

**Continuity of Operations Plan (COOP) for
NMRFAM
Department of Biochemistry**

CONTACTS AND BACKGROUND

Staffing

1. Essential personnel

Name	Email
Katherine Henzler-Wildman (backup – maintenance, solution NMR COVID-19 projects)	henzlerwildm@wisc.edu , khenzler@gmail.com
Chad Rienstra (primary – SSNMR COVID-19 projects, backup-maintenance)	crienstra@wisc.edu
Paulo Falco Cobra (primary – maintenance)	paulo@nmrfam.wisc.edu paulofcobra@gmail.com
Marco Tonelli (primary – maintenance, solution NMR COVID-19 projects)	tonelli@nmrfam.wisc.edu 6marco9@gmail.com
Kelsey Collier (primary – maintenance, SSNMR COVID-19 projects)	kcollier3@wisc.edu bookwyrmkc@gmail.com
Milo Westler (computational infrastructure)	milo@nmrfam.wisc.edu wmwestler@gmail.com
Dwaipayan Mukhopadhyay (Rienstra group – SSNMR tech dev)	dmukhopadhyay@morgridge.org
Eric Han (Rienstra group – SSNMR tech dev)	Rhan28@wisc.edu
Vilius Kurauskas	kurauskas@wisc.edu

(Henzler-Wildman Lab – Solution NMR Covid-19 projects)	vilius.kurauskas@gmail.com
Bren Myers (undergraduate)	bhmyers@wisc.edu
Ronnie Frederick (primary – sample prep for COVID-19 projects)	rofederick@wisc.edu
Lai Bergeman	Lai.bergeman@wisc.edu Cookies1010@hotmail.com
Josh Kraus	jakraus2@wisc.edu
Clayton Mickles	mickles@wisc.edu
Benjamin Harding	bdharding@wisc.edu
Maryam Bakhtiari	mbakhtiari@wisc.edu

2. Non-essential Personnel

Name	Email

External resources

- FP&M point of contact – Matt Harman, matt.harman@wisc.edu
- Chemical safety contact – Tilak Chandra, tilak.chandra@wisc.edu

Continuity of authority

Who is responsible for the lab, and who are two backup decision-makers in case the responsible individual is unable to make decisions on operation or shutdown? Provide name, email, and best emergency phone number for each.

- a. (PI) Katie Henzler-Wildman, henzlerwildm@wisc.edu, khenzler@gmail.com
- b. (PI) Chad Rienstra, crienstra@wisc.edu
- c. Paulo Falco Cobra, paulofcobra@gmail.com

Communication

- Group messaging is via nmrfam_staff@lists.wisc.edu or nmrfam_staff@lists.nmrfam.wisc.edu. Please make sure that these do not go to your spam folder!
- Contact info for all lab members is on the shared google sheet: <https://docs.google.com/spreadsheets/d/1Y3kwIQqjZZ8BpvG0POVPN8qX1LYEsnRRTK0qIEFt-7o/edit?usp=sharing>
- Video conferencing (e.g. Webex, Zoom, or Skype) for remote lab meetings, starting with staff meeting at 11AM on Wednesday 3/18.

Remote Data access, exchange, and security

- All NMR data should be backed up following the standard operating procedures that are already in place.
- Remote spectrometer and server access follows our standard operating procedures that are already in place.
- Use of VPN to maintain secure access to campus IT systems (see <https://it.wisc.edu/services/wiscvpn/>).

Research Priorities:

1. *Maintenance of NMR spectrometers* Cryogen fills to keep the NMR magnets operational are an essential operation. If this is not maintained, the magnets will quench and require costly and time-consuming repairs or may not be repairable and require replacement of these machines that cost million(s) of dollars.
Performing cryogen fills and maintaining our helium recycling infrastructure (transferring recycled helium from the liquefier to other dewars) will require trained personnel to come in about twice per week. At the same time staff will check the integrity and operation of all water-cooled equipment in the facility (cryoplatfoms and helium recovery system). For safety, two individuals should be present during these operations.

If outside vendors are needed to perform repairs or maintenance, this will be approved in advance by the PIs and schedules of core facility staff will be adjusted to maintain total lab occupancy at or below 6 people.

Key personnel to perform these duties, including backup personnel in case some individuals become ill:

Primary:

Paulo Falco Cobra, paulofcobra@gmail.com

Marco Tonelli, tonelli@nmrfam.wisc.edu

Kelsey Collier, kcollier3@wisc.edu

Bren Myers - Undergraduate student assisting with routine cryogen fills. Bren has already been trained in cryogen fills and lives in Madison. Other NMRFAM staff will be present in the facility for safety but will maintain social distancing. The work done by Bren enables the other primary staff to devote their time and expertise to more complex tasks needed to support user projects and develop the facility, which are important for maintaining facility operation and funding.

Secondary:

Chad Rienstra, crienstra@wisc.edu

Katie Henzler-Wildman, henzlerwildm@wisc.edu

2. Nitrogen Dewar Refilling. While essential personnel are already present to perform essential cryogen fills, they can assist departmental staff in filling nitrogen dewars from the ports present in NMRFAM so that essential operations elsewhere in the department that are dependent on liquid nitrogen can be maintained. Staffing same as above.
3. Collaboration and Service Projects. Experiments requiring long-term data acquisition are prioritized during Phase 2 of research restart to minimize staff time required in the facility. Samples will be inserted and removed from the spectrometer and external spectrometer operation enabled by NMRFAM staff listed below. Established remote-data acquisition procedures will be used for data acquisition. Paulo Falco Cobra (small molecule, solution NMR), Marco Tonelli (solution NMR of macromolecules), Kelsey Collier (solid-state NMR) will assist users in data acquisition. Lai Bergeman will assist users in sample shipping, project and user registration and remote access. Milo Westler will assist in project planning and analysis.

Sample hand-off will be via

- shipping & receiving (non-UW collaborators)
- physically distanced drop-off at a marked drop-off location immediately outside the B225 facility entrance (Biochemistry collaborators with access to the building)
- physically distanced drop-off at a marked location at the Biochem loading dock in BSB (UW collaborators without building access)

Primary:

Marco Tonelli, tonelli@nmrfam.wisc.edu

Kelsey Collier, kcollier3@wisc.edu

Secondary:

Paulo Falco Cobra, paulofcobra@gmail.com

Chad Rienstra, crienstra@wisc.edu

Katie Henzler-Wildman, henzlerwildm@wisc.edu

4. NMRFAM Servers: The NMRFAM servers provide remote access for instrument operation and data analysis. It is not anticipated that these will need any in-person maintenance during this time, but if an unexpected event happens essential IT activities will be carried out by

Primary:

Biochem IT, job board

Secondary:

Milo Westler, wmwestler@gmail.com
Chad Rienstra, crienstra@wisc.edu
Katie Henzler-Wildman, henzlerwildm@wisc.edu

5. Completion of NMR spectrometer and probe installation. When outside vendors are needed to perform equipment moves and installation, this will be approved in advance by the PIs and schedules of core facility staff will be adjusted to maintain total lab occupancy at or below 6 people.

- Solid state NMR probe and pulse sequence implementation and testing.

Chad Rienstra, crienstra@wisc.edu

Eric Han, rhan28@wisc.edu

Dwaipayan Mukhopadhyay, dmukhopadhyay@morgridge.org

- 750 MHz wide-bore NMR move. Expected start date for console arrival at UW-Madison, Thursday 6/4/2020. Expected date for magnet arrival at UW-Madison, late June/early July, contingent on U. Illinois and external contractor coordination.

Chad Rienstra, crienstra@wisc.edu

Kevin Goehring (external contractor, BlueSky NMR), consoles only

David Gardner (external contractor, SuperCon Solutions)

Reynolds (external contractor) for rigging and move of magnet only

- Completion of 600 MHz solution NMR installation. Date TBD depending on contractor availability and scheduling of other facility activities to avoid overlap in external contractors as much as possible.

MR Resources (external contractor)

6. SARS-CoV-2 Research Projects. Installation and calibration of the probes and pulse sequences needed for solid-state NMR studies of SARS-CoV-2 membrane proteins. Sample prep of SARS-CoV-2 proteins. Solution or solid-state NMR data acquisition of SARS-CoV-2 proteins – sample changes and remote data acquisition will be performed as described above for all remote operations by staff performing the essential maintenance tasks.

Primary:

Vilius Kurauskas, kurauskas@wisc.edu

Kelsey Collier, kcollier3@wisc.edu or Chad Rienstra crienstra@wisc.edu (SSNMR probe install - performed on days when staff are *not* performing essential maintenance to maximize social distancing).

7. Fe/S Research Project for sample prep of Fe/S proteins in support of the NIH-sponsored research project. Ronnie Frederick will supervise protein production by the two undergraduates, Bren Myers and Jingxuan Tang. Jingxuan Tang is completing a senior research thesis project. As soon as protein production is complete (\approx 1 month of lab time), Marco Tonelli will require the necessary NMR data and share the data sets electronically with the undergraduate students. Both undergraduates will then perform data analysis remotely during the latter portion of the semester.

What to do if someone feels unwell?

If you feel unwell or have been in contact with somebody that is ill or tested positive for COVID-19, alert the PI immediately and please do not come to the lab. The PI will communicate with the group. Follow the campus guidelines (<http://covid19.wisc.edu>).

Posters with symptoms should be posted and are available from the CDC and others (see e.g., <https://www.cdc.gov/coronavirus/2019-ncov/downloads/COVID19-symptoms.pdf>), as should those about handwashing (see e.g., <https://www.cdc.gov/handwashing/materials.html>).

OPERATIONS UNDER DIFFERENT RISK LEVELS

1. Operation as normal.

Labs/offices staffed during business hours and after hours. Lab meetings in person.

2. Operation with limited risk – e.g., no known cases in the municipality.

Labs/offices staffed during business hours and after hours with essential personnel members only.

- General SOPs in place for minimizing community spread (see below).
- Particular vigilance for
 - Personal hygiene
 - Space hygiene
 - Social distancing
 - Symptom monitoring (see above)
- Lab meetings per videoconferencing.
- Heightened communications - Look for text and email messages from PI

3. Operation with heightened risk – e.g., known cases on campus.

Labs/offices staffed only by essential employees, limited hours. Lab meetings held by videoconferencing during regular lab meeting schedule.

- General SOPs in place for minimizing community spread (see next page).
- Minimal workflows in place
 - Critical requirements included cryogen fills and maintenance of the helium recycling infrastructure. Sample changes as possible in conjunction with these essential operations.
 - Non-essential spaces and critical check-ups for spaces/equipment
 - Lab room - liquid nitrogen and freezers - check weekly
 - Lab room - freezers, check weekly
- Lab meetings per videoconferencing.

Heightened communications - Look for text and email messages from PI.

General SOPs for Minimizing community spread:

Current SOPs in the lab require daily surface sterilization of work spaces using 70% EtOH, and frequent hand washing. In addition, we will implement the following steps to minimize the possibility for virus transmission:

- 1. We will strictly enforce access to all laboratory spaces by authorized lab personnel only. All other personnel entering laboratory spaces must seek permission by PI first. This includes facility personnel, as well as personnel from external contractors. Exceptions are emergency situations that pose immediate risk, such as fire. Generally, samples from facility users will be handed off and data collected following remote operation procedures following sample insertion in the magnet by NMRFAM staff. Access to the facility for non-NMRFAM staff will be limited to Rienstra and Henzler-Wildman group members listed on this COOP during phase 1. Any exceptions will be reviewed on a case-by-case basis by the PIs (Rienstra and Henzler-Wildman) and if granted, will be for a specified and limited time period.*
- 2. Occupancy of all labs that are assigned to the PI will be limited to ensure adequate distancing to 6 ft, as currently recommended by the CDC. Specifically:*
 - a. B225: 3 persons (the space can accommodate more with 6 foot distancing but we are restricting the facility occupancy to minimize shared contact with common surfaces)*
 - b. All smaller rooms in the facility: 2 persons as required by the task to be completed or to comply with safety protocols, when possible occupancy will be limited to 1 person per room.*
- 3. Only healthy personnel, regardless of the level of symptoms, are allowed to enter the lab spaces.*
- 4. Upon entering any laboratory space, personnel must wash hands immediately and in accordance with CDC guidelines, before touching any surfaces (see above).*
- 5. Working surfaces will be sterilized with 70% Ethanol prior to assuming work and upon completion of work.*
- 6. A mask will be worn while in the lab to reduce the risk of asymptomatic transition. A mask MUST be worn if you approach within 6 feet of another person or two individuals are present within a small equipment room at the same time. These interactions should be minimized (no more than 5 minutes) when needed to quickly access samples or equipment in a time-sensitive experiment. A mask MUST be worn by all external contractors and all staff whenever any external contractor is present in the facility.*
- 7. In-person communication will use at least 6 feet distancing.*

Resource from OSHA, <https://www.osha.gov/Publications/OSHA3990.pdf>,

Maintaining the community of the lab:

- Remote lab meetings will be held via video conferencing, at the usual scheduled times.

In addition to these measures, we will comply with all regulations, implemented by the university, and accessible through <http://covid19.wisc.edu>.

SCENARIO PLANNING FOR DIFFERENT LEVELS OF DISRUPTION

Instructions: Listed below are three potential scenarios that might result from COVID-19. Under the scenarios listed, provide a step by step response detailing how your lab would respond to the scenario. In addition to the 3 scenarios listed, additional lab specific scenarios can be added, if needed. The section, “other concerns” provide additional information that might should be included in your COOP.

Scenario 1 - Disruption: Several members of the lab are out sick / unavailable for an extended period, and some suppliers or internal dependencies are at risk; Add as many steps/bullets as needed.

1. Discontinue experiments with hazardous materials.
2. Ensure that information on samples in the spectrometer is up to date so that another staff member can continue the work if you become ill.
<https://docs.google.com/document/d/1BzAwTGDENUV6aTZp-v2Gchufg65HLiP45rl-0taKlZA/edit?usp=sharing>
3. Data acquisition for SARS-CoV-2 samples will continue.
4. Data acquisition for user project and collaborations continue with preference for experiments that require less staff time (long-term data collection rather than sample-intensive projects).
5. Cryogen fills and maintenance continue as usual.
6. NMRFAM servers are maintained to ensure remote access for data collection and analysis as usual.

Scenario 2 - Suspension: Students not allowed on campus; research and lab activities suspended; infrastructure support systems remain operational; Add as many steps/bullets as needed.

1. Wet lab instruments turned off.
2. Cryogen fills and helium recovery system maintenance continue as usual with a buddy system of essential personnel. To the extent possible, sample changes are performed concurrently with cryogen fills to allow continued remote data acquisition of long-running experiments. SARS-CoV-2 sample changes are prioritized.
3. NMRFAM servers are maintained to ensure remote access for data collection and analysis.
4. All NMRFAM staff other than essential personnel work from home.

Scenario 3 - Shutdown: For a campus shutdown planned for longer than two weeks, or else if the campus is inaccessible, we cannot assume critical infrastructure would be available or is at least unreliable. Place all instruments and experiments in a safe idle state that does not require services. Additional details in this scenario relate to equipment shutdown and the like.

1. Prioritization of cryogen fills to minimize damage to the NMR spectrometers and potential time/cost to recover. Decisions will be made by Katie and Chad, with Paulo to make decisions in the even that Katie and Chad are not able to.
2. Cryogen fills and helium recovery infrastructure maintained if possible.
3. Warm up cryoprobes and turn off cryoprobes and consoles.
4. All NMRFAM staff work from home unless essential personnel are able to have access to campus to perform cryogen fills and critical maintenance.

Other concerns to consider in scenario planning

What facilities are at risk of harm to the facility, its contents, to campus or to the public (e.g., animals that must be fed, samples that must be secured, equipment or hazardous materials that must be maintained or shut down)?

1. Hazardous gases – If cryogen fills are not maintained, a quench becomes more likely. This will result in rapid boil off of helium and poses a suffocation hazard. The NMRFAM space is designed with oxygen sensors that should immediately and rapidly vent these gases to ensure a safe breathing environment.
2. Animal care – NONE.
3. Water cooled equipment that can be damaged by loss of water – cryoplatforms and liquid helium recovery system.
4. Loss of nitrogen purges – N/A
5. Static tanks/containers of chemicals in hoods and loss of exhaust – All should be in sealed containers.
6. Vacuum systems pump and valve off – NONE that can be turned off.
7. Turn off UV lamps - NONE
8. Ensure all chemical bottles are in storage cabinets and all bottles have secure lids.
9. Cap all solvent carboys
10. Empty all trash containers – remove any chemical contaminated wipes

If the lab must be staffed to avoid risk or harm, who will act as the primary minimum essential personnel to keep it operating? If the lab mustn't be staffed, state that it will shut down to ensure no risk or harm. Provide name, email, and best emergency phone number for each.

1. Paulo Falco Cobra, paulofcobra@gmail.com
2. Marco Tonelli, tonelli@nmrfam.wisc.edu
3. Kelsey Collier, kcollier3@wisc.edu

APPENDUM, INFORMATIONAL, the information below was shared with by Vice Chancellor for Research & Graduate Education on March 15, 2020 with the VCRGE Center Directors to assist them in continuity planning. It is included here to further assist your planning activities.

Center directors;

See the message below from the Chancellor. The message provides guidance to ensure the safety of our community while offering the least disruption to our work. To summarize:

- *Please maintain your center research activities to the extent possible.*
- *Review your COOP plans and activate as appropriate.*
- *Formulate and disseminate plans that guide ramping down and then suspension of research if needed.*
- *Encourage remote work for those staff that can do so without disruption, while others (i.e., those you identified as essential personnel in your COOP plans) are expected to be on campus.*
- *Continue to practice recommendations and procedures that reduce the spread of the virus.*

While most research can be conducted with appropriate social distancing and typical hygienic steps, the COVID-19 outbreak has presented us with significant challenges. I thank you for your

continued leadership in these challenging times. The RSP webpage, which is updated regularly, is an excellent source of information about sponsored projects: <https://rsp.wisc.edu/COVID.cfm> Some specific actions you can take include:

- *Identify critical equipment that must remain in service, then plan for how to manage or shut down this equipment if necessary.*
- *Strive to keep all lab activities within reasonable business hours — including those involving work with hazardous material or processes. Doing so enhances the ability of Research Safety to respond if services are needed.*
- *Continue or expand cross-training among your staff to support critical functions.*
- *Identify personnel who are essential to maintain critical research and ensure they know what to do if operations are interrupted or suspended.*
- *Distribute your communications plan to personnel. If necessary, develop this plan and designate contacts to help disseminate information in a timely manner.*
- *Identify priorities and plan for critical experiments in case of limited access.*
- *Take steps to ensure remote access to files, data, servers, etc., except with regard to research with sensitive or restricted data.*
- *Research must be conducted within appropriate space designated for research activities. Personnel should not remove research materials other than laptops, data storage devices, etc. to alternative locations, including home.*
- *Plan for remote proposal submission.*
- *Be sure to check travel restrictions in advance of making travel plans.*

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