BINA, BioImaging UK, RMS
Meeting Notes from the Virtual Light Microscopy Facility Meeting to establish safe working practices in the COVID-19 era
May 13, 2020

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Meeting Demographics ~270 attendees, 18 countries
To see a discussion of this meeting and meeting topics check
#vLMFsafe - Virtual Light Microscopy Facility Safety

TOPICS DISCUSSED

1. **Cleaning**

2. **Personal Protective Equipment (PPE)**

3. **Physical distancing**

4. **Managing Staff**

5. **Staff-User Interactions**

EXECUTIVE SUMMARY

This document provides a summary of both the verbal and Zoom chat comments from the open access virtual community discussion organised by members of the RMS, BioImagingUK and BioImaging North America (BINA) held on Wed May 13th, 2020. The summary is a simple record of all comments made; it is not intended to provide any recommendations. Imaging facility staff are encouraged to investigate and follow their own institution's policies, as well as local and national policies, when deciding how best to operate their facility in the COVID-19 era. There were a number of points that garnered broad consensus during the discussions, as illustrated by the results of the poll questions summarized below.

These notes do not necessarily reflect personal views, but reflect an open discussion around the points that were raised.

Examples of such consensus opinions include:

1) Although most microscope facilities have traditionally had a "no-gloves" policy, the majority of attendees felt that gloves should be worn during the current crisis. It was generally felt that gloves should be provided by the facility, to encourage users to wear clean gloves at the beginning of their session, then the gloves could be re-sterilized during the session using 70% ethanol or hand sanitizer, then discarded before leaving the facility (to minimize the number of gloves used and impact on the environment).

2) Most comments supported the use of masks of some variety being worn at all times while in the microscope labs. At the very least, the wearing of gloves and masks may make the users and staff feel safer and more comfortable about working in the facility.

3) If gloves and mask policies are a reversal of former practices, education is key – the new policies must be carefully explained to users to encourage following them and also to prepare for future adaptations of the policies.

4) Users must be very careful about contamination from the eyepieces. Safety glasses alone may be insufficient since other nearby parts of the microscope could also be contaminated. Covering these areas with clingfilm may be a better solution, and this should be disposed of by the user at the end of their session. Cheaper brands of clingfilm may actually work better than e.g. Saran wrap.

5) Having multiple cleaning and personal protective equipment and measures provides redundancy that is best to ensure safety.

6) Based on the chat window, there was a general consensus from the group that cleaning is a shared responsibility, but that due to the nature of imaging facilities the users will clean more often than the staff. Many facilities will only have enough staff per instrument on site to perform periodic cleaning, so users should be responsible for cleaning the systems before and after their session. User-performed cleaning will also minimize the number of people in the rooms and the number of times the staff expose themselves to potentially contaminated environments. It will also facilitate after-hours access when there are no facility staff around.

7) A compromise could be to have staff clean at beginning/end of each day/shift (if staff are on site all day) and users at the beginning/end of each microscope session.

8) In early phases of reopening should only have one user per room unless labs are a large open plan design, in which case appropriate distancing must be considered.

9) Workstations or equipment could be moved to other locations to ensure instruments are not too close together.

10) Facilities should ensure good airflow in rooms but take care not to cause instrument performance issues.

11) Leave a time gap between users to let any aerosol settle and to avoid users running into each other in common spaces.

12) Facilities need a plan for what to do if a user or staff member get a positive COVID-19 diagnosis (potential topic for future discussions?).

13) Facilities need to manage the expectations of users/researchers while allowing enough time for air exchange rate with the room empty. Shared facility space could be viewed as a unique area that may need additional considerations beyond those being established across the broader research labs spaces due to the potential of cross team interactions and sheer volume of unique users sharing the same space. As such, Institutions need to understand that facilities cannot go back to their previous full operational levels and productivity. A change in the culture and way of working will be required.

14) Although leaving doors open would reduce the touching of handles etc., doors most likely need to remain closed to achieve sufficient air exchange, as well as for security and fire codes. Ventilation is usually designed for closed doors.

15) Important to make sure staff feel safe coming back to work.

16) General consensus that technical support can be facilitated with remote desktop applications, video/audio devices and tools like Zoom.

17) Videos and user guides with step-by-step instructions will be important for technical support and eventually training.

18) Full-service imaging is a good solution for advanced instruments, external users, or projects where users cannot be trained right now.

19) Most facilities will not offer in person support or training in the early stages of opening. Consensus that remote training will not compare to what can be done in person. Training novice users will be the most challenging issue. Post meeting suggestions included encouraging research labs to work as a team and use a delegated member to undertake the imaging for non-trained members, thus minimising the need for training, troubleshooting and optimisation.

TOPIC 1 – CLEANING

There are many helpful guidelines coming out from different countries, such as German BioImaging, the ABRF and the UK Government. Links to these websites, as well as other useful links e.g. for recommendations from microscope companies for cleaning microscope components, can be accessed on the RMS and BINA websites, and are also listed below in the "Resources" section.

1) Whose responsibility is it to clean?

Notes from discussion and chat window:

- Need redundancy with users cleaning with 70% ethanol before and after use and facility staff cleaning at the start and end of the day.

- Could put up signage reminding people not to unnecessarily touch surfaces.

- Discussion of not bringing in cell phones as potential high contact items but resolved these are needed to contact facility staff for support, for safety if working alone, for checking in and out of some facilities/institutions with phone apps for tracking purposes and so on.

- What about light switches? Doorknobs? Card access pads? Many high contact surfaces in common areas will be cleaned by institutional/building staff.

- Discussion to prop open doors but issue with biohazard and fire hazard regulations as well as instrument stability. Maybe okay for doors within main hallways and high traffic areas, if they are not fire doors, rather than instrument labs themselves.

- Suggestion to have a sign on the microscope room door indicating the last time it was cleaned by facility staff.

- Remove clutter in the rooms. Ask users not to bring coats, bags and so on.

2) What needs to be cleaned?
   a. Eye pieces
   b. Focus knobs
   c. Mouse
   d. Keyboard
   e. Work area
   f. What else?

Notes from discussion and chat window:

- Rubber eyecups should be removed. Could train users to find samples without looking in the eyepieces.

- Washable keyboards were suggested but this would be a significant cost and would generate a significant amount of waste replacing old keyboards.

- Keyboard covers were suggested (see resources below for more info).

- Area around the eyepieces and the portion of the stand immediately below should also be cleaned well as they will be in close contact with the user's nose and mouth.

- Should wipe down immersion oil bottles.

3) Cleaning Methods
   a. Saran wrap/Clingfilm
   b. Alcohol (70%) and wipes
   c. Other solvents?
   d. Microfiber cloths?

Notes from discussion and chat window:

- GerBI recommends the use of cling film and no need to clean surfaces. Others thought redundancy and cleaning with 70% ethanol by users before and after each session was important. Discussion that 70% ethanol should not be used in spray bottles as the aerosol is unhealthy to breathe in, plus the potential for fire around electrical equipment, lasers etc. Compromise could be ethanol in squeeze bottles rather than spray bottles that make an aerosol. In either case, ethanol should be sprayed onto a cloth and not directly onto the equipment.

- Concern that 70% ethanol could damage keyboards, touch pads, rubber surfaces (focus knobs). Each microscope manufacturer has released cleaning procedures (see above to access links) so staff could cross check those with any protocol that is developed. Spray bottles will result in a high use of ethanol. Could use disposable wipes but difficult to source right now. Viricidal wipes. Distel cleaning solution.

- Bleach was mentioned but it can take minutes to destroy the virus while ethanol works more quickly. Mentioned that bleach loses its strength over time when diluted. Would also probably damage microscopes/optics/plastic. Isopropanol was mentioned but may be damaging to plastics and optics. However, bleach and other disinfectants (e.g. hydrogen peroxide) may be more appropriate for hard surfaces, since ethanol may evaporate before the virus is completely neutralized.

- Some concern about waste generated with cling film that could be contaminated. Could have trash bins with covers to minimize any risk if it is contaminated.

- How to source ethanol? It might be difficult to get. Will facility order it or the institution? Who will pay for it? If cost/availability is an issue, one alternative suggestion was that users can bring their own spray bottle with 70% ethanol.

- Mentions of using ultraviolet c (UVc) light to clean hard to reach surfaces. Time did not permit this to be discussed with the larger group though. *The equivalent Flow Cytometry meeting did comment that UV light would not be simple as many areas would be shaded from the light source.*

- Suggestion of 1.4% hydrogen peroxide as more gentle on plastics such as keyboards and more effective on hard surfaces. But concern that users may then use this around the lenses themselves.

4) Cleaning samples before coming to the facility or dropping them off for full service.
   a. Wipe down slides with 70% ethanol before coming the facility.
   b. How to transfer samples to facility staff for full service?

Notes from discussion and chat window:

- Comment that all sample containers should be wiped down before bringing them to the facility. Slide boxes, Styrofoam boxes, containers if they are used to keep live samples warm during transport.

POLL QUESTIONS
1) Whose responsibility it is to clean?
   a. Facility staff – 11%
   b. Each user – 89%

2) Is 70% ethanol sufficient?
   a. Yes – 94%
No – 6%

Resources:
1) German BioImaging Guidelines: https://www.gerbi-gmb.de/sites/default/files/2020-04/GerBI-GMB_Corona_Recomm_2020-01-04.pdf

2) Association of Biomolecular Resources Guidelines: https://abrf.org/sites/default/files/temp/abrf_core_facility_ramp-up_information_v3.1.pdf

3) UK Guidelines: https://www.gov.uk/guidance/working-safely-during-coronavirus-covid-19/labs-and-research-facilities

4) WHO SARS-Cov2 hand rub formulations:
https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf

5) Testing of formulations:
https://www.biorxiv.org/content/10.1101/2020.03.10.986711v1

6) US environmental protection agency guidelines for cleaning and disinfecting:
https://www.epa.gov/sites/production/files/2020-04/documents/316485-c_reopeningamerica_guidance_4.19_6pm.pdf

7) US CDC guidelines for Cleaning and Disinfecting your Facility:
https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html

8) Leica Microsystems: How to sanitize a microscope

9) Nikon: Recommended Handling and Disinfecting Procedures for Nikon Microscope products to reduce spread of infectious agents including SARS-CoV-2 (Coronavirus)

10) Olympus: How to Clean and Sterilize Your Microscope

11) Zeiss: Cleaning and Disinfecting the Microscope and its Optical Components

12) Keyboard covers, e.g.: https://www.amazon.com/BronaGrand-Computer-Keyboard-Protection-Protector/dp/B01AXR9OQ0

13) Waterproof keyboards https://www.wetkeys.com/default.asp

14) Cleaning solutions: https://www.tristel.com/tristel-products/distel-medical

15) Detailed list of over 400 cleaning products but searchable. Says ethanol works with 1-5 mins of contact depending on product. https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

16) Tests of viricidal wipes:
https://aricjournal.biomedcentral.com/articles/10.1186/s13756-019-0569-4

17) Review of cleaning solutions and viral infectivity (Note many references were not directly tested on SARS-Cov2 but other viruses)
https://www.journalofhospitalinfection.com/article/S0195-6701(20)30046-3/fulltext

18) Sanicloth: https://www.canadiansafetysupplies.com/Sani-Cloth-Plus-Wipes-p/100288.htm

19) Peroxigard wipes

20) Chemgenne wipes

21) Microfiber cleaning clothes e.g. https://www.amazon.ca/AmazonBasics-Microfiber-Cleaning-Cloth-24-Pack/dp/B009FUF6DM

22) General SARS-Cov2 virus transmission information. https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations

TOPIC 2 – PERSONAL PROTECTIVE EQUIPMENT (PPE)

1) Should users wear gloves?
   a. Limited access to gloves.
   b. Access to a sink for hand washing.
   c. False sense of security.
   d. Environmental issue.

Notes from discussion and chat window:

- First, discussion of gloves. Most people are told not to wear gloves in microscopy facilities. Other people think that gloves should be on all the time. Suggestion of gloves and then clean those gloves with hand sanitizer or ethanol. Are the gloves protecting people from the equipment or the equipment from the people? Also concerns if gloves are recommended what about the supply chain? Many people donated gloves to hospitals so may be difficult to get them. Environmental concern? Cost?

- Should users bring gloves or the facility provide them? If facility supplies gloves you know they are clean and haven't been worn in the lab all day. Suggest one pair of gloves per user per session and wash them with 70% ethanol or hand sanitizer periodically. Could provide gloves of a certain colour to know they were new gloves from the facility. People tend not to touch their face if they have lab gloves on. Link to NIH proper glove use and integrity was added in the chat:

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5700156/

- If wearing gloves is a reversal of previous policies it is important to educate people that before, gloves were worn to protect users from samples (when needed), but now gloves are to protect users from each other. Education is key!!

- Do all gloves, masks, cling film go in the waste bin or biohazardous waste? Could use a waste bin but should it have a lid?

2) Should users wear masks?
   a. Do they need to be worn at all times?
   b. How often do they need to be changed?
   c. Who provides them?
   d. Are homemade masks okay?

Notes from discussion and chat window:
- Masks, face shields, safety glasses. Many regions require masks at all times. Some rules are confusing such as a need for masks in public but not at work? British study where they show that there is not much evidence that masks help

in the spread of the flu. Could be helpful in creating a feeling of a safe environment even if they don't work well. Need more research to see if COVID spread is inhibited by masks. Suggestion that in Asian countries they have a culture of wearing masks and it appears that these have helped in containing the virus. People tend to touch their face less if they have masks on. Comment that face shield (N95) helps in hospitals so should likewise help in facilities. However, N95 facemasks may need to be preserved for use in hospitals.

- A comment was made that 1000 virus particles is considered the dose required for infection.

3) Should users wear lab coats?
a. Cotton or disposable?

Notes from discussion and chat window:

- Some think fresh lab coat for the facility. Many facilities do not require lab coats. Normally lab coats protect users from their samples but not one user from another. Concern they might be dirty or contaminated if people have been wearing them a lot and they are not cleaned often. Perhaps only if they are working with BL2 or higher samples.

- Disposable lab coats could be used but expensive and wasteful. Could have lab coat that is only used in the facility and kept there, but this would be difficult for large cores with many users.

- Goggles or safety glasses can be used for looking through the eyepieces. The UK has recommended no PPE beyond what would normally be used in the lab. If working directly with coronavirus, that work will be done in a level 3 lab.

- Safety glasses. Either glasses or cling film on the eyepieces, or both, when looking down the microscope. Some people find it difficult to focus on a sample with glasses on. Need to take rubber cups off of eyepieces. Eyes, nose and mouth are close to the microscope when looking in the eyepieces so potentially a higher chance of virus spread. Cling film helps with that the best – need to cover more than just the eyepieces.

- Question raised without consensus: Do all gloves, masks, cling film go in the waste bin or biohazardous waste? Consult local regulations.

- Many thought that gloves should be worn. Facility should provide them to make sure they are clean. Users should be taught how to properly put on and dispose of gloves and reminded not to touch face or surfaces unnecessarily so they don't get a false sense of security. To minimize number of pairs of gloves needed per user could use alcohol-based hand gel to sanitize them periodically.

- Many people think masks should be worn or their government or institutions have mandated it. Some think the institution or facility should supply them and others

that users should bring their own. Maybe not necessary if users are in a room alone. Some think only if you cannot be 2 m/6 feet apart.

- Not a lot of discussion on safety glasses or lab coats but seemed most thought they should be worn if they would normally be needed for the experimental work at hand.

- In all cases, education and training are key so that people do not develop a false sense of security and use PPE inappropriately. E.g. dirty gloves = dirty hands. Important to wash hands and cough on sleeve etc.

- General thought that gloves and masks may play a role in just making people feel safer in the facility.

POLL QUESTIONS
1) Should users wear gloves?
  a. Yes – 72%
  b. No – 28%

2) Would you feel more comfortable if users and staff were wearing masks all the time?
  a. Yes – 66%
  b. No – 12%
  c. Not Sure? – 22%

Resources:

1) Sample protocol for posting about PPE and microscope cleaning.
https://www.uni-duesseldorf.de/redaktion/fileadmin/redaktion/Oeffentliche_Medien/Fakultaeten/Mathematisch-Naturwissenschaftliche_Fakultaet/CAI/PDF/CAi-safety-measures_pics.pdf

2) Article arguing that masks are not that effective for the flu.
https://www.bmj.com/content/369/bmj.m1435

3) Study on the effectiveness of glove including if washed frequently with hand gel.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5700156/

4) Video showing how masks restrict the spread of exhaled air – this is with an N95 mask though. https://www.lavision.de/en/news/2020/4302/

5) Health Article in The Atlantic magazine about wearing masks to protect others, not yourself. https://www.theatlantic.com/health/archive/2020/04/dont-wear-mask-yourself/610336/

6) This article cites a meta-analysis of protective measures for all coronaviruses, not just CoV2. https://www.fastcompany.com/90501603/masks-prevent-the-spread-of-covid-19-landmark-analysis-of-64-studies-finds

7) This article cites numerous studies in respectable journals on the subject of masks. https://theconversation.com/masks-help-stop-the-spread-of-coronavirus-the-science-is-simple-and-im-one-of-100-experts-urging-governors-to-require-public-mask-wearing-138507

TOPIC 3 – PHYSICAL DISTANCING

1) How will physical distancing rules impact the number of your instruments available for use at the same time?
   a. 2 meters/6 feet between people
   b. Room size
   c. Room shape

Notes from discussion and chat window:

- Software companies such as Stratocore and Agilent have developed options in their PPMS and iLabs software to manage equipment in rooms with multiple instruments. Limiting bookings per room and spaces between bookings available in open source "Booked Scheduler". Discussions should be held with the software companies to introduce additional features that will aid facility managers in the current crisis.

- After-hours users will be responsible for following the rules. After-hours access also offers a method of physically distancing in time.

- Analysis workstations could be moved into offices or other spaces or set up for remote access.

- Move equipment around to limit number of instruments in a single room.

- Will be issues in user traffic in common spaces like hallways and staircases. These will be very unique to each facility/building/space. Rules/solutions will likely be determined by the institution, not the facility.

- Use "Do Not Disturb" signs to let people know when a room is occupied.

- Many institutions are starting with only 25% capacity in phase 1 or reopening.

- For rooms with multiple instruments, single occupancy may be necessary, hence rooms rather than microscopes should be reserved in order to manage numbers.

2) Could/should barriers be installed?
   a. Curtains?
   b. Plexiglass?
   c. Air flow and temperature control?

Notes from discussion and chat window:

- To establish necessary time between users you could find out the time for air exchange rate and then leave the room empty for 2x air exchange.

- Curtains could be difficult to clean, conversely, a comment was made that the virus does not live long on soft/dry surfaces. Laser safe or plastic curtains can be wiped clean. Plexiglass barriers could interfere with air flow and cooling of equipment so may not be a good option.

3) Time between users?
   a. Who decides?
   b. Longer might be better?
   c. No revenue during this time?
   d. Can this be enforced?

Notes from discussion and chat window:

- Comment that with 6 air exchanges per hour, it takes a full hour to get to 99.9% air change. Time between users should incorporate some gap but maybe we don't have to get it to 0% risk? Important for users' to be confident that the facility is safe. See CDC reference on air exchange below.

- Increased air flow can be an issue for temperature changes and mechanical vibrations. Not good for high resolution systems.

- Get HVAC info in order to calculate required time between users. Some people feel if PPE is being used and things are being cleaned there is no need for a gap between users.

- CDC has published guidelines on time between users.

- If more than one person is in the room, do they have to work during exactly the same time window? Otherwise it will be difficult to coordinate timing so that the room is completely empty for the required period for air exchange.

 POLL QUESTIONS
1) Are each of your instruments housed in individual rooms (physical walls not curtains).
   a. Yes - 14%
   b. No – 42%
   c. 50/50 – 44%

2) What % of your instruments will be **in**accessible at any given time due to physical distancing rules?
   a. 0-25% - 41%
   b. 26-50% - 38%
   c. 51-75% - 17%
   d. 76-100% - 5%

3) How long should the room be empty between users?
    a. No gap – 9%
    b. 15 min – 21%
    c. 30 min – 58%
    d. 1 hour or more – 12%

Resources

1) CDC guidance on air exchange.
https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html

2) Room Purge Equation is $t = (1/A) * \ln(C_{init}/C_{final}) * 60$ where

   t = time required in minutes, assuming ideal mixing

   A = air changes per hour

   C = concentration of contaminant

3) Possible airborne spread of SARS.
https://onlinelibrary.wiley.com/doi/10.1111/j.1600-0668.2004.00317.x

4) Risks and how to avoid them. https://www.erinbromage.com/post/the-risks-know-them-avoid-them

TOPIC 4 – MANAGING STAFF

1) How will you manage staff rotations in the workplace?
    a. Small children at home.
    b. At risk groups.
    c. Public transit.
    d. Cohorts/teams?

2) How to maintain team morale and share the workload?

Notes from discussion and chat window:

- Some staff will not be able to come in at all if they have to take long public transit trips. They might have at risk conditions themselves or be living with people who have high risk conditions. Limits on finding other forms of transport. Can't buy a bike right now! If staff can't come in they might feel left out, guilty for being unable to come in. Can have virtual staff coffee breaks, casual meetings so people can feel connected and still part of the team. Good idea to have some of these meetings as more of a break/informal meeting.

- Consensus that it is of primary importance for staff to feel safe and comfortable coming in. If they are unable to come due to family circumstances/travel issues, they should be supported in the decision and not forced to come in. On the flip side, it was pointed out that we are needed to support COVID-19 research (and other research) and should come in if possible.

- Childcare is a huge concern, particularly over the summer months. Fortunately, many/most institutions have already taken the approach that staff cannot be forced to come in to work.

- There will be difficulty coordinating staff, other family members who need to work, childcare? No one size fits all approach for staff.

- People in small facilities managed by only 1 or 2 staff will be particularly impacted if they cannot come to work physically. Single staff facilities may feel even more conscious of the need to balance safety for the staff (i.e. staying healthy) against the demands of the users.

- Most facilities plan staff rotations – on a daily or weekly basis. If certain staff specialize on certain equipment, this may mean not all systems are available each week. Exact plans depend on number of staff, staff ability to come to work etc. Also plans will change as governments change things e.g. open up schools again, so long-term planning may not currently be feasible.

- Users should be asked to book further in advance so the facility can plan staff around usage. No walk-ins allowed. Perhaps make booking at least 24 hours ahead of time, possibly longer. Could even limit bookings to 7 days ahead for planning reasons too. Really helps people plan around things. However, policing of users will be very difficult with reduced staff on site.

- Concerns regarding the financial impact on the facility if not all systems are available, and possible layoffs of staff if the institution does not perceive the value of retaining staff to work remotely. Some staff already furloughed or being let go. It is important for institutions to appreciate value of remote work and assistance as well as education of staff at home. Very small facilities may be less impacted than large ones in justifying retaining staff.

- Hiring freezes, replacement of staff who are leaving, and length of guarantee of staff salaries also discussed – highly dependent on individual institution.

- Staff working at home can also build on their professional development with online resources, learn image analysis etc. How to manage our teams? Mix of at home remote support and some people going in. Question if pregnancy was considered an at-risk group? Issues finding parking. Many people must come in early. Some facilities not allowed to have people come in during evenings and weekends. May limit people with long experimental time course to later in the reopening plans.

- Some places are offering free parking to keep people from having to use public transit. Some places are working at 25% capacity to get started.

- Make sure to check with each staff member and have an open discussion. We need to advocate for our staff to the institution and find something that will work for everyone. People need to understand that the facility cannot offer the same level of support as they have in the past. Staff do not have to reveal details about why they cannot come in.

- Use Microsoft team and put users on a team (can also be installed on Cellphones). Users can then contact staff so that staff can stay at home. Could also use programs like TeamViewer, Splashtop software, Zoom, Anydesk, Jump desktop.

- Bomgar works on DeltaVisions (linux).

- Some programs (e.g. TeamViewer) may require firmware on graphics cards to be upgraded to work well with certain softwares (e.g. Imaris), or increased RAM and GPU. One user managed to launch Imaris remotely (Remote Desktop Protocol (RDP) connection) by disabling AMD FirePro card and reported that Zen works only in Lite version (free software options) via RDP. Another uses Imaris on remote servers via VM Horizon.

- Discussion regarding the cost of TeamViewer – only free for personal use so can end up being expensive for facilities to use on all systems. Exact cost

unclear – cat comments varied between $49 per month, $99 per month and $1800 for a pro license, but the latter may be overkill. Cheaper if pay for a year in advance.

- Positive comments regarding the use of zoom for remote assistance a well as staff meetings, particularly since many institutions already pay for a full license.

- Microsoft remote desktop works with many instruments (e.g. Zeiss) and is free. Microsoft Teams is also useful for facilities.

- Splashtop is $340/year for up to 50 supported instruments.

- Other facilities use LogMeIn – in the end, the decision regarding which software may depend on your institution.

- Remote software access also may not work if the license is not recognized – also the computer may need rebooting periodically and sometimes this can only be done on site.

- Teams and TeamViewer both work on Win7 and can windows remote desktop between Win7 and Win10.

- You can pay for extended Window 7 security from Microsoft for $10-50 per year per computer. A comment was made that this will go up to $100 per computer per year in 2021 and $200 per computer per year in 2022.

- Systems with older Windows operating systems can be a problem. Can use VPN but often slow for instrument control or image analysis. Best not to use continuous or scan features while operating software such as TeamViewer or things really do stop working remotely. May need to upgrade the video card on your home computer to manage video intensity programs like image acquisition software or Imaris. Could push companies to make it more affordable to upgrade to Windows 10? Or ask institutions to take on this cost (some do, some don't). Some upgrades only require software, others the purchase of new computers, which will not be feasible for facilities with budget cuts. This is a big concern!

- Also, some instruments won't work on Windows 10. Old hardware with new software is often a major problem.

- Temporary floating licenses offered to current Imaris customers has been a huge help – but only works well if the user has a good computer at home.

POLL QUESTION
1) Should staff with small children be expected to work in the facility in person if the school/day-care facilities are still closed?

    a. Yes – 6%
    b. No – 65%
    c. Not sure – 29%

Resources:

1) Big shout out to NEUBIAS for providing so many online resources for image processing and analysis. https://www.youtube.com/channel/UC-oy7UpEhRfHQ-5ePCviKFg

2) Robert Hasse Youtube channel for image analysis :
    https://www.youtube.com/channel/UC-hlwQ9Q4GS3rtv2EwSStAQ

3) BioImaging UK Resources page. https://www.rms.org.uk/study-read/news-listing-page/online-microscopy-talks-list.html

4) Microsoft Windows 7 extended security support.
    https://support.microsoft.com/en-gb/help/4527878/faq-about-extended-security-updates-for-windows-7

TOPIC 5 – STAFF-USER INTERACTIONS

1) How to facilitate **virtual** one-on-one interactions? Pros/cons?
    a. Phone apps.
    b. Screen/desktop sharing apps.
    c. Internet resources/security.

Notes from discussion and chat window:

- Put cameras in rooms with 2-way audio to enable remote technical support because our instrument rooms are too small to accommodate more than one person at a time. Trainings will be handled through a combination of pre-recorded instructional videos and live video chat.

- Try Zoom training/assistance for experienced users. Allow brand new users to drop off samples to the core so that staff members can image the slides for them.

- Use Microsoft teams for remote technical support.

- Users could text staff to ask for technical support, then use Zoom or other software.

- Could use slack groups to let the next user know the scope is free.

- Could provide custom trouble-shooting guides for each instrument with information on the most common problems typically encountered on each microscope. This could be on the facility webpage or the desktop on each computer. Could try a hybrid approach where facility staff put the sample on and get things set up and then leave so that the user can come in and work.

- Training is expected to take a while to ramp back up – facilities may choose to only accommodate existing users at first. First, offer staff service work and accommodate existing users with remote assistance, next stage, train on simpler systems with videos and remote training, later on, train on more complex systems.

- Plan to record remote trainings on Zoom for some systems, with staff sitting at the system and users remoting in from their computer.

- Training videos with screenshots, buttons and components would be ideal.

- One-page instructions with pictures on how to turn the microscope on and off.

- Comment that you can use Windows to record every mouse click and operation that can then be shown to users.

- Requests for the vendors to make videos – and particularly for any video showing the correct way to apply immersion liquids to objectives and how to mount samples – easier to train on software remotely than on the hardware.

- Many people have already written training guides, including screenshots of software and photos of hardware, turn-on buttons etc.

- Could all of these guides/videos be shared somewhere centrally, instead of everybody re-inventing the wheel?

- For remote trouble shooting, could have a picture of the microscope on the computer and use remote desktop application to point to things on the computer.

- Online training resources and good repositories of such information could prove invaluable. Could they be centralised on just a few sites, e.g. the RMS and also Microlist?

- Use WhatsApp/video call for remote troubleshooting/technical support and record videos.

- Webcams can be helpful too. What about privacy concerns?

- Concern that remote training will not be sufficient and users may damage the equipment. Also cannot troubleshoot hardware issues like cables that are not attached well.

- Automated systems like the Zeiss CD7, Nikon Biopipeline will be much easier as users can drop off samples and facility staff or users can control the entire system remotely.

2) How to facilitate **in person** one-on-one interactions?
    a. Laser pointers.
    b. Remote mice.
    c. Others?

Notes from discussion and chat window:

- It is going to be very difficult to do in person training. Suggestion to prepare hardware and software videos. Videos for (1) disinfecting the keyboard, area, scope parts, (2) turn on procedure, (3) starting the software, (4) focusing and changing objectives and (5) basic acquisition examples in software. Use Zoom or TeamViewer to interact with trainees. May be easier to make up advanced user guides because it can be difficult to make videos with physical distancing rules in effect. Could use a laser pointer to point out parts of the instrument to trainees. Laser pointers should not be too high powered because of safety concerns. Safe laser pointers have the yellow class 1 sticker indicating <1mW. Could use remote wireless second mouse in the room to take control of the microscope. Could use a long physical pointer (stick! https://images.app.goo.gl/EtVyVhsYymUA2tUg7) instead of a laser pointer. Set up camera and studio to make training videos. Perhaps some trouble shooting guides could also help for the most common problems. Videos can also be good

homework for trained users or before training sessions or they can be used as refresher guides.

- Could wear professional full PPE to do in person training. This might be possible later as the PPE supply chain is improved. Could be communication issues with language barriers, masks make it difficult to hear/understand and 6 feet distance to read body language. Any suggestions?

- Comment that some automated instruments only require the user/staff to go into the room and mount their sample on the microscope, thus limiting time required to be in the room.

- Many people WANT to get back to training, since this is their favourite aspect of the job.   Also, offering trainings of some sort may be important to convince the institution of the importance of retaining staff.

- New users could be trained on basic teaching microscopes first.

- Important to have a good standard sample at the microscope to help with trouble shooting.

3) Do you expect to do more full-service work?
    a. Staff limitations.
    b. Unique/complex instruments.

Notes from discussion and chat window:

- For very complex, unique instruments, full-service might be the best option. Would people charge extra for full service? Need to work out a way for sample drop off. Might be hard to charge extra for full service if it is required. Can be issues of knowing what to image. PIs will worry about this. Could do a hybrid approach, e.g. ask them to check/explain on a remote desktop application. Staff-performed imaging could improve the quality of scientific data by removing user bias. However, users might complain about images even if it is the sample preparation that is the issue. PIs might be willing to pay for facility staff to take images as a full-service fee because after getting so far behind they will be anxious to have high quality images quickly.

- Could have the facility staff at the microscope and the user login remotely so that the staff member can be sure to be imaging the areas of interest of the sample.

- Could have trained superusers in each lab to do imaging for several projects.

POLL QUESTIONS

1) Is full service practical for your facility?
   a. Yes – 4%
   b. No – 14%
   c. Not Sure – 82%

2) Should users be charged extra fees for full service?
   a. Yes - 22%
   b. No - 50%
   c. Not Sure - 29%

3) Should we have a follow up Meeting?
   a. Yes - 92%
   b. No - 8%

Resources:

1) Videos from companies on how to use their instruments, e.g.
   https://www.youtube.com/watch?v=Zr9wCtwXF8g

2) Microlist. https://www.microlist.org/explore/?type=career&sort=a-z

3) Video about objective lenses and shows how to apply Immersion Oil.
   https://www.youtube.com/watch?v=c58P4Zt9xX0

4) Training videos on the Aurox YouTube page.
   https://www.youtube.com/channel/UCykKTH2IhFPRtQV0q31LP2w/videos

5) General information about microscopy and microscopy facilities
   microscopist.co.uk

6) Video about creating online resources.
   https://www.youtube.com/watch?v=L6dxHCDp_aI&feature=youtu.be

7) Training video from Bruker. https://www.youtube.com/watch?v=Zr9wCtwXF8g

8) BioImagingUK collects microscopy resources using this shared Google Doc.
   https://docs.google.com/spreadsheets/d/1IVQ2SH9ii0D71bmu2kpAEiKkbJ8REb
   wYXrD7912vaDA/edit?usp=sharing **Add your favourites.**

9) Later they are uploaded on the RMS website.
   https://www.rms.org.uk/study-read/news-listing-page/online-microscopy-talks-
   list.html

10) BINA's shared google doc with many great microscopy links:
    https://docs.google.com/spreadsheets/d/1hLpWqpSkzdcblmu5FZdFggHJZ0dt7a
    bDyrBXEEU2VFM/edit?usp=sharing

Countries in Attendance

1. Australia
2. Brazil
3. Canada
4. Colombia
5. Finland
6. France
7. Germany
8. Ireland
9. Israel
10. Mexico
11. Norway
12. Qatar
13. Singapore
14. Spain
15. Sweden
16. The Netherlands
17. UK
18. US