

A report submitted to President Neil Theobald and Vice Provost Tami Benham-Deal on behalf of the University Structure working group studying research

Committee members: Jim Ahern, Carolyn Broccardo, Comfort Brownell, Danny Burns, Dave Finoff, Paul Flesher, Isa Helfgott, Diana Hulme, Patrick Johnson, David Jones, Marsha Knight, Kem Krueger, Holly Krutka, John Ritten, Scott Seville, and Naomi Ward. Administrative support provided by Karyn Bercheni.

Executive Summary

The first section of this report documents the current and future impacts on research of COVID-19 and associated restrictions. The second section lays out recommendations for both navigating and mitigating impacts. Each section contains both general information and a more detailed look at four different types of research generation and dissemination: group work settings such as laboratories and studios; human subject research; fieldwork; and non-fieldwork travel.

Impacts. Impacts of current restrictions have been profound for all categories of UW researchers, across all types of research and scholarly activity, and all disciplines. The current constraints have reduced research productivity and dissemination, constrained essential training experiences, and delayed progress in faculty careers and student degree completion. These impacts will have long-term adverse effects on the career trajectories of UW researchers, the research reputation of our institution, and our ability to support state industries through extension services, unless mitigated by the development of supportive institutional policies and provision of appropriate financial resources.

General recommendations (common to all scenarios and research types)

1. Apply general guidelines on following public health directives, protecting the mental and physical health and safety of personnel, and ramping up research activities in a safe and compliant way.
2. Allow informed decentralized decision making at the level of the college, department, or research entity, recognizing the diversity of UW research contexts and constraints.
3. Develop and apply research-specific best practices for general building operations.
4. Recommend to lab-based researchers a set of proactive actions to minimize research disruption in transitions from more permissive to more stringent public health restrictions.
5. Support flexibility in timing for key events, such as the duration of T&P clock stops, time to degree for graduate students, and timing of required research experiences for undergraduate degrees.
6. Support flexibility in research experiences and expectations, such as programs of graduate study, the nature of undergraduate research experiences, and college and departmental T&P research expectations.
7. Provide resources to mitigate research impacts, such as a small-grant program as well as a research and teaching scholars program.

Recommendations under specific scenarios and research types. This report further provides recommendations and associated implications for the conduct of four different types of research, with different risks of viral transmission, and which are differently impacted by current restrictions on research generation and dissemination. We provide these under each of four different scenarios of viral transmission, with different estimates of scenario likelihood. In each case, our provided recommendations are consistent with emerging planning recommendations from comparator institutions, but the report also contains a review of alternatives.

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Report

1. Impacts on UW research of the restrictions and guidelines currently in place.

1.1. General impacts

Faculty in general. Most UW faculty have experienced profound impacts, including slowed or stopped research, the need to change focus to virtual/computational approaches, stopped or greatly reduced research-related travel (described further below), impacts on planned spending and budget management, cancellation/postponement of grant-funded projects, significant barriers to research dissemination (described further below), and diminished or stopped community engagement. Although UW data are not currently available, research from other institutions suggests that current restrictions are having disproportionate impacts on the research productivity of certain faculty, e.g., during this time, article submissions by men have increased significantly while those by women have decreased. This may reflect differences in division of household labor and dependent care. Scholars of color have also been more profoundly affected than white researchers. Actions designed to avoid perpetuating these inequalities have been proposed by groups such as [500 Women Scientists](#).

UW faculty have faced increased teaching workloads this Spring due to preparation and implementation of online coursework. This will continue with the recommended move to a fully online or hybrid model in the coming academic year. This workload increase has reduced time available for research, and hence research productivity. Faculty also face a variety of new requests and demands on their time, including recruitment of undergraduate researchers doing virtual work. Faculty thus face a real risk of overcommitment when research constraints are lifted and effort needs to be channeled back to research, but these commitments are still in place. Remote working creates challenging work environments, particularly for women and members of under-represented groups (minorities and individuals with disabilities). All of the above have potential negative impacts on the tenure and promotion process, as well as the annual performance review cycle.

Faculty – discipline-specific. Faculty in the Fine Arts are dealing with impacts unique to the nature of disseminating new knowledge in these fields. Dissemination/presentation of research and creative endeavors through public and/or juried theatrical and concert performances, exhibitions, participation in academic conferences, and public readings have come to a halt. For many faculty across Theatre and Dance, Visual and Literary Arts, and Music departments, these engagements are considered the primary creative research components for tenure and promotion.

Art faculty report the following as crippling to research: a slow-down in book review and responses due to staffing and budget challenges; work being 'stranded' in a gallery with no audience to view and no way for shipment return; and invitations to exhibitions and galleries that cannot be accepted. Theatre and Dance faculty report the cancellation of many opportunities, including a large project scheduled for off-campus regional production, residencies, and dozens of regional outreach opportunities. Significantly, summer dance festival is canceled, and summer theatre has been significantly altered to one online show. Many studio faculty are not able to present research and creative activity through traditional methods in line with disciplinary or departmental expectations.

Faculty and students in the humanities, social sciences, and Fine Arts (and other disciplines) are suffering from lack of access to Coe Library. While Coe staff have done their best to scan materials

and provide on-line sources, this still does not compensate for lack of access to the more than one million physical volumes held by the library.

Post-doctoral and other staff researchers. These research personnel face many of the same impacts as faculty, described above. In addition, pauses in research-related travel (e.g, fieldwork, and reduced productivity in socially distanced lab spaces) creates special challenges for those in positions that are grant-funded or in some way term-limited. Some may not have options for virtual or computational work. Modifications in training to meet career goals for postdoctoral researchers have been necessary.

Graduate students. Restrictions have created a need for graduate students to re-tool research towards virtual and computational projects that can be completed under current conditions, but such changes are not possible for all disciplines. Additionally, students who need to perform non-local fieldwork or other research-related travel have had to cancel that work, losing a year of field data. In some cases, students have been able to pivot their work to local sites, but this can constrain the nature of research questions that can be posed, and conclusions that can be drawn. In the Fine Arts, ensemble rehearsal and performances lose the important component of collective training and mentorship. All Music department. graduate recitals were canceled for Spring, with hopes for Fall realization. Graduate recitals have been shifted to live-streamed solo performance. By necessity, students are learning about digital mixing and self-reliance. Though Creative Writing graduate students are able to carry on with their research and creative work, their summer opportunities, travel to conferences, and public events such as readings are not possible. Modifications in training to meet career goals for students may be necessary in multiple disciplines.

For the many UW graduate students who work as Teaching Assistants, impacts echo those reported for faculty (above) due to the Spring 2020 shift to online teaching. Although data are not yet available, cancellation of summer 2020 classes that cannot be offered online may have reduced teaching and support opportunities for summer TAs. In addition to changes in formal classroom teaching, graduate students and postdoctoral researchers have, in many cases, lost the opportunity for informal training of more junior lab personnel, such as undergraduate or visiting high school students, because necessary social distancing cannot be maintained. Similarly, these proximity problems make it much more difficult for graduate students from collaborating research groups to cross-train each other and thus enhance interdisciplinary research. These missed opportunities for informal teaching and interdisciplinary training are important for graduate student professional development.

Across all disciplines, COVID-19 has delayed progress to research completion and graduation, which means either that final-year students lose support and may not complete their degrees, or existing GRAs and GTAs must be stretched to support these students, which limits the number of new students faculty can recruit. Graduate programs that recruit predominantly international students face substantial hurdles due to current international travel restrictions. Recruitment problems will have both short-term and longer-term adverse impact on the strength of UW graduate programs, and the career success of both students and faculty.

Undergraduate students. UW has long been distinguished by its excellent opportunities for undergraduates to participate in faculty research, but this is currently hampered by problems with

availability of safe physical spaces, identification of appropriate research mentors, and limited financial resources. These limitations are particularly problematic for research experiences required for undergraduate degrees. Faculty and other research supervisors have been working to create virtual and computational research experiences but ultimately most students require some bench experience to be competitive for graduate and professional schools and the STEM job market. Faculty accept requests for undergraduate virtual work but due to challenges of this training mode students in some cases receive a subpar experience-

In the sciences, UW has federally funded institutional programs (e.g., NIH INBRE and NSF EPSCoR) that normally provide research coordination, resources, and mentoring for large numbers of students each year. In the case of NIH INBRE, programs also specifically support the research experiences of students transferring from Wyoming community colleges, generating a college-to-UW research pipeline. As well as facing hurdles described above for placing students in individual research groups, these programs often feature student group activities that have necessarily been heavily curtailed by current restrictions. The latter includes the annual (April) Undergraduate Research and Inquiry Days, which provide an important forum for students throughout the state to gain experience in disseminating research. For Theatre and Dance undergraduates, the studio classroom and scenic and costume shops are the teaching laboratories. These skills evolve and are applied over time into public production in-consort with the creative research of faculty mentors, directors, choreographers and designers. With public production opportunities in question, outcome of training is compromised. New methods of delivery are in progress (online theatre as performance, self-filmed solos, etc.), but curriculum, equipment, and expertise are a challenge.

Research administration personnel. At the department level, staff with research administration responsibilities have had to provide appropriate guidance to faculty and other researchers within the various guidelines put in place by different entities (e.g., federal, state, county, UW, and College). These guidelines can have subtle or pronounced differences in what is and is not allowed, creating conflict that staff are sometimes tasked with resolving and communicating. Accounting staff face confusion regarding use of department and faculty funds and carry-forward of unspent funds due to constraints on activities. Lastly, the need to rapidly respond to a changing public health and fiscal environment has created new processes at different administrative levels, e.g., multiple new forms, that have tasked administrative staff at a time when they were still adapting to new processes and training demands (e.g., WyoCloud).

The Office of Research and Economic Development (ORED) anticipates an increase in the volume of no-cost extension requests in the coming year as COVID-19-related research delays persist. The other unknown at this time is how much funding will be required to provide graduate student funding for an additional year that was not accounted for in the original project budgets.

Stakeholders. Statewide COVID-19 economic impacts, including high levels of new unemployment, have created a critical workforce development need. Wyoming's workforce needs to re-tool to prepare for re-entry into existing economic sectors or areas of new opportunity. UW's research enterprise could support these re-training efforts (see Recovery Research Scholars program, under Recommendations).

1.2. Impacts by research type

Laboratory, studio, rehearsal space, and archival collections work

Laboratory (wet lab): Conduct of wet laboratory research has been heavily impacted, principally due to the need to maintain appropriate distance between lab personnel. In many cases, research groups working in small spaces have been forced to allow only one or two people to work concurrently. This clearly greatly reduces research output, as well as opportunities for training. Further complexities are introduced when different lab groups need to share the same equipment or reagents, which is very common practice in many departments. Interdisciplinary lab spaces, to which multiple research groups have access, pose particular problems as it is not always clear how safety protocols are being developed, communicated, and enforced.

Labs employing animal, plant, and cell culture models face the same impacts as those described above, with additional problems. Specific to animal subject research, researchers are required to review and follow the Office of Research and Economic Development's Institutional Animal Care and Use Committee's (IACUC) Guideline SC19-1: Animal Research During COVID-19. One of the major problems for these facilities is that regardless of the restrictions in place, animal, plant, and cell culture colonies need to be maintained in a safe and (for animals) ethical way. Many colonies, collections, and strains are valuable, and loss would have major impacts on research resumption, both in time and money. Constraints instituted while experiments are in progress could have a similar impact. Essential personnel need access and back-up plans need to be in place.

Computational: Research labs conducting computational research have been impacted by researchers' more limited access to higher performance computers physically housed in their research labs. Individual limitations vary according to home-based computing capability and internet quality.

Studio/Fine Arts: The performing arts depend on human interaction, on ensemble learning, and collaborative exchange in the creative studio process. Mentoring of students by faculty in realization of concerts, recitals, designs, direction, and choreography has been significantly compromised. Faculty are making every effort to reinvent creative experiences and engagements with students. Art faculty report reinvention of creative methods brought about by necessity; how to make sculpture from found objects, specific mini-sessions on exact points, and increased emphasis on conceptualization. Lack of access to kilns, wheels, and welding equipment has brought development of these skills to a halt.

Performance rehearsal space: Practice halls, small and large rehearsal spaces, and art studios are where creative research is produced. Students and faculty currently have essentially no in-person interaction. In lieu of rehearsal space, music faculty and students report ambitious activity with at-home solo recording, though equipment and expertise are lacking. Creative work continues in dance with site-specific solo work for capstone choreography projects.

Archives and collections: The combination of travel restrictions and social distancing regulations makes on-site, data-generating work in archives, museums, other collections, and cultural or historical sites, impossible. Only a small proportion of materials are available digitally, and many

repositories have slowed operations due to COVID-related staffing issues. Even when digital materials are available, many projects require physical or *in situ* analysis.

Face-to-face human subjects work

Human subjects research labs: All researchers holding Internal Review Board (IRB) protocols are required to review and follow the established IRB COVID-19 guidelines. Current social distancing requirements make it nearly impossible to conduct in-person human subjects research, whether in group settings or one-on-one. In some cases, human subjects research may allow for interaction through video conferencing systems or telephone as alternatives and in other cases, it may limit the ability to perform research. The ability to resume research will also depend on research participant willingness to participate when restrictions are lifted. Further, many studies use students as subjects, making research opportunities limited with any full/partial move to online classes.

Clinical/medical sites: Clinical facilities in the region have restricted faculty and student researchers from entering their facilities. This has impeded progress on projects, as researchers have been unable to collect data.

Fieldwork

Currently, the Office of Research and Economic Development (ORED) has restricted travel for field research until July 30, 2020. Researchers may apply to the Vice President of Research for an exception to this restriction for local travel (travel within 60 miles of the researcher's point of origination) and mission critical research. Exception requests are made by filling out an [ORED Field Research Exception Request Form](#). Prior to submittal of the form to ORED, approval by the researcher's department head and dean, and documentation that all participants willingly consent to take part in the project, must be obtained. Depending on the logistics of the field work request, researchers will be asked to complete a [Medical Screening Checklist](#) prior to departure. These forms are to be retained by the project PI. This exception request process is meant to reduce the risk of COVID-19 exposure to UW research faculty, staff, and students and those living in communities to which researchers may travel. Given the field research travel restriction, UW researchers have cancelled or postponed their field campaigns or altered their field site location when possible to avoid travel. Researchers who have had to postpone field work until the following season may require extensions to their grants. This may also delay graduation dates for some graduate students. To date, 55 exemption requests have been submitted and all have been approved.

Field work cancellations have a broad impact. Many disciplines require fieldwork as part of their research activities; data, observations, and objects must be obtained regularly from field locations so they can be analyzed, both on-site and back on campus. Faculty must often conduct field schools, both to educate students in how to undertake study in the discipline and to provide person power to undertake the research. The exceptions allowed by ORED described in the previous paragraph are for individual faculty researchers. Field schools remain cancelled. These cancellations impact undergraduates (in some cases preventing progress towards graduation), graduate students, and faculty. They impact science faculty from Zoology and Botany to the Agriculture disciplines, but also archaeological excavations. The latter affects students and faculty not just in Anthropology, but also some in Religious Studies, Classics, and History.

Travel (non-fieldwork)

Restrictions on travel, whether due to UW policy, funding restrictions, transportation company policies, or government policies at the destination (at the county, city, state, or national level) can all impact the ability of faculty simply to reach their research location, let alone carry out research once they have arrived. Current restrictions on travel prevent these types of research and reduce educational experiences for students. Faculty have experienced impacts related to travel restrictions for many different types of research:

1. The closing of archives, museums, and historic buildings and sites has restricted historical research. Even when these entities are open, UW travel guidelines prevent travel to those locations.
2. Biologically based research (in a variety of disciplines) often needs to take place in locations not easily reached as a day outing from Laramie; this is true for research around Wyoming as well as research at international locations.
3. While social distancing requirements have cancelled most archaeological excavations, travel to them is currently forbidden by UW regulations. Again, these apply to sites within Wyoming as well as abroad. Many of these excavations provide field schools for undergraduate and graduate student education.
4. Travel for performance or exhibitions in the Fine Arts is not taking place. All areas have ambitious engagement in the state and region in schools (music education) and studios (dance—approximately 15 workshops canceled for spring for outreach and recruitment) in WY and surrounding states. Zoom engagements are ongoing with studios in Theatre & Dance.
5. Travel for data collection on location in the social sciences (e.g., Criminal Justice and Sociology) is not taking place.
6. Nearly all research in International Studies (SPA AIS) takes place in foreign locations; travel restrictions, lockdowns, etc. have severely hampered that type of research. Faculty in numerous departments in the humanities and social sciences carry out this kind of research, as well as other disciplines.

Travel restrictions have had additional impacts at UW research facilities outside Laramie. At UW Casper, the Cooperative Agreement between UW and Casper College requires UW defer to Casper College for all security and safety issues. This may be the case wherever UW activities/facilities occur on Community College campuses (e.g., Whitney Building at Sheridan College). Interpretation of these agreements in the context of the pandemic are being discussed.

County Ag Extension Centers, Agriculture Research Stations, and the UW Teton Campus (AMK Ranch) may be subject to different guidelines and impacts dependent on location, federal agency jurisdiction, etc. Often research projects at Agricultural Experiments stations (Research and Extension Centers) are joint efforts with non-UW personnel. Also, many campus-based faculty and students have field experiments at the R&E centers, and any travel on non-UW limitations on access places extra burden on center-based faculty and staff. However, travel and access to station places those center-based personnel at increased risk of exposure due to increased number of contacts and the need to interact when people are on on-site (both in the field as well as using facilities such as

kitchens, break rooms, restrooms) and use of shared equipment. Further, obtaining cleaning supplies and PPE equipment in Wyoming's smaller communities is proving to be a challenge.

Research dissemination

Conference presentations. There have been substantial impacts on dissemination of project results. Greater effects are seen in pre-publication dissemination compared to publications, due to the cancellation of planned summer and fall 2020 conference travel. This will be a moving target, since conferences carry risks similar to Spring Break and Thanksgiving vacation. If one part of the country experiences resurgence in viral transmission, then a national conference may cancel at the last minute to prevent broader spread of the virus. The best situation will be with those conferences that plan for virtual meetings, whether solely or alongside an in-person format. (Nearly all conferences have hotel contracts which penalize early cancellation with heavy financial charges; so these cancellations often take place at the last minute.) Of course, virtual conferences will lack nearly all the informal venues for connecting and consulting that make conferences so important to faculty, especially junior faculty.

Publication (literature). For many disciplines new knowledge can still be brought to publication, but there may be systemic delays relative to pre-COVID experience, due to difficulty in securing reviewers, longer-than-usual times required for review submission and editorial decisions, and general slow-downs in the academic publishing industry as publishing houses and print shops attempt to deal with social distancing, quarantines, and other factors.

Performance. Music faculty are required to conduct public performance as part of research and creative expectations. Alternative solutions such as recorded solo performances are an option, but professional equipment and staff are lacking. Inability to work with small or large ensembles is an obvious issue. Theatre and Dance designers, directors and choreographers also realize most of their creative research responsibilities through public performance in a performance venue. Alternative solutions such as online performance, reduced audience, remote rehearsal, and small cast works are in consideration. As we look forward, well-advised guidelines for safe practices and associated appropriate equipment for audience members, exhibition/gallery attendees, faculty, and students will be a priority.

Exhibition. Art Department faculty and students have juried invitations in hand, but venues are now unable to accept work. Or the art is currently staged, but the venue is closed. Some online presence of gallery work is reported. Some works are 'stranded' at exhibition sites. Concern has been expressed for commercial galleries that may not survive due to closure.

Extension. Often, county-based UW Extension educators are housed in space not owned by UW, which can result in local restrictions in access to clientele (if a county building is closed, UW personnel will abide by the local closure). Travel restrictions make it difficult for faculty to travel to local events across the state to present, and limits on gatherings of groups of 10 or more (or similar numbers) will limit extension faculty and staff to host and/or attend annual events such as Farm and Ranch Days, West Ag Days, Progressive Rancher Forum, and the Wyoming Stock Growers annual meeting (and numerous other regional events hosted by Extension), as well as county and state fairs. The limited

ability to present at these venues is akin to missing academic conferences in terms of career advancement for research/extension faculty.

Outreach (e.g., public, K-12) Research that relies on, and gives back to, local, state, national, and international organizations or communities is slowed, relying on less substantial virtual communication and collaboration, or stopped. This also impacts graduate students hoping to pursue public-facing projects that can lead to career placement.

2. Recommendations and implications

2.1. General recommendations (common to all scenarios and research types)

i. Apply the following general guidelines (adopted from UC Davis):

Follow local, State, and National Public Health Authority directives to shelter-at-home and maintain physical distancing. We suggest that for any in-state UW research activity or facility, UW guidelines have primacy unless local versions are more restrictive than UW. Local guidelines (or other) are secondary, to ensure the highest level of precaution to protect personnel and communities.

Protect the mental and physical health and safety of the research workforce, clinical patients, and human research subjects. Recommendations may not apply to persons currently identified as belonging to high-risk groups. Variation in individual levels of risk tolerance should be considered. Researchers should not be asked to follow recommendations for increased research activity and exposure if they believe such exposure constitutes unacceptable risk for themselves or those with whom they are in close contact. This encompasses the availability of appropriate personal protective equipment.

Ramp up research activities in a way that ensures safety of all employees and compliance with public health guidelines (described under 2.3 below).

- #### ii. **Informed decentralized decision making.** Allow informed decentralized decision making at the level of the college, department, or research entity, recognizing the diversity of UW research contexts and constraints. This is particularly important given that UW, local, state, and federal restrictions or guidelines may not be completely aligned or may not match the local circumstances for research. Consequently, UW should allow researchers some degree of flexibility in planning and conducting their work based on realistic assessment of risks. The research fieldwork exemption process currently administered by the UW Research Office provides a good example of such a flexible approach. This should also apply to research travel. However, the need for flexibility should be balanced with a need for clear standard operating protocols within a research unit. Some units (e.g., College of Agriculture, School of Pharmacy, Department of Molecular Biology) have developed such SOPs that may serve as useful models for units where SOPs have not yet been formulated. SOPs, though constraining the flexibility mentioned above, remove pressure on individual researchers to conform to social pressure to work in a way that they may personally consider unsafe.

iii. **Research-specific general operations best practices.** Develop and apply research-specific best practices for general operations such as entry, exit, and general flow of people within buildings (conduct of meetings etc.). Plans available from [Duke University](#) and [Vanderbilt University](#) provide good models for these operational aspects. For buildings featuring high-interaction spaces (students, creative/research faculty, and the public), expert guidance and management is requisite for minimizing contact. These buildings include the existing ENZI/STEM building, the Engineering Building, the Buchanan Center for the Performing Arts, and the Visual Arts Building, but also the Science Initiative building currently under construction. This guidance may be available from building managers, and thus we add our support to efforts to recruit a building manager for the ENZI/STEM and Science Initiative buildings. For shared research spaces, it may be necessary to clarify which units or individuals are responsible for oversight of necessary safe practices.

iv. **Recommend proactive actions.** Recommend to lab-based researchers a set of proactive actions as a standing practice to minimize research disruption in transitions from a more permissive scenario to one in which public health restrictions are increased. Many of these recommendations are also found within the current [UW Research Office guidelines](#).

v. **Provide flexibility in timing for key events:**

Allow flexibility in the duration of T&P clock stops, to include the option of stop periods of longer than one year. This may be necessary to address variable effects of research and travel pauses on research generation, and delays in research dissemination.

Allow extended time to degree for graduate students, due to the impacts on graduate program progress.

Allow flexibility in timing of required research experiences for undergraduate degrees, to mitigate the reduced availability and delayed timing of these experiences.

Allow extended time to expend monies granted for research (and teaching and special events), whether by purchasing ahead or by carrying the funds across the June 30 end of the current fiscal year.

vi. **Provide flexibility in research experiences, evaluation, and communication/dissemination:**

Consider updating college and departmental T&P research expectations to reflect COVID-19 impacts, with an emphasis on providing flexibility in expectations. Also provide a framework for considering these impacts within the annual performance review system.

Encourage graduate committees to support re-orientation of graduate student research goals, approaches, and expected products, as well as affected coursework requirements. Encourage flexibility in graduate program design without undermining academic integrity. Graduate students

and faculty researchers may benefit from training to take advantage of emerging digital humanities technologies and methodologies.

Encourage creativity in the design and implementation of undergraduate research experiences. Consider working with campus entities that offer organized undergrad research experiences (INBRE, EPSCoR, etc.).

Encourage use of electronic systems for collaboration and project management.

In the interests of supporting continued professional development, especially for early-career researchers, encourage participation in virtual conferences or training opportunities in 2020, as well as in-person attendance for conferences postponed to 2021.

vii. Provide resources to mitigate research impacts:

The Recovery Grants Program. A summer/AY20-21 small-grant program that would mitigate the severe effects of restrictions on travel to non-local field sites as well as archival collections, performance spaces, and galleries. It would enable UW researchers to pivot to conduct more of their scholarly work in place and maintain both their individual research productivity and standing in their field, as well as UW's research reputation. Researchers in the hard sciences could develop new research projects that are lab or computationally based rather than field-based. It would also support arts, humanities, and social sciences researchers to develop new projects that could be conducted, created, performed, or exhibited locally, or acquire technology to create or disseminate their work in a virtual environment. One stream of this funding could be aligned with the Grand Challenges, so that this initiative also addresses a major campus strategic priority. Inclusion of undergraduate researchers would be strongly encouraged.

The Recovery Research Scholar Program. A special pool of additional GRA funding to mitigate COVID-19 impacts on the graduate education timeline and to enhance career success of graduate students and mentoring faculty (1.1), as well as assist the Wyoming workforce in re-tooling for re-establishing their careers and economic security (1.1). Graduate school is an established and successful path for the latter.

The Recovery Teaching Scholar Program. A special pool of additional TA/GA funding to assist faculty with developing and implementing online coursework, and thus mitigate COVID-19 impacts of increased teaching workload on faculty research productivity (1.1). The pool would include both GTAs, and undergrad TAs for those departments lacking graduate programs. These TAs would also be available, if needed, for classroom support when large classes are split into multiple smaller classes, or to ensure social distancing in large enrollment courses.

An equity consideration for all proposed programs: We recommend that a portion of resources for each program be targeted towards women, minority, and disabled researchers due to the documented disproportionate impact of COVID-19 on these groups, which may be exacerbating gender, racial, and ability imbalance and inequity in academia.

2.2. **Scenario framework.** The Working Group considered four scenarios and the corresponding public health restrictions we are likely to encounter over the next 12 months. Determining how transitions between scenarios will be recognized and defined, triggering associated changes in research operations, is beyond the charge of this working group. We assume that relevant guidance and definitions, presumably influenced by the planning of comparator institutions, will be released by other working groups in the near future.

Scenario 1. Extension of current conditions – viral transmission declining but not contained (possible but unlikely). Considered unlikely because recent and near-future easing of restrictions, as well as the return of large numbers of students to campus in Fall, soon leads to increased disease incidence and brings about transition to Scenario 3 (below).

Scenario 2. Sustained control of viral transmission (unlikely). Considered unlikely because recent and near-future easing of restrictions, as well as the return of large numbers of students to campus in Fall, soon leads to increased disease incidence, and brings about transition to Scenario 3 (below). But, if viral transmission was contained, public health measures in Wyoming would likely be modified to be less restrictive than currently.

Scenario 3. Regional virus resurgence (most likely). Given the anticipated further easing of public health measures in the coming weeks, the return of large numbers of students to campus in Fall, and the resulting increase in disease spread, we consider the most likely scenario to be that we will experience regional resurgences of the virus and periodic implementation of more restrictive public health measures than those currently in place.

Two sub-scenarios:

3.1 Despite regional virus resurgence, campus viral transmission is minimal and/or easily contained because the implemented test-trace-isolate methods were effective.

3.2 Extensive campus viral transmission because the implemented test-trace-isolate methods were not effective.

Scenario 4 Pandemic escalation. Given current knowledge of the virus and the proven effectiveness of social measures to reduce transmission, we think it is unlikely but possible that there will be a widespread (uniform across the United States) increase in disease incidence. If there were, we would expect more restrictive public health measures.

2.3. Recommendations by research type and scenario

Laboratory, studio, rehearsal space, and archival collections work

Scenario 1. Maintain UW Research Office guidelines and restrictions currently in place. Laboratory work could continue albeit with procedures for social distancing. Operation of necessary core facilities. Prioritization of authorization for time-sensitive research, such as seasonal data collection, projects close to completion, or deadline driven. Restricted access only to library, archive, and

museum collections. Maintain a 10-foot distance (minimum standard subject to updated recommendation) in studio and rehearsal spaces if engaging in lecturing or physical movement (e.g., dance, theatre, etc.). Maintain a reduced frequency of studio classes and number of students, adjust timing to allow for cleaning, and regulate entrance and exit of students and creative/research faculty.

Scenario 2. Return to pre-COVID guidelines for conduct of research. Ease social distancing restrictions in laboratories allowing more individuals to work in parallel, using shared equipment and spaces. Relax restrictions on access to library, archive, and museum collections. Maintain studio and rehearsal space guidelines as for Scenario 1.

Scenario 3.1. Maintain UW Research Office guidelines and restrictions currently in place as for Scenario 1, with possible more stringent measures for research-intensive areas. Maintain studio and rehearsal space guidelines as for Scenario 1.

Scenario 3.2. Research is conducted under greater restrictions, including a possible closure of all campus facilities. Exceptions for personnel needed to conduct critical research functions, such as maintenance of living plant collections and research animals, as well as maintenance of critical equipment. Possible exceptions for data collection for longitudinal research studies, depending on the exposure risk of participants. Studio and creative research will return to online/remote presentation.

Scenario 4. Research is conducted under greater restrictions, similar to Scenario 3.2.

Face-to-face human subjects work

Scenario 1. Maintain UW Research Office guidelines and restrictions currently in place. For human subjects research, permission to conduct only observational and clinical research that can be conducted at a distance. No in-person research allowed.

Scenario 2. Return to pre-COVID guidelines for conduct of research. Permitted face-to-face research where social distancing can be maintained or risk can be mitigated to a minimal risk level. Research that involves physical contact with human subjects must follow CDC guidelines and be approved by the UW IRB. If restrictions are lifted, and human subjects are permitted back into research labs on campus, researchers whose work involves physical contact with research subjects will need to use full PPE—gloves, gowns, masks, and goggles or face shields. Researchers must disinfect all equipment and surfaces in which a research subject comes into contact before allowing another research subject to enter the lab. As clinical sites, K-12 schools, and other agencies admit researchers, the guidelines established by those sites for research subject interaction must be followed.

Scenario 3.1. Maintain UW Research Office guidelines and restrictions currently in place as for Scenario 1.

Scenario 3.2. Maintain UW Research Office guidelines and restrictions currently in place as for Scenario 1.

Scenario 4. Maintain UW Research Office guidelines and restrictions currently in place as for Scenario 1.

Fieldwork

Scenario 1. Maintain UW Research Office guidelines and restrictions currently in place. Local research fieldwork could continue as is the case now.

Scenario 2. Return to pre-COVID guidelines for conduct of research. Ease travel restrictions so that there are fewer or no limits to research-related travel within or possibly outside the state, allowing resumption of fieldwork.

Scenario 3.1. Maintain UW Research Office guidelines and restrictions currently in place as for Scenario 1.

Scenario 3.2. Research is conducted under greater restrictions, including a possible prohibition on fieldwork. Possible exceptions for data collection for longitudinal research studies, depending on the exposure risk of participants.

Scenario 4. Research is conducted under greater restrictions, similar to Scenario 3.2.

Travel (non-fieldwork), including research dissemination

Preamble: There are a number of reasons for faculty, graduate students, and even undergraduates to travel for research. UW needs to lay out its travel restrictions and guidelines in a thoughtful and transparent way rather than a “one size fits all manner”. Essentially, UW at present forbids any travel that might require an overnight stay. But as the rest of the world begins to open up (perhaps only temporarily), UW needs to set out a policy that enables travel to locations that are available—even if Wyoming remains under stricter rules. Since different parts of the world and the nation will open up at different rates, UW should develop guidelines for evaluating whether travel to different locations is safe or not. This should not be done by Risk Management alone, but by a committee that includes numerous experienced research travelers. There is a need for transparency and responsiveness in this regard.

Scenario 1. Maintain UW Research Office guidelines and restrictions currently in place. Local research travel could continue, as is the case now. Public performances, exhibition venues, and scheduling respond accordingly.

Scenario 2. Return to pre-COVID guidelines for conduct of research. Ease travel restrictions so that there are fewer or no limits to research-related travel within or possibly outside the state. Public performances, exhibition venues, and scheduling respond accordingly.

Scenario 3.1. Maintain UW Research Office guidelines and restrictions currently in place as for Scenario 1. Possible exceptions for data collection for longitudinal research studies, depending on the exposure risk of participants. Public performances, exhibition venues, and schedules respond accordingly with shift to online/remote presentation or cancellation.

Scenario 3.2. Research is conducted under greater restrictions, including a possible prohibition on research travel. Public performances, exhibition venues, and schedules respond accordingly with shift to online/remote presentation or cancellation.

Scenario 4. Research is conducted under greater restrictions, similar to Scenario 3.2.

Rationale/research from other universities, available at the time of writing (see also Table below)

Scenario 1. Recommendations are equivalent to those proposed for UC Davis Research Ramp-up Phase 2, which emphasizes prioritization of time-sensitive research activities and represents approximately 33% of research personnel on site at any time. They also align with Phase 2 of the NYU Research Reconstitution Plan, in which there is some relaxation of current restricted access, permitting 25-50% of normal activity, and Level 1 at the University of Montana.

Scenario 2. Recommendations are equivalent to those proposed for UC Davis Research Ramp-up Phase 4 (also Phase 4 of the NYU Research Reconstitution Plan) which describes a return to full research operations. However, it may be necessary to proceed through an equivalent of Davis Phase 3, which describes a gradual restart of research and 66% of research personnel on-site at any time. This transition would also align with NYU Phase 3, in which there is Increased relaxation of restrictions, representing an estimated 50-85% of normal activities, and Level 0 at the University of Montana.

Scenario 3.1. Recommendations are consistent with UC Davis Research Ramp-up Phase 2, which emphasizes prioritization of time-sensitive research activities and represents approximately 33% of research personnel on site at any time. They also align with Phase 2 of the NYU Research Reconstitution Plan, in which there is some relaxation of current restricted access, permitting 25-50% of normal activity, and Levels 1-2 at the University of Montana.

Scenario 3.2. Recommendations are equivalent to Davis Phase 1, which permits only critical research activity. They are also consistent with Phase 1 of the NYU Research Reconstitution Plan, in which access for critical research is restricted to an estimated 10-25% of normal capacity, and Levels 3-4 at the University of Montana.

Scenario 4. Recommendations are consistent with UC Davis Research Ramp-up Phase 1, which permits only critical research activity. They also align with Phase 1 of the NYU Research Reconstitution Plan, in which access for critical research is restricted to an estimated 10-25% of normal capacity, and Levels 3-4 at the University of Montana.

Additional rationale/research from other universities (University of Utah and Colorado State University) was used as a basis to formulate recommendations specific to studios and rehearsal spaces.

WY	UC Davis	NYU	U Montana/MSU
Scenario 1	Phase 2 (33%)	Phase 2 (25-50%)	Level 1
Scenario 2	Phase 4 (100%) (transition through Phase 3 66%?)	Phase 4 (100%) (transition through Phase 3 50-85%?)	Level 0
Scenario 3.1	Phase 2 (33%)	Phase 2 (25-50%)	Level 1-2
Scenario 3.2	Phase 1 (only critical activity)	Phase 1 (only critical activity; 10-25%)	Level 3-4
Scenario 4	Phase 1 (only critical activity)	Phase 1 (only critical activity; 10-25%)	Level 3-4

2.4. Alternatives

We have provided above recommendations for four different types of research activity, conducted under each of four different scenarios of viral transmission. In each case, our provided recommendations are consistent with emerging planning recommendations from comparator institutions. However, recognizing that some aspects of UW research differ from those of the comparators, and also that we do not know how quickly one scenario may transition to another, acceptable alternatives for Scenario 1, 2, and 3.1 may be found by allowing latitude to move between recommendations for this set of scenarios. For example, under Scenario 1 (extension of current conditions), it may be acceptable or preferable to relax some aspects of the guidance currently in place for conduct of research, to the level recommended above for Scenario 2. However, we do not currently support latitude in the context of the more severe viral transmission state of Scenario 3.2 or 4.

2.5. Implications if recommendations are adopted.

Scenario 1. Impacts on researchers and research productivity would continue as described under 1.1, or worsen. Research productivity and the quality of research training for students would continue to be adversely affected. Opportunities for research dissemination would remain reduced. For humanities and some social science and Fine Arts researchers, improved access to Coe Library collections would somewhat mitigate this situation.

Scenario 2. Impacts on researchers and research productivity as described under 1.1 would lessen. Research productivity and the quality of research training for students would increase. Opportunities for research dissemination would increase.

Scenario 3.1. Similar to Scenario 1.

Scenario 3.2. Complete shut-down of research-related travel and laboratory work. Only research that can be conducted appropriately from home (online data gathering, use of existing data sets, computational analyses, creative activities, preparation of research results for dissemination) is permitted. Impacts on researchers and research productivity as described under 1.1 would worsen precipitously. Research productivity and the quality of research training for students would be severely affected. Opportunities for research dissemination would be severely reduced. Even in the face of the

recommended campus closure, it is likely that the UW researcher community and their families would not escape viral transmission, with multiple downstream effects including complete loss of research productivity, and disruption of research mentoring relationships.

Scenario 4. Similar to Scenario 3.2.

3. Other considerations

Dependent care responsibilities for UW researchers. If schools and daycares do not reopen in the Fall and remote schooling continues, or we relapse to this state, this will be the major productivity constraint for many UW faculty, staff, and students. At a minimum, this will require remote working accommodations for people in the research enterprise who have dependents. Alternatively, UW could establish back-up dependent care for Laramie-based employees. Assuming this can be done safely, it could confer enormous peace of mind for parents to know that there is a back-up system. It would not need to replicate school, but would need to be staffed by qualified people (i.e. paid teaching assistants, education majors, grad students, etc.) who could ensure that children are making progress with online assignments, and have age-appropriate activities to do when the work is done for the day. Considerations for launching this complex venture include securing physical space, recruiting qualified personnel, and identifying funding. Other organizations have implemented similar programs for essential personnel and first responders, so models do exist.