ACSCOLI Notes, 5/12/10

I. Chair's Announcements

- LBNL July 7 Meeting: The July 7 meeting has been scheduled for LBNL. UCPB Chair Krapp cannot attend; he suggested either sending the UCPB Vice Chair or UCPB member Jim Chalfant (two different people), who will become the UCPB Chair next year.

LANL S&T: With respect to LANL S&T (4/19):

- Pit Production (LANL): Pit production at LANL (TA55) has expanded to such a degree that it is now crowding out other science and technology research (especially actinide science). Subsequently, there has been a drop in actinide science-related publications from LANL scientists. This crowding-out effect has also created other vulnerabilities in the nuclear weapon stockpile surveillance program.
- Budget: There has been a $625M increase in the NNSA budget, but all of this is going towards the weapons program. Non-proliferation activities also are a major recipient, which is a major emphasis of the Obama administration. With respect to budgetary matters, the new contract has added about ½ billion dollars to LANL costs (pensions, New Mexico's gross receipt taxes).
- JASONS Report & the National Posture Review (NPR): It was noted at that continuing with the current program of record (e.g. the Obama Administration's increase in funding of the program) is less of a problem than continuing with the past program of record (less funding). The Obama Administration seems attentive to maintaining the current stockpile. With respect to the NPR, Tomas Diaz de la Rubia (LLNL) did remark that the current NPR does provide the necessary technical flexibility to manage the nuclear stockpile.
- National Ignition Facility (LLNL): The recent GAO report on NIF was more of a bureaucratic critique, and did not include anything that the LLNL management did not already know (damaging of the optics, capsules, etc.). Another one of GAO's complaints is that the NIF review committees do not have the appropriate independence from the Lab Directorate. There is also the use of overhead in relation to the NIF; they were allocating funds in the way that NNSA directed, but now NNSA is unwilling to sign off. LLNL officials stressed that the point of NIF is the science not its practical applicability at this time. LLNL is moving forward with NIF, despite the GAO report.
- Post-Doc Hiring and Morale: Terry Wallace (LANL) noted that most of LANL's hires are coming from post-docs. That said, there is concern over the non-value added bureaucratic content of their jobs. It was noted that approval in the area of procurement needs to be pushed down to the lower levels. With respect to morale, Lab officials did indicate that the moral in the Labs is slowly getting better—a number of post-docs are being hired, and a number of them are foreign nationals. There was not total agreement regarding the treatment of foreign nationals—access does seem to be getting better in some areas, but there still seem to be problems.

- LBNL Advisory Board (Henry Powell): The Advisory Board held its last meeting on March 15-16. Paul Alivisatos has been appointed by The Regents and confirmed by the Department of Energy (DOE); he is identifying a number of senior leaders to work under him. He has also proposied five strategic areas for the Lab. In that vein, Director Alivisatos has articulated the following goals in energy research: climate modeling, bio fuels, batteries, carbon sequestration, etc. In addition, there are six major searches that are ongoing, including a deputy director. A recent staff proposal for flex-time was rejected out-of-hand by the Board. Community relations remain a significant issue, and even though Director Alivisatos has made this a priority (visiting with neighboring city mayors, etc.), some of the neighborhoods within Strawberry Canyon remain entrenched against LBNL's presence there. Space constraint is another issue; grant money is being turned down because of the lack of space. Towards solving that problem, one of the strategic views is to organize LBNL better (e.g., locate the same type of research in closer proximity). Turn-over at LBNL is down to 4.5% (excluding retirements). The electronic low-value purchasing system has saved LBNL over $30M over the past five years. Finally, the Advisory Board is interested in enlarging its size by three or four members; Harry Powell made the recommendation that the UCORP chair might be a valuable addition.

II. LLNL/Sandia Open Campus/Hertz Hall

Chair Simmons noted that Buck Koonce has been appointed as a Senior Advisor to the LLNL Director and will take responsibility developing this LLNL Open Campus. There is nothing new to report on Hertz Hall, but this does not seem to be a huge impediment to moving forward with the Open Campus. UCORP Chair Miller added that there is a new MOU between LLNL and UCD. In related news, John Garamendi (D-CA) recently introduced a bill in the House of Representatives to authorize the establishment of a technology transfer center at Lawrence Livermore National Laboratory and Sandia National Laboratories. That said, it is often difficult to attract funding to develop "proof of concept" ideas/inventions into actual products that can be manufactured.

III. UC Faculty/Lab Collaborations Task Force

VP Steve Beckwith remarked that it is important to begin to get more people from the Labs integrated into UC as adjunct faculty on the campuses. At the same time however, campus budgets are ill-equipped to pay their salaries. In that respect, using Lab funding would be one solution, and would also be a key a recruiting pipeline for the Labs. The Lab Directors are interested in such a proposal. Funding for initial meetings of groups to get this idea off the ground would be needed, but could possible come out of the $20M currently allocated for the Lab Fee competition. One member remarked that cross-collaboration is already common-place at UCD with very little to no money. However, this would be difficult to replicate on more remote campuses without some kind of funding. Chair Simmons added that there is a side benefit of an academic title—Lab scientists with university appointments can supervise

graduate students. These benefits notwithstanding, the real crunch (in terms of courses) will be in undergraduate courses, and very few Lab scientists will be able to handle an M-W-F schedule at a campus. LBNL-Berkeley joint appointments work extremely well, but it would be a little different with the other Weapons Labs. Co-teaching courses, either at the undergraduate or graduate level, might be another possibility for some departments. Courses on non-proliferation, nuclear forensics, and even climate modeling are very interesting—much of this talent does not exist among campus faculty (with the possible exception of some climate subjects).

VP Beckwith cautioned that we do not really know at this time what the results of such a program would be. An RFP will be necessary, with some light peer review (e.g., internal UC faculty peer review) with a focus on simply getting Lab scientists to come into joint appointments that would be organized by the campus departments and the Labs. Such an RFP would have two components: 1) A Lab scientist going to a certain campus; and 2) a campus in need of a certain scientist with particular skills/talents. The title of adjunct faculty is definitely a carrot, but there may be some difficulties in persuading them to regularly teach courses. Members also mentioned the possibility of using Lab scientists to free-up a campus faculty member's teaching load (basically a swap). However, VP Beckwith remarked that while this would benefit the individual faculty member; it would not help the University or be viewed favorably within the State Legislature. Chair Simmons summarized the main goals of these proposed appointments: 1) Bring Lab scientists to the campuses; 2) facilitate connections between campus faculty and Lab scientists; 3) enhance campus faculty research at the Labs; 4) improve Lab morale; 5) improve the recruitment pipeline for the Labs; and 6) improve support for graduate students working at the Labs.

IV. Senate Review of the Commission on the Future Recommendations: Research Strategies

Chair Simmons recommended that ACSCOLI endorse Recommendation #2 from the Research Strategies Work Group (RSWG), "Research Excellence in All Fields", and RSWG Recommendation #3, "Multicampus and Interdisciplinary Research":

- Recommendation #2: "The University of California must ensure continued excellence across a broad spectrum of cutting-edge research. To aid in this effort, the University should (1) prioritize internal funds to support world-class research in disciplines where extramural funding options are limited; (2) motivate the development of large-scale, interdisciplinary, collaborative research projects to capture new funding streams; and (3) augment and enhance opportunities for graduate student research and support wherever possible."
- Recommendation #3: "Create multicampus, interdisciplinary "UC Grand Challenge Research Initiatives" to realize the enormous potential of UC's ten campuses and three national laboratories on behalf of the state and the nation."

With regard to Recommendation #2, this can be enhanced with collaborative arrangements with the National Labs. Members remarked that the Labs are initiated many "Grand Challenges" research objectives themselves. That said, funding continues to be a crucial issue; right now, the grand challenge is simply making ends meet. It was also noted that such "Grand Challenges" initiatives would probably do little to help most students and staff. Members also opined that in terms of research funding, noting that the more local it is, the more visible it is. In general, Recommendation #2 is quite vague and lacking details, which could significantly impact its ultimate results. One concern is that such an initiative my only benefit particular fields, rather than the entire University as a whole. Another issue is this initiative's relationship to the newly established MRPIs, which largely supplanted a number of MRUs by virtue funding and defunding. If this initiative replaces, and therefore places a uniform and Senate-endorsed process on UC's systemwide research activities, this might be something that ACSCOLI could endorse, but the devil is in the details.

In sum, ACSCOLI agrees that the three National Labs are particularly well-equipped to address Grand Challenges envisioned in the COTF recommendations; however the committee recognizes that funding remains a key problem. That said, members noted the potential to address a number of "Grand Challenges" by increasing both formal and informal collaboration between UC's campus faculty and scientists at the National Laboratories (LBNL, LLNL, and LANL) that are currently jointly managed by the University through the respect LLCs (LANS and LLNS; LBNL is wholly managed by UC). In addition to collaboration in the hard sciences, opportunities also exist for the social sciences, as the Obama Administration's recent Nuclear Posture Review report lists as its five prime objectives (in descending order): #1: Preventing nuclear proliferation and nuclear terrorism; #2: Reducing the role of nuclear weapons; #3: Maintaining strategic deterrence and stability at reduced nuclear force levels; and #4: Strengthening regional deterrence and reassurance of U.S. allies and partners.

V. Researcher Morale at the Labs

UCORP Chair Greg Miller presented his committee's letter to ACSCOLI regarding researcher morale at the Labs; this letter is the outgrowth his recent update to that committee on the S&T comments from LLNL regarding morale. Chair Simmons remarked that at the S&T, it was noted that morale is improving. That said, morale was impacted by an optional transition from a defined benefit plan (DBP) to a defined contribution plan (DCP), as well as the fact that these scientists lost so-called "tenure" with UC when the Labs transitioned to the LLCs. However, negative comments are often prefaced by statements that the science at the Labs is excellent. UCOP's Office of Laboratory Management is very concerned about morale and is monitoring this issue quite closely. LANL has recently completed an employee morale survey; it is unclear where this stands, but John Birely will get back to ACSCOLI on this.

VI. May Regents Item on the Appropriation of Lab Contract Fees

EVP Brostrom briefed members about the content of the upcoming May Regents' item, noting that about $30M is allocated in the category of Lab Fees, with approximately 70% going to research (e.g., the Lab Fee Competition at S21M). Of the remaining $9M—$2M is for personnel compensation at the Labs; $4.2M is going to UCOP ($3.5M for the Office of Laboratory Management and $1.85M goes to other UCOP miscellaneous costs). There are also two contingencies associated with the Lab Fees fund: 1) A $9M contract closeout contingency fee that has been slowly funded at 1.3M per year (currently in its 4th year); and 2) a contingency fund of $3M for "factors affecting the fee" (when fees received are less than projected). With respect to UCOP costs, these have risen from $3.8M to $4.2M; EVP Brostrom explained that this is due to better accounting of associated costs at UCOP, not actual higher costs. For the Lab Fee competition, January 22, 2011 is the next review date. It was also noted that the bulk of the Lab Fees goes to UC's private partners.

VII. Laboratory Management Consultants Update

- LLNL/Sandia Open Campus update: John Birely briefly commented on the bill introduced by John Garamendi, but he did not have any other updates or details beyond what had already been reported in the press.
- S&T Update: Consultants elaborated on some issues from Chair Simmons' report on this topic earlier in the meeting. With respect to budget, it was noted that approximately $1.6B was transferred from DoD to DoE; $625M will go towards the nuclear weapons program (including non-proliferation). There is a wish that this money could be distributed more optimally however. With respect to actinide research and the issue of plutonium pit production crowding out actinide research, John Birely noted that LANL's plutonium facility TA 55 was established as a research institution in the 1970s, but its actinide research function(s) have been slowly crowded out by various production-oriented activities including pit fabrication. While there had been a general trend upward in the amount of actinide research being done, actinide scientists at LANL are less productive than they had been just a few years ago. Although TA55 is one facility that is category one (e.g., can handle a significant amount of plutonium); there are other facilities in which one can do work with smaller amounts of plutonium, which will increase the actinide work being done at LANL.
- Structure of Joint Appointments between LBNL and UCB: This has been scheduled for the July 7 meeting at LBNL. Consultant Bill Eklund recommended that this topic be expanded to cover LANL and LLNL as well. Currently, there is poor documentation on federal research funding that is being done at the Labs, but coordinated through joint appointments on the campuses. One concern is Lab adjunct faculty, who are compensated by the Labs, not the campuses, and receive this funding. It may be helpful to have the Berkeley Academic Affairs Vice Chancellor present this issue at the July meeting. He also urged the committee to work on basic rules regarding joint appointments, as he recently discovered that while

joint appointments were more common before the LLC contracts, this practice has continued with very little administrative foundation under the new contracts.

- Lab budget update (*see above under "S&T Update"*)
- NAS Study of the Nuclear Security Laboratories: John Birely remarked that there will be two steps in this study –one to look at the latter contractual questions and the second step for the technical questions. It is unclear when this will actually be due.
- START Treaty: This treaty has been signed by the heads of state (Russia/US) and commits to deep reductions in nuclear delivery vehicles. However, it is light on verification; it is questionable on strategic defense and prompt global strike (attacking with a conventional warhead); and there are counting rules. It is also questionable about how easy it will be to ratify this treaty.
- Comprehensive Nuclear Test Ban Treaty: Ratifying this treaty may not happen in the near-term future. President Clinton signed this treaty, but it has not been ratified; it actually sits with the Foreign Relations Committee in the Senate.
- President Obama's Nuclear Security Summit Conference: There is a non-binding communiqué that commits 47 states to do their best to round up fissile material and come back in four years.
- Five-Year Review Conference on the Nuclear Nonproliferation Treaty: In addition to START, the US declassified the total number of nuclear weapons (5,113 warheads as of September 2009). The US has also dropped its nuclear stockpile by 84% since the end of the Cold War. With respect to non-strategic weapons; the US has reduced these by 90% between 1991 and 2001 (Russia has an advantage in this area).

VIII. Nuclear Posture Review

It was noted that the annual assessment of the stockpile is an annual assessment of each weapon; this assessment was put into place by President Clinton, and consists of annual letter to the President. The group that performs this assessment has a better view of how to answer questions of longevity than the JASONS do. As a retrospective, John Birely noted that some weapons that were originally assessed as "high-confidence" were later discovered to need additional work to bring them up to standards.

IX. LEP/JASONS

John Birely remarked that the unclassified executive summary over-simplifies what is in the classified study. There are also issues associated with what you can do to improve nuclear weapons' surety (e.g., preventing accidental detonation and deliberate unauthorized use). He explained that there are basically three approaches to life-extension: 1) Refurbishment (R1), which is an attempt to clone the weapon while updating the components; 2) Reuse (R2); and 3) Remanufacturing (R3). The JASON executive summary leads one to believe that nuclear weapon lifetimes can be extended for a long time by solely using R1. The classified version shows that R2 and R3 become more likely candidates for some life-extension programs. It is also over-

simplification to just use these three categories. There are a series of bombs known as B61, which were introduced 50 years ago; these have been updated and altered however. This approach is clearly a re-use (R2) program, thereby combining the B61 with other secondaries so that there is only one item—B61-12. R3 also requires that one must use components and/or designs that have been tested before.

The JASONS' concern that a stable funding environment is necessary for life-extension was not communicated very well as their marquee message. The Lab Directors' letters resonate this concern. Another issue is inadequate stockpile surveillance. This is necessary to catch problems with design or simply aging of weapons. Enhanced surveillance does not necessarily mean tearing the weapons apart, but using high technology to conduct this surveillance. Determining the level of surety of these nuclear weapons has not been done; such a study could only be classified.

X. UC Labs/Faculty Research Collaboration

PRESENTATION: As part of ACSCOLI interest in examining research collaboration between the Labs and the campuses, Philip D. Goldstone, who is Executive Advisor for LANL's Principal Science, Technology and Engineering Directorate, made a presentation on "*UC and LANL: Partnership in Public Service—Expanding Research and Education*". He stated that LANL has a strong historical record of collaboration with UC since its beginnings in 1943; its current leadership supports this collaboration. Such collaboration is represented by the large numbers of UC faculty who participate in external review committees at LANL, as well as LANL's UC collaborations on LDRD. For example, in FY 2009 there were a total of 89 collaborations on 49 LDRD projects totaling $39.6M. Research funding is another measure of collaboration. In FY 2009, LANL awarded $20.5M in R&D subcontracts to UC. To put this level of funding into perspective, UC leads in this area, followed by Rice University ($14.8M), the University of New Mexico ($4.6M), New Mexico State University ($4.5M), and Colorado State University ($3.8M). Another excellent gauge of UC-LANL collaboration is the number of annual journal articles resulting from collaborations between LANL scientists and faulty on the campuses. Berkeley leads in this category with approximately 290 publications, followed by Riverside (~255), San Diego (~247), Davis (~197), Los Angeles (~198), Irvine (~140), Santa Barbara (~107), Santa Cruz (~100), and San Francisco (~20). When compared to other institutions, Berkeley and San Diego fall between the University of New Mexico (~485) and the University of Illinois (~292). LANL's link to UC is also reinforced by the large numbers of UC degrees held by its scientists and engineers—for instance just over 300 S&E employees hold UC MS or PhD degrees (sandwiched between the University of New Mexico (~415) and New Mexico State University (~220)); UC holds a slight edge over the University of New Mexico in MS or PhD degrees among its R&D employees at just over 200 (almost in a virtual tie with UNM). Critical to LANL's success in this area are its pipeline programs—its postdoctoral program (394 postdocs currently, 62% foreign nationals), high school/undergraduate/graduate student internships (1098

students in July 2009), and minority/diversity programs (17 minority serving institution student interns, tribal education programs, NNSA Native American scholarships, and 100+ teachers in the Math and Science Academy). Related to the large number of UC degree-holders at LANL is the fact that a number of LANL scientists and engineers have become UC faculty.

LANL also boasts a number of shared institutes with UC or institutes that have a UC focus (e.g. significant UC faculty and graduate student participation). These include the Engineering Institute (EI) with UC San Diego (damage prognosis, sensing and networks; 20 UC students out of 21 students total, 14 faculty); the Institute for Multi-Scale Materials Studies (IMMS) with UC Santa Barbara (soft materials, polymers, nanotechnology; 15 students, 14 faculty UC; the Information Science & Technology Institute (ISTI) with UC Santa Cruz, Carnegie Mellon, MIT, and Ohio State (data management, high performance computing, system failure; 25 students UC (66%), 10 UC faculty (53%)); the Materials Design Institute (MDI) with UC Davis (materials, energy and infectious disease; 15 students, 17 faculty); the Institute for Advanced Studies (IAS), which is a New Mexico consortium of research universities (HPC, cosmology, astrophysics, energy and environment); the Institute of Geophysics & Planetary Physics (climate change, geoscience, astrophysics; 22 UC students (59%), 22 faculty (59%) and involving 6 UC campuses); and the LANL branch of the Seaborg Institute (actinide science; 14 students in the most recent 2 years (35% UC)). LANL will also host eight undergraduate summer schools in 2010, which provide opportunities for UC undergraduate students; in 2009, Institutes' summer schools and collaborative research programs brought 150 undergraduate students to LANL. Beyond the Institutes and their support UC-LANL projects, UC faculty, researchers, and graduate students make extensive use of LANL facilities, which include the Los Alamos Neutron Science Center (LANSCE), the Trident Laser Facility, the National High Magnetic Field Laboratory (NHMFL), and the Center for Integrated Nanotechnology (CINT).

DISCUSSION: Members proposed a UC Center for undergraduates at LANL and LLNL, which would entail courses, internships, etc. Phil Goldstone will find out whether undergraduate course credits that are taken at LANL get transferred back to UC. However, most of the discussion centered on the idea of creating joint faculty appointments between UC campuses and LANL, LLNL, and LBNL. It was noted that a UC academic title is important because it would make Lab scientists instructors of record. Chair Simmons added that such a title would be something that would be distinct to the Labs and involve a distinct appointment process; it could also bestow Senate membership (this is controversial though). However, one member noted that currently there are not any real barriers towards UC/LANL collaboration, with the possible exception of funding/finance. That said, in a time of sparse funding for recruitment and start-up funding, if the Labs were to put up some of this money, it would fuel recruitment of faculty. Such funding would be Lab program money rather than Lab Fee money though. One issue (that a joint appointment could alleviate) is the fact that Lab scientists have problems securing NSF research funding directly because the NSF does not fund weapons research as a matter of policy.

Graduate student work at the Labs was also briefly discussed; it was noted that this work is often directed towards programmatic goals, rather than academic goals. In other words, the graduate student becomes a wonderful technician, but not much more.

ACTION: Mary Croughan and Bob Powell agreed to work with Chair Simmons on a proposal for joint appointment faculty title.