Brimacombe PI Request to Restart Research: Phase I

Complete this form and submit to John Madden (ampel.dir@ubc.ca) cc'ing Gary Lockhart (Gary.Lockhart@ubc.ca) in order to request approval for restarting research. APSC SBQMI members please also copy Andrea Damascelli (andrea.damascelli@ubc.ca) and Pinder Dosanjh (dosanjh@phas.ubc.ca). Please also cc your department head or appropriate departmental contact. Once approved, complete and sign the Access Agreement (sent to you separately) and have it posted on each exterior lab door.

Applications will be accepted immediately. The re-opening date will depend on approval of faculty level restart plans, in addition to the time taken to review applications. Additional forms and approvals may also be required.

Name: Kostis Michelakis

Department/Institute: SBQMI

Building Name: Brimacombe

Email: kostis.michelakis@ubc.ca

Phone#:[redacted]

Standard hours of return: Phase I occupancy 7 AM to 6 PM Monday to Friday.

1. Briefly outline proposed experiments/research that require on-campus access:

Following up on my request to the SBQMI executive board on April 8, 2020 to consider the SBQMI/AMPEL Nanofabrication Facility (nanofab) first in the line of priority when research is re-started at UBC in a phased way, I am hereby requesting this officially now according to current provisions. This will mainly allow us to get on with the setting up and commissioning of the various nanofab tools and processes in the recently renovated cleanroom space, a task which was cut short when UBC curtailed all research operations on campus. It will also allow us to facilitate research restart for various PIs who rely heavily on using the nanofab. The labs, support rooms/spaces and offices detailed in section 2 below comprise the workspace of the SBQMI/AMPEL Nanofabrication Facility and fall under the supervision of the Director, Nanofabrication Facilities, Dr Kostis Michelakis. The other members of the nanofab technical team are, Mario Beaudoin, Matthias Kroug, Andrey Blednov and Khush Hydri. The nanofab labs are used by several PIs across SBQMI/AMPEL and UBC in general, who will be eager to re-start their research during this phase and the upcoming phases, and some of whom will require access to the available nanofab tools and processes for this reason. It is therefore essential for the nanofab to be allowed to serve this need, according to the provisions, limitations and observances of the current plan and phase. It is clarified that permission to work in the nanofab space is requested for the above mentioned 5 members of the technical team, who will be the main occupants during this phase, with

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the exception of select few already trained researchers who will be nominated by their respective PIs following official email request to the nanofab Director Kostis Michelakis, detailing approximate hours and justification of urgency. Some or all of these researchers will then be safely accommodated in the nanofab workspace according to the provisions of the present plan and under strict supervision by the nanofab technical team (they will always work with a buddy member of the tech team present in the building), taking into account the urgency of the request, the nanofab technical team capacity to support them, and provided they fulfill all requirements set out by UBC for the current phase.

In more detail, the labs, support rooms, space and offices in Brimacombe, associated with the present request, together with a brief description of their use, are as below. Occupancy will be mostly by the tech team, and will occasionally include select researchers as explained above.

Lab 446 ISO5 Yellow Cleanroom: Dedicated lab within the renovated cleanroom, which houses photolithography.

Lab 446 ISO6 Yellow Cleanroom: Dedicated lab within the renovated cleanroom, which houses photolithography.

Lab 446 ISO6 White Cleanroom: Dedicated lab within the renovated cleanroom, which houses thin film deposition, plasma processing, wet etching and some inspection/analysis techniques.

Lab 449: Lab that houses a wet bench, an evaporator and a dicing saw.

Lab 65 EBL Cleanroom: Cleanroom that houses the electron-beam lithography (EBL) tool.

Room 67 EBL Pump Room: Support room for the EBL tool, nanofab tech team access only.

Mezzanine supporting 446 Cleanrooms: Support space and infrastructure for renovated 446 cleanroom – nanofab tech team access only.

Office 472: Office for Kostis Michelakis, normally shared with Pinder Dosanjh, will be singly occupied by one of these occupants at a time, following mutual arrangements.

Office 482: Shared office for SBQMI students and staff, including for Andrey [redacted] and Khush [redacted] may be occasionally occupied by Andrey [redacted] and/or Khush [redacted] observing necessary arrangements already in place for this room through a different request, for distancing and disinfection.

Office 417: Office for Matthias [redacted], currently single occupancy.

Office 419: Office for Mario [redacted] in, single occupancy.

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2. For each room occupied by the PI, indicate the room number, the total number of personnel who usually work in that space, the total number of personnel who need to access the room, and the maximum number who will work in the room at once. Note that UBC is aiming for 1/3 occupancy of spaces during Phase 1, and that there must be space for physical distancing.

Room #	Total # of personnel (usual)	Total # of personnel who need access to the space	Max. # at one time during Phase 1
446-ISO5-Yellow	**>15**	1 regular user 1 occasional user	**2**
446-ISO6-Yellow	**>15**	1 regular user 1 occasional user	**2**
446-ISO6-White	**>15**	2 regular users 2 occasional users	**4**
449	**>10**	1 regular users 1 occasional user	**2**
65	**>10**	2 regular users 1 occasional user	**2**
67	**5**	1 occasional user	**2**
Mezzanine	**0**	2 occasional users	**5**
472	**2**	1 occasional user	**1**
482	**>10**	2 occasional users	**4**
417	**1**	1 occasional user	**1**
419	**1**	1 occasional user	**1**

Important note: Maximum occupancy of six (6) at anyone time over all workspace identified above will be imposed and managed via the booking system (all bookings will be set to require approval). This ensures an under 30% of maximum occupancy during normal

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operations. The nanofab director will also personally oversee the operation to ensure enforcement and compliance.

3. Is your lab space shared? The workspace mentioned in this request, all falls under the Nanofab Director. However, in addition to the nanofab tech team, there will be some select research users, experienced and already facility-qualified, originating from other PIs, who will have justified urgency to use the labs. This will be managed by the nanofab Director after communication with those PIs while complying with all UBC expectations for the current phase, as detailed above. Maximum occupancy limits will be managed and controlled via the existing nanofab booking/scheduling software Bumblebee. The Director will personally oversee the operation to ensure compliance and success.

If yes, *indicate how you will coordinate with adjacent groups or personnel. For the SEM, 2D materials lab, CRN and similar spaces shared by multiple PIs, please submit one form with the names of all users from multiple groups. For the high head area, please submit one form per research group or service (e.g. Helium), and specify the area and PIs that are involved. You may include part of the high head along with other lab space on one form (e.g. CRN occupies lab space in high head and in the Brimacombe extension). In some cases groups may decide it is easier to submit separate forms for each space they work in. We are flexible in the formats we will accept.*

4. Describe how you will ensure physical distancing within your lab. The various user locations corresponding to nanofab operations, corresponding to tools and/or processes, across the mentioned labs are physically distant in themselves and the work protocol already in place is to restrict one user per tool/process at a time, as also managed and controlled by the booking software. For example, each one of the yellow cleanrooms mentioned will only be used by one user at a time. We have made provision for a second person to be able to be present in the yellow room, to cover all eventualities, for example to check the lab or to communicate something to the user if needed, while keeping the distance. Similarly, in the case of the white cleanroom, which is much more spacious, the three items of equipment that may be used at the same time are at quite a distance and each one of them cannot possibly accommodate more than one user at a time. The EBL lab too, can only accommodate one user at a time for the EBL tool. All users allowed during this phase will be users that have already been trained and qualified for the certain tools and processes, so they will not require assistance at close proximity during the course of their work in the nanofab labs. This is true for the tech team members too, who will be working on various tools and processes, setting them up or optimizing their performance. On very rare occasions, where 2 technicians will be required to work in close proximity, for example in the case where manual handling by two people is required for a heavy item, the appropriate protection measures will be taken, including gowns, face masks and face/eye protection. These provisions are already in place for working inside the

cleanrooms anyway. We do not foresee the need for this to happen (working in close proximity) beyond rare occasions and we are confident we can manage the operation safely.

5. How will you schedule occupancy of your lab space? Phase I occupancy 7 AM to 6 PM Monday to Friday. *e.g. online sign up, weekly discussion in lab meeting to prepare a schedule together, other?. Ensure that people on the same shift are not in conflict for the same resources in their own lab. Include an example plan with the application. Schedules should be posted on the lab door weekly.* ***Note:*** *at any one time, UBC is aiming for* ***ca. ⅓ occupancy*** *during Phase 1. If you request after hours access, this should be thoroughly justified here*.

Occupancy will be scheduled, controlled and monitored with our existing booking software, Bumblebee. This will ensure not two people are clashing for the same resource/location at the same time. Furthermore, bookings will be set to require approval, so that the maximum overall workspace occupancy of six (6) can be managed and enforced. Members of the nanofab team will ensure that the numbers set out here are adhered to at all times.

6. Outline plans to address working alone regulations.

Nanofab tech staff will always work under a buddy system, whereby another team colleague will be present in the building at the same time. In addition to physical checks, the team will use the messaging app "Signal" as well as available walkie-talkies to address working alone in labs. In the case of other research users beyond the nanofab tech team, who will be approved and scheduled by us to work in our labs, again with supervision and similar communication methods, we'll ensure that there will be no risks from lone working. More specifically, every researcher approved to work in the nanofab during this phase will also have a buddy from the tech team staff and there will be regular checks at one-hour intervals, the majority of them physical. In case of no response to a buddy check communication, UBC security will be alerted immediately following failure of the user to first communicate with a member of the nanofab tech team personal check. The same provisions will be in place for addressing lone working between members of the nanofab tech team itself.

7. Identify high-contact points that need to be sanitized (doorknobs, fridge handles, switches, communal keyboards, work surfaces, chairs etc.) and all multi-user instruments and equipment in your lab(s), their location, sanitization protocols: this includes items only used by your lab group. The protocols should be posted as a checklist at the entrance for research personnel to complete before and after each shift.

Due to already in place cleanroom gowning protocols (which include individual gowns, gloves, face masks and eye protection) and user conduct when working in the cleanroom, which all address contamination and cross contamination issues, there is no need to sanitize anything inside any of the cleanrooms mentioned above. However, IPA will be available and all users will

be instructed to use it prior to starting and when finishing work, on high contact areas, like doorknobs and door finger plates, worktops, instruments, tools and equipment, as well as keyboards.

In all other (non-cleanroom) spaces mentioned in this document, again IPA and sanitizers will be available for users to sanitize all sensitive areas as above, prior and after work.

Log forms will be erected throughout for users to sign that they carried out sanitization as required.

8. Are there any tasks where physical distancing cannot be maintained? No

If yes, describe the task, explain why it is important to perform in the coming month, and describe the frequency and duration of tasks. What safety measures will be taken to mitigate risks?

All types of operations relating to nanofab processes and actions that are supported and conducted in all mentioned labs can be adequately performed by one person in the vicinity of the respective operation. If inspection is required by a second person, this can be performed when the first one makes space, or at a different location, and distancing can be safely managed. Users will also be inducted and supervised to ensure compliance. We have no work scenarios that require more than one person working in close proximity. All installations that required this type of work have now been completed and any preparation work in the renovated cleanrooms is all about testing and optimizing processes, as well as using already operational processes, all of which can be safely done by just one user working in the vicinity of each tool or process.

If, on rare occasions, it will be indeed required for more than one person to work at close proximity under 2m at the same time, we will mitigate risks by using the appropriate PPE, including face masks, and eye protection (PPE which are already required for one to work in our cleanrooms), plus face shields. Moreover, before proceeding with this type of operation, a risk assessment will conducted, discussed, and understood by those involved in order to optimize the procedure along the lines of safe working.

9. Is equipment in your lab space used by personnel from other labs? Yes

If yes, explain how you will arrange for other users to access this equipment while maintaining physical distancing. How will this equipment be sanitized between users? List the anticipated users below in section 13.

During the current phase, mainly the technical nanofab team of five will be working in the above labs. However, select researchers stemming from various PIs will be eventually accommodated, when safe and productive to do so, and these users will be already trained on

our processes and will only need a minimal induction for the new space, which can be done online for distancing purposes. As, during normal operations, it is the common mode of work to accommodate users from different research groups, those few select researchers who will be allowed to work in the nanofab labs during the current phase, following assessment of the urgency of their research in close communication with their PIs, and provided the nanofab tech team has the capacity to support them, will be managed by the existing booking system (Bumblebee software). The nanofab tech team ourselves will be obviously using the same booking system in order to attend at work, to ensure single occupancy of the various locations that support tools and processes, and which, as described, are physically adequately separated. Although all workers will use gloves and face masks at all times, along with personal gowns as is standard for the nanofab labs, equipment will indeed be sanitized between uses with pure IPA. Common areas such as bench tops, door finger plates etc. will also be frequently sanitized the same way

10. Will you need to access equipment located in other research labs, or your lab equipment housed in shared equipment rooms in your building? Yes

If yes, list the equipment or room numbers and how will this be arranged. How will this equipment be sanitized between users?

One piece of equipment we foresee the nanofab team may need to use, is the Zeiss SEM in Lab 63. If so, we will abide by the local rules and will inform the respective PI accordingly. Our understanding is that this facility too is applying to restart during this phase. Matthias Kroug and Andrey Blednov of the nanofab tech team are already trained users for the Zeiss.

11. Will you need to access equipment or services in other buildings? Yes

If yes, List. e.g. BiF, Chem Stores, Kaiser, Frank Forward, Henning's, …

The nanofab tech team may need to access the MSL cleanroom, as we are supporting this operation; the lab has effectively been under our nanofab for a while now. This lab is already open due to a VPRI granted exemption for COVID-19 related research. We have been supporting this operation all along, and we'll continue to do so.

12. It is mandatory for Phase 1 that all research personnel have appropriate certified training. Will all personnel from your group accessing the lab be certified prior to having access, including new COVID-19 video training? Yes

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Identify each of the personnel below who will require access to on-campus space (information will be attached to the fob access to the building):

[redacted]

13. Explain below how you will prioritize research personnel in your group to access lab space.

The SBQMI nanofab facility is essential for the research of many PIs across the Institute, AMPEL and UBC. As we were caught half way in the process of setting up the recently renovated cleanrooms, it is important that the work needed to complete this task takes high priority in the first place, and this work will be carried out solely by the members of staff nominated in the present request. There is also priority for COVID-19 related research, already ongoing under a VPRI curtailment exemption (PI Lukas Chrostowski, RA Kashif Awan), which has to be supported and continue smoothly. Beyond these, certain PIs have already contacted us to let us know that they are eager to re-start their research, which is heavily dependent upon nanofab. Given this situation, it is clear that the highest priority and the bulk of work has to be focused on finishing the setting up of the new cleanrooms and delivering working and reliable processes, a task for the nanofab tech team. Where such processes have been already commissioned and/or as processes become safely operational, research will be accommodated with priority, as assessed by urgency in direct communication with interested PIs. Prof Chrostowski's project certainly falls in this category. Other research will also be accommodated, with similar criteria and if our capacity allows it safely. The members of the nanofab staff are happy to carry out tasks for PIs, if this is going to be more time efficient, and if our capacity allows it. Overall, not many researchers, perhaps only three or four at most, in addition to the nominated five nanofab staff, are expected to work in the whole of the nanofab space during this phase, and the expected total occupancy of the labs during this phase will be well below one third of normal numbers.

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I agree to abide by the rules and procedures I have described above during UBC's Phase 1 of research resumption. I acknowledge that failure to uphold the commitment confirmed here could result in the loss of research access privileges. *Signatures of additional PIs who share the space should be added.*

Signed

Signed (PI1):

Date: June 15, 2020

Add as needed: AMPEL Approval

Signed (PI2): John D Madden, AMPEL Director Signed

Date: 16 June 2020

Signed (PI3): _____

Date: _____

In addition, please have all those anticipated to entre your lab during Phase I sign the agreement below.

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