

# What Happens to the Continuity and Future of the Research Enterprise: Looking to 2020-2021 and Beyond

Report of a CNI Executive Roundtable  
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## Introduction

As part of the Spring 2020 Virtual Membership Meeting, CNI added a last-minute, extraordinary Executive Roundtable on the implications of COVID-19 for the research enterprise: *What Happens to the Continuity and Future of the Research Enterprise?* We were concerned that while there was a great focus on the move to remote instruction, much less attention was being paid to what was happening to the research enterprise in the response to the pandemic; a major commitment to research is one of the distinguishing and unique characteristics of the majority of CNI's member institutions. Demand for participation was unprecedented, ultimately leading to four separate Roundtable sessions on the topic, made up collectively of about 60 participants representing around 30 organizations. The discussions took place in mid to late April 2020, and a report of those conversations was published in May 2020: <https://cni.org/go/what-happens-to-continuity-and-future-of-research>.

Much has happened since the April Roundtables took place, and a number of organizations have looked at various aspects of this issue in the intervening months, ranging from physical lab safety to the varying impacts on researchers across disciplines.<sup>1</sup> As schools were actively planning their strategies for the fall and beyond, we wanted to look at how thinking had evolved since CNI's spring Roundtables, and we invited community members to participate in a discussion to explore this issue anew, and to share their experiences, thinking, and planning. The September sessions took place over the course of two meetings with different sets of participants. In all, over 50

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1 See, for example: the July 10, 2020 report by JASON, "Managing the Risk From COVID-19 During a Return to On-Site University Research," <https://fas.org/irp/agency/dod/jason/covid-19.pdf>; the National Academies of Sciences July 21, 2020 virtual workshop, Reopening U.S. Research Universities, <https://www.nationalacademies.org/event/07-21-2020/reopening-us-research-universities-confronting-long-standing-challenges-and-imagining-novel-solutions-an-exploratory-virtual-workshop>; the report by the American Institute of Physics, "Peril and Promise: Impacts of the COVID-19 Pandemic on the Physical Sciences," <https://www.aip.org/covid-impacts-on-physical-science>; and "What about Research? Scholarship and COVID-19" by Nicole Betancourt of Ithaka S+R, <https://sr.ithaka.org/blog/what-about-research-scholarship-and-covid-19/>. Many campuses have also issued detailed guidance on the return to research; see for example "UC Berkeley Guidance for the Ramp-Up/Ramp-Down of Research Activities during the COVID-9 Pandemic," [https://vcresearch.berkeley.edu/sites/default/files/inline-files/Final\\_Research\\_Recovery\\_Committee\\_Report\\_June\\_16%2C\\_2020-UCB\\_Guidance\\_for\\_Ramp-Up\\_Ramp-Down\\_of\\_Research\\_Activities.pdf](https://vcresearch.berkeley.edu/sites/default/files/inline-files/Final_Research_Recovery_Committee_Report_June_16%2C_2020-UCB_Guidance_for_Ramp-Up_Ramp-Down_of_Research_Activities.pdf).

individuals representing some two dozen-member organizations participated in the Roundtables. Participants were from various types of higher education institutions in the United States and Canada, and primarily included research officers, library administrators, and information technology and research computing officers; representatives from associations and the publishing industry were present as well. Some of the attendees had participated in the April 2020 sessions and updated their strategies and experiences; other institutions joined this discussion for the first time. This report is our attempt at a synthesis of those conversations, reflecting a snapshot of the situation at the time, as well as some of our thinking on the topic as of October 2020.

## **Background**

Clifford Lynch, CNI executive director, opened each of the Roundtable sessions by noting that when shutdowns were imposed in March 2020, what was happening with instruction was quite clear, as colleges and universities scrambled to transition to online teaching environments. There was intense focus on the undergraduate experience; this was covered in institutional publicity, the higher education press, and indeed the national popular press. The impact of the coronavirus crisis on the research enterprise was much more difficult to understand and assess – it was little reported or announced, other than in internal institutional communications – hence the impetus for the Roundtable series CNI hosted in April. During those early spring conversations, we learned that there was tremendous variation in the status of the research enterprise across campuses, and we also came to understand that, at that time, for key decision makers at the administrative level, research seemed to be very closely associated with lab work, despite the fact that a considerable amount of the scholarly enterprise takes place beyond the realm of the lab, such as computational work, office work, field work, and research conducted largely through the use of library collections, museums and archives. The role of public health authorities in many (but far from all) jurisdictions further distorted priorities and strategies, since their orders primarily affected lab and fieldwork. Additionally, it was apparent that the crisis was having an uneven impact across disciplines, yet we had little understanding of the details of that impact, much less what was being done, or what might be done, to mitigate it.

At those institutions that closed libraries and lab facilities, discussions were just beginning to take place in April around the question of how to restart research, and knowing that this planning would mature and move into implementation over the course of the summer, we convened a second series of Roundtables in order to revisit questions surrounding the research enterprise, its status as of September 2020, and plans for its future. In the discussions reported here, we continued to take a broad view of research, beyond the sciences and the campus labs, and very specifically considered the roles of libraries, research collections, research computing and other groups in supporting research continuity. We invited participants to address aspects of the implications of the coronavirus crisis on research operations, including questions about planning, graduate students, physical labs and facilities, access to physical collections and digital materials, the pattern of impact on various disciplines and mitigation strategies, and institutional approaches to improving research resilience, to name only a few.

## Synthesis and Institutional Perspectives

The fundamental themes dominating the September conversations were similar to those that emerged in the spring roundtables, but the situation on most campuses was very different, and it was clear that campuses have mainly moved from a reactive stance to one of cautiously implementing a well-considered strategy that was often well advanced. Most organizations have now developed and adopted a phased approach for returning to operations (often documented on a website for the campus community), usually comprised of a series of graduated steps, with the initial stage representing no or very limited activity, and the final phase indicating a resumption to normal (pre-COVID) operational status. In April, most attendees described their organization's operating status to be very low on the scale, with campus facilities open only for what were deemed as the most critical activities, such as COVID-related research, other critical in-progress research that if halted would jeopardize the health and safety of human subjects, maintaining cell lines or expensive and sensitive experimental apparatus, managing animal care, etc. Now, six months later, Roundtable participants reported that the research enterprise has substantially resumed across institutions in one form or another, though at reduced capacity. Organizations have implemented policies and strategies to mitigate the risk to people working in reopened spaces, such as establishing shift schedules and controlling the number of people concurrently allowed within enclosed spaces (with density levels often being set based on the phase of the reopening).

It was interesting to hear about various institutional priorities and strategies. Many institutions represented at the Roundtables first restarted research by faculty, and then they brought graduate students back; undergraduates were viewed as the biggest challenge, and were the last to return to campus, or undergraduate instruction was left almost entirely online. A few institutions prioritized undergraduate physical return, and subordinated everything else.

There was a very strong sense that while the fall 2020 and spring 2021 undergraduate experience was very much in flux at many institutions, the research enterprise was more stable, perhaps subject to incremental adjustments towards more limited or more expansive reopenings, and decisions about the research enterprise were not reported much in the press, nor were they subject to the same political pressures that drove undergraduate in-person reopenings in some states. Graduate students were largely back on campus when they needed to be, and graduate instruction and research were operational and would be able to adopt and continue reliably (this was generally the case in PhD programs at least – we did not much explore the status of professional schools). There was considerable concern expressed about the various pressures, stresses and uncertainties facing graduate students (particularly international graduate students), and we note that many US institutions have halted admission to select (humanities and social science) PhD programs for fall 2021 in order to conserve resources to better support the current cadre of graduate students.

There are certain types of research activities that clearly are going to be impossible for the near but indeterminate future (such as most foreign travel, much fieldwork, and some kinds of interactions with human subjects), and institutions and researchers are just beginning to fully reckon with this fact; part of the strategy here pivots on estimations of the duration of the pandemic, and whether it's worth investing in attempts to develop alternative strategies for those research activities or simply "wait it

out.” Our reading is that there’s some bias towards trying to wait it out, perhaps due to the considerable number of other demands for resources and attention, and because devising alternative strategies is going to be really problematic and expensive.

The events of 2020 have upended operations across higher education and the full implications of these disruptions remain to be seen. Here is what we heard during the September Roundtable discussions about some of the challenges resulting from the COVID-19 crisis, and the planning and strategies some organizations are formulating as they work to forge a path back towards full research operations.

We also explore here the opportunities and new or strengthening partnerships that are developing among the primary drivers behind research support on college and university campuses: offices of research, libraries, and campus IT and/or research computing divisions.

- The pandemic has accelerated many trends that were already well established in complicated ways. For example, research data management, data sharing, and data reuse were already receiving a great deal of attention in various disciplines, and gaining growing support from funders, both in the US and abroad. The direct response to COVID emphasized data sharing and the construction of pooled, curated community data and information resources, a move to preprints and similar very rapid scholarly communication, and related developments.
- Indirectly, and particularly in areas which emphasized lab work that was suddenly suspended, the acceleration became more complex. Research groups had time to become more expert in research data management and data curation, and to invest in doing this. Researchers became more interested in data reuse, since they couldn’t collect new data; in some cases they reached out to librarians to help them identify appropriate data sources and resources. Perhaps the greatest take-away is that the importance of research data management (including FAIR practices) and data sharing has been strongly reinforced. This is an area where universities are scaling up support services.
- Considerable emphasis has been placed on the importance of curation of faculty scholarly profiles and understanding research impact in recent years. Many faculty have found time recently to work on this, and hence we’ve seen a new emphasis on identifiers, notably ORCID, DataCite, altmetrics, and related mechanisms.
- Faculty and graduate students have spent much time and effort in recent months improving various research-related skills: research data management, software and data carpentries, data science tools and platforms (R, Python, Jupyter Notebooks, GitHub, etc.). We heard consistent reports that demand for classes and other instruction and consultation in these areas has expanded enormously. The libraries and research support groups have been investing heavily not only in moving existing workshops and small group instructional activities online, but also developing asynchronous recorded educational tools to provide additional alternatives and leverage to meet this demand. What is less clear is precisely what motivations are driving this move towards researcher upskilling: is it to simply

improve research skills, or is it part of a shift towards computational rather than bench research methods and practices because these are more resilient?

- Some libraries (particularly medical, but not exclusively) are reporting a high level of requests for help with systematic literature reviews; it's not entirely clear whether this is an effort to use time when labs are closed to improve skills, a prelude to possible adjustments of faculty research agendas (and grant applications), or something else, but the level of requests is high enough to be creating challenges for librarians.
- There are changes taking place in the ways in which labs and research groups are being managed. Regular, in-person, "all hands" meetings are now impossible, and are being replaced by communities moving to platforms like Slack or Microsoft Teams. Libraries and research computing units need to consider establishing a presence in these environments. Also, electronic lab notebooks are seeing increased adoption and use, though the patterns here are not uniform.
- Archives and special collections have reopened at some institutions, usually by appointment and often limited to only certain members of the community, such as faculty or doctoral students. Some archives and special collections are providing on-demand or other targeted digitization services.
- Access to the HathiTrust Emergency Temporary Access (ETAS) program, which enables member library patrons to obtain access to specific digital materials that correspond to physical books held by their own library, has now become more nuanced as more libraries are beginning to provide at least some access to their physical collections and as they are grappling with the tradeoffs of choosing one form of access over the other. Some libraries that have invested in careful collection matching with HathiTrust holdings, and have sufficient flexibility in their workflows and integrated library systems, are combining Hathi Emergency Access with physical collection access. More broadly, some libraries' digitization and circulation practices are approaching what could be viewed as controlled digital lending, whereby libraries digitize materials in their collections and make the digital editions available to borrow (while restricting access to the physical material). At many institutions where at least a large part of the student body is attending courses only online and remotely, there are difficult equity issues involved as the physical collection becomes more accessible.
- A few institutions, or groups of institutions, are now trying to restart or re-establish various consortial or reciprocal arrangements for the sharing of access to physical materials. The discontinuity between the physical and digital environments has been a huge problem for institutions, researchers and students.
- We learned a few interesting things about interlibrary loan (ILL). In March-April, at the peak of the shutdowns, there were a few libraries that stayed open, and tried to carry the burden of much of the national ILL demand, particularly for biomedical material, which provided a huge reservoir of resilience for the research library system, but placed a tremendous strain on the service-providing institutions.

- Childcare and the impact of school closings is a major issue for researchers across disciplines (particularly for younger researchers), with what may have serious workforce and productivity ramifications long-term. The impact seems to be especially acute for women, whom we repeatedly heard have been disproportionately burdened with the fallout from the shutdown. Many institutions reported that faculty were placing some research projects on hold due to the demands of childcare (and perhaps homeschooling); some academics have been forced to take leaves of absence. Lab work scheduled across multiple shifts to accommodate density restrictions is exacerbating an already difficult situation for some academics that are parents or caregivers. Most institutions are making adjustments to the tenure and promotion processes to recognize and accommodate these challenges.
- Budgetary implications:
  - Some institutions whose budgeting cycles had been delayed are now getting more clarity on their budgets, allowing units to begin to make decisions regarding priorities vis-à-vis research support. Others are still waiting to see about enrollment, success in operating in-person instruction, and other factors (notably state appropriations) before they will have much clarity about their budgets; units are being asked to plan for a wide range of budgetary contingencies.
  - One library reported that they've had to stop digitization efforts due to budget cuts.
  - A few libraries that have very effectively aligned themselves with institutional responses to the pandemic (in both instruction and research) are actually seeing budget augmentations.
  - Despite budgetary pressures, libraries seem to be steadfast in their commitments to advancing open scholarship, open educational resources, transformative publishing agreements and related initiatives. Several institutions reported that research grant influx has increased, sometimes at record-breaking levels.
- Fieldwork is presenting tremendous challenges, except for some limited research related to natural resources, agriculture, biodiversity, etc., where travel can be done by personal auto and risks are low; approval of those activities has also been expedited by their importance to essential state and regional planning and management activities. Many institutions have prohibited nearly all travel at least through the end of the academic year and international travel will likely be difficult for some time to come. These challenges are particularly serious to humanists who cannot visit archives, collections, archaeological sites, etc.; these visits (and the funding to support them) are often scheduled very far in advance. In contrast, a significant part (but far from all) of the international travel that scientists do is about collaboration rather than fieldwork.
- While shut out of labs or fieldwork, many researchers have turned to grant writing – we saw this in the spring, and the reported spike in proposal submissions (about 20-30% by some estimates) seems to confirm the trend, which has implications for review and refereeing, and for funding competition going forward.

- Researchers, in particular “bench” scientists, have used the time when their labs were closed to write up results and perform computational data analysis; we heard repeatedly that journal submissions were up about 20-30%, which will have implications for reviewers. It will be important to understand how quickly the demand to capture new experimental data begins to constrain the analysis and publication pipelines.
- At some institutions, particularly smaller ones, and ones without medical schools, the role of the chief research officer has been at least temporarily re-defined to focus on issues surrounding a safe return to campus (including COVID testing and monitoring, facilities safety, and the like), distracting from core research and innovation concerns. CIOs have also become heavily involved in some of this work at many campuses.
- There are serious concerns about the human cost of the crisis, including mental health issues. Participants discussed the high levels of anxiety and stress across the community: among, researchers, faculty, staff, and students. Equity for those individuals working remotely and those that had to be physically present on campus was also raised as a source of tension. This has many operational implications: early retirements when positions can't be replaced because of hiring freezes, more management time spent on human resources (HR) issues, the challenges of onboarding new staff in virtual environments; but the overarching issues are about staff morale and well-being. This is much more than an HR issue.
- Heating, ventilation, and air conditioning (HVAC) and other facilities issues have become extremely important; we are seeing new collaborations around building management, IT, research space, and facilities management.
- Libraries, archives, and museums that are planning or launching new exhibits are now forced to do so in a dual virtual and physical (or sometimes entirely virtual) framework.
- With library maker spaces closed, at least one institution reported that their library was lending out maker space carts.
- There were some very interesting discussions that indicated that as research facilities re-opened, there was very limited demand for return to studio spaces; the presumption was that users of these spaces were often able to functionally recreate them off-campus, at home or elsewhere. This led to a discussion of home labs, and moving lab equipment to faculty homes, and the various policy restrictions on doing this. This entire area deserves some more organized examination going forward. There are anecdotes about corporate research staff that are less constrained by policies continuing to do important innovation in home “labs” even while corporate facilities are closed.
- Some libraries used the shutdown as an opportunity to advance large digital projects (e.g. systems and data migration); others have been able to reassign staff to advance digitization, metadata upgrading, or accessibility work on collections, resulting in enhanced access to these collections. This has been opportunistic so

far, but sets up longer-term questions about resource allocation, priorities, and user expectations.

- Prior to the pandemic, libraries at many state institutions served as libraries of last resort to state citizens, particularly those who needed access to research materials (including, for example, medical literature). As the research literature became increasingly available in digital form, they made these resources available to the public by negotiating licenses that provided access to those physically present in the library, even if they were not affiliated with the institution, and citizens could visit the university libraries to obtain access to this literature (including electronic resources). At present, libraries at public institutions, which have a very strong commitment to supporting this public access role, are struggling with how to continue to support citizen access when their facilities are not open to the general public, or perhaps not open at all.

We heard surprisingly little about work on lab automation, robotics, telepresence, remote access to lab equipment and related technical questions, or about which organizational units or collaborations should be responsible for trying to advance these efforts. Interestingly, we've heard from other sources that attention is being focused on these issues in the context of central or "core" large-scale instrumentation that provides service to many units across a campus, or even across a multi-campus scholarly community. We would welcome any information or pointers about developments in these areas.

## Concluding Thoughts

We heard many accounts of fruitful cross-unit partnerships working to advance the research enterprise. Organizations that are orienting themselves toward researchers and scholarship are finding opportunities amidst the challenges; libraries at member institutions that had worked to develop this kind of alignment prior to the pandemic have found that they've been very well served by this work.

Researchers who have had to pause their current projects are finding support and resources for research projects that *can* be conducted under the current circumstances; organizations like libraries and archives are making extraordinary efforts to provide targeted support to junior faculty and PhD candidates trying to complete their theses. Faculty at all levels, and graduate students, are seeking and taking advantage of opportunities for professional and skill development, and support for research outputs analysis and management; collaborations among libraries, IT and research computing, and the office of research are stepping up to meet these demands. By strengthening the foundation for intra-institutional partnerships to support the research mission, colleges and universities can be better prepared when normal operations are unexpectedly disrupted in the future.

It has become clear that, in the course of dealing with this crisis and the particular challenges surrounding research support, there has been greatly increased awareness at the highest administrative levels of the critical role of the library in the institution's research enterprise. At most institutions, libraries are now an integral part of the



leadership team planning for research restart, instructional resilience, and other aspects of pandemic response.

Even as institutions make progress reinstating many aspects of the research enterprise, difficult questions and substantial uncertainties remain.

In spring 2020 funders were very accommodating and flexible in the face of the sudden widespread shutdowns. It's less clear how the positions of funders – particularly federal funders – will evolve in the coming months. Researchers have been busy writing grants (some estimates are 20-30% more than last year), which means that competition for funding may be much more intense for researchers in the coming year (though this, also, depends on what happens with proposals for supplemental funding to key federal funders like the National Science Foundation and the National Institutes of Health).

School closures and the lack of childcare are creating problems across our society. Within academia, unsurprisingly, this is having the greatest impact on female researchers, and particularly junior ones; our universities will need to track societal level responses to this, and simultaneously make choices (in a resource-constrained environment) about whether they will step up to addressing these challenges for their own communities, and how to mitigate the impacts for their students, faculty and staff.

In a resource-scarce environment, with hiring and admission freezes, what are the implications for diversity, equity, accessibility, and inclusion initiatives?

There are perhaps three or four fundamental issues that we will return to when we convene additional follow-up roundtables in late spring 2021. It's clear that a robust research enterprise is essential for national security, national competitiveness, and a healthy economy; this means that the research enterprise is highly connected to political developments, geopolitics and national security, and federal government policy and budgetary choices, all of which are very much in flux at present. Particularly for public institutions, there are enormous budgetary issues connected to what happens with state budgets (and federal relief for state budgets). The scope and scale of the commitment to the humanities and social sciences as part of the research enterprise is going to be pressured and scrutinized as never before; the outcome is unclear.

The pandemic has lit the fuse for a long-delayed and essential reckoning with issues around intellectual property and digital content. Research continuity is part of this, but it goes much more broadly to instructional continuity (in K-12 as well as higher education), to cultural memory and accountability, and public access to information. One component of this reckoning is retrospective, and deals with the legacy of print; this includes questions about variations on controlled digital lending and their legality. The most important component, however, is forward-looking, and deals with the terms and conditions under which digital content can be marketed, acquired and used. The resolution of these issues will be critical to the future of the research enterprise (and to our society more broadly); we need to see a lot more concrete thinking in this area.

It's also clear that other public policy issues such as universal broadband availability are essential underpinnings to research resilience (among many other societal objectives); universities are advocating for renewed focus on and investment in this problem, but they have limited influence, and the issue is much broader than the higher education community.

It's unknown how long the pandemic will persist, and when we may begin to move towards some kind of "new normal" that accommodates at least the option of reasonably large-scale, in-person interactions (though it's clear that we will not revert to the old normal – working from home, online education, telehealth, videoconferencing, and other changes forced by the pandemic are not going to be entirely reversed). The optimistic scenario says that this may start to emerge in fall 2021. We won't dwell on the details of the pessimistic scenarios here, but it's clear that some kind of robust operational research enterprise is essential under any scenario (arguably more so than continuity of in-person undergraduate education). Institutions are being very vague in articulating their assumptions and contingency plans regarding the research enterprise, particularly in the more pessimistic scenarios.

It's clear that the pandemic – particularly if it persists, but even if not – is ushering in a serious reconsideration of the calculus of campus space allocation and funding, and the built environment in higher education more broadly. This goes far beyond the research enterprise, but outcomes will shape that enterprise in critical ways.

It remains unclear the extent to which institutions are going to make an ongoing, major commitment to advancing research resilience to parallel the investments they've made in instructional resilience, and, if so, how this commitment will be organized and advanced. The current pandemic is a wake-up call on this question, and the problems won't go away when the pandemic ends; several authors have suggested that the pandemic might be viewed as a rehearsal for an era of disruptions driven by climate change, for example. Our view is that laying a solid foundation for research resilience is essential, and in the coming months, we intend to advance discussion of priorities and strategies in this area.

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**CNI Executive Roundtables** bring together a group of campus partners to discuss a key digital information issues and their strategic implications. The roundtables build on the theme of collaboration that is at the foundation of the Coalition; they serve as a forum for frank, unattributed intra- and inter-institutional dialogue on digital information issues and their organizational and strategic implications. In addition, CNI uses roundtable discussions to inform our ongoing program planning process.

**The Coalition for Networked Information (CNI)** is a joint program of the Association of Research Libraries (ARL) and EDUCAUSE that promotes the use of information technology to advance scholarship and education. Over 200 institutions representing higher education, publishing, information technology, scholarly and professional organizations, foundations, and libraries and library organizations, make up CNI's members. Learn more at [cni.org](http://cni.org).