC Riverside and UC Santa Barbara would be able to participate after the pilot program is proven successful. Mr. Leasure responded that he would like both campuses to be a part of this program.

Upon motion duly made and second, the Committee approved the President's recommendation and voted to present it to the Board.

The meeting adjourned at 10:05 a.m.

Attest:

Secretary and Chief of Staff