UC San Diego
Environment, Health and Safety

Biological Use Authorization

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Principal Investigator:	FUBO RAO	**Overall BSL: 2**	
BUA #:	R2801		
Department:	CA INSTIT TELECOM/INFO TECH		
Mail Code:	0436	**Request Type:**	Amend
Office Phone:	(858) 534-4518	**Renewal Date:**	4/12/27
Email Address:	furao@ucsd.edu	**Approval Status:**	Approved

1. Project Summary

Project Title: Applications of microfluidic devices and atomic force microscopy in cell biology, cell mechanics and genome sequencing

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Amendment 2025

Amendment 2025:
1. Adding new location Atkinson 1416. Only established mammalian cell lines will be allowed in Atkinson 1416. The procedures allowed in 1416 will be limited to pipetting and AFM measurements.
2. Including CERC facility (Jacobs Hall/EBU 1 rooms 5313, 5315 and 5319) for cell culture
3. Adding SW982 human cell line under ¿Established cell lines¿
4. Modifying project title and description accordingly.

Original project Summary:
Project Title: Applications of microfluidic devices in cell biology and genome sequencing
Nano3 Cleanroom Facility would like to convert the microfluidics lab into a biosafety level 2 laboratory. Our goal is to set up a microfluidics core facility that allows internal and external users to develop novel genome sequencing techniques, as well as culture/observe prokaryotic and eukaryotic cells on the microfluidic devices fabricated in Nano3 cleanroom facility.
In addition to the existing microfluidics fabrication tools, this space will also be equipped with a biosafety cabinet, centrifuge, vortex mixer, and biohazard waste management. The space will be used to prepare samples to be loaded into microfluidic channels, and to observe cellular dynamics under microscopes. The experimental procedures involving with the listed biological materials will be limited to centrifugation, vortex mixing, pipetting and pumping at slow flow rates (typically <10 uL/min). At this time, the space is not set up for culturing. Users are expected to bring in their own materials and, upon completion of work, remove all items. This space is not meant for long term storage of biological materials. Research labs that plan to perform work in this space are required to include a description and add the lab location to their BUAs for IBC approval prior to start of work.
Users will be allowed to work with BSL-2 human cells, BSL-2 bacteria and Fungi/Yeast and BSL-1 invertebrates. Users are not permitted to work with BSL-2 or higher viruses or viral vectors, or BSL-2+ or higher agents in this space.
This BUA includes an overview of anticipated biological agents.

Merged/revised project summary:
Project Title: Applications of microfluidic devices and atomic force microscopy in cell biology, cell mechanics and genome sequencing
Nano3 Cleanroom Facility would like to convert the microfluidics lab and the AFM lab into biosafety level 2 laboratories. Our goal is to set up a core facility that allows internal and external users to develop novel genome sequencing techniques, measure cell mechanics using atomic force microscopy (AFM), as well as culture/observe prokaryotic and eukaryotic cells on the microfluidic devices fabricated in Nano3 cleanroom facility.
In addition to the existing microfluidics fabrication tools, this space will also be equipped with a biosafety cabinet, centrifuge, vortex mixer, and biohazard waste management. The space will be used to prepare samples to be loaded into microfluidic channels, and to observe cellular dynamics under microscopes. The experimental procedures involving with the listed biological materials will be limited to centrifugation, vortex mixing, pipetting and pumping at slow flow rates (typically <10 uL/min).
At this time, the Nano3 microfluidics lab (Atkinson 1414) and the AFM lab (Atkinson 1416) is not set up for culturing. Users are expected to bring in their own materials and, upon completion of work, remove all items. Nano3 scientists will use the CERC facility (Jacobs Hall/EBU 1 rooms 5313, 5315 and 5319) to culture mammalian cells. This space is not meant for long term storage of biological materials. Research labs that plan to perform work in this space are required to include a description and add the lab location to their BUAs for IBC approval prior to start of work.
Users will be allowed to work with BSL-2 mammalian cells, BSL-2 bacteria and Fungi/Yeast and BSL-1 invertebrates in Atkinson 1414. Users

will only be allowed to work with BSL-2 mammalian cells in Atkinson 1416. Users are not permitted to work with BSL-2 or higher viruses or viral vectors, or BSL-2+ or higher agents in both labs.
This BUA includes an overview of anticipated biological agents.

2024:

Nano3 Cleanroom Facility would like to convert the microfluidics lab and the AFM lab into biosafety level 2 laboratories. Our goal is to set up a core facility that allows internal and external users to develop novel genome sequencing techniques, measure cell mechanics using atomic force microscopy (AFM), as well as culture/observe prokaryotic and eukaryotic cells on the microfluidic devices fabricated in Nano3 cleanroom facility.

In addition to the existing microfluidics fabrication tools, this space will also be equipped with a biosafety cabinet, centrifuge, vortex mixer, and biohazard waste management. The space will be used to prepare samples to be loaded into microfluidic channels, and to observe cellular dynamics under microscopes. The experimental procedures involving with the listed biological materials will be limited to centrifugation, vortex mixing, pipetting and pumping at slow flow rates (typically <10 uL/min).

At this time, the Nano3 microfluidics lab (Atkinson 1414) and the AFM lab (Atkinson 1416) is not set up for culturing. Users are expected to bring in their own materials and, upon completion of work, remove all items. Nano3 scientists will use the CERC facility (Jacobs Hall/EBU 1 rooms 5313, 5315 and 5319) to culture mammalian cells. This space is not meant for long term storage of biological materials. Research labs that plan to perform work in this space are required to include a description and add the lab location to their BUAs for IBC approval prior to start of work.

Users will be allowed to work with BSL-2 mammalian cells, BSL-2 bacteria and Fungi/Yeast and BSL-1 invertebrates in Atkinson 1414. Users will only be allowed to work with BSL-2 mammalian cells in Atkinson 1416. Users are not permitted to work with BSL-2 or higher viruses or viral vectors, or BSL-2+ or higher agents in both labs.

This BUA includes an overview of anticipated biological agents.

2. BUA Locations

Atkinson Hall

Room Number	Room Use	Bays	BSL	ABSL
1414	Laboratory			
1416	Laboratory			

Engineering Building Unit I

Room Number	Room Use	Bays	BSL	ABSL
5319	Equipment			
5315	Laboratory			
5313	TC Room			

3. Biological Categories

Microbial Agent
- Bacteria
- Fungi/Yeast

Cells/Tissues/Body Fluid
- Human Primary Cells, Tissues & Body Fluids
- Human and Animal Established Cell Lines

Recombinant DNA/RNA
- Plasmid Vectors
- Nucleic Acids (includes transgenes and DNA/RNA oligonucleotides to be expressed in cells)

Animals
- Invertebrates (free living)

4. Biological Materials & 5. Biological Links

Microbial Agents

Bacteria	Strain	Hazardous Procedures	Max Vol (mL)	BSL	ABSL
Aliivibrio Fischeri		Centrifugation/Pipetting/Vortexing		1	
	Biological Link(s)				
	Nucleic Acid: Non-hazardous nucleic acid(s)				
Bacillus Subtilis		Centrifugation/Pipetting/Vortexing		1	
	Biological Link(s)				
	Nucleic Acid: Non-hazardous nucleic acid(s)				
Bacteroides Thetaiotaomicron		Centrifugation/Pipetting/Vortexing		2	
	Biological Link(s)				
	Nucleic Acid: Non-hazardous nucleic acid(s)				
Caulobacter crescentus		Centrifugation/Pipetting/Pumping in closed system/Vortexing	100	2	
	Biological Link(s)				
	Nucleic Acid: Non-hazardous nucleic acid(s)				
Escherichia Coli (laboratory Strain)		Centrifugation/Pipetting/Pumping in closed system/Vortexing		1	
	Biological Link(s)				
	Nucleic Acid: Non-hazardous nucleic acid(s)				

Fungi	Strain	Hazardous Procedures	Max Vol (mL)	BSL	ABSL
Saccharomyces Cerevisiae		Centrifugation/Pipetting/Vortexing		2	
	Biological Link(s)				
	Nucleic Acid: Non-hazardous nucleic acid(s)				
Schizosaccharomyces Pombe		Centrifugation/Pipetting/Vortexing		2	
	Biological Link(s)				
	Nucleic Acid: Non-hazardous nucleic acid(s)				

Cells/Tissues/Body Fluids

Human Primary Cells, Tissues & Body Fluids	IRB Protocol #	Max Vol (mL)	BSL	ABSL
Blood			2	
Biological Link(s)				
Nucleic Acid: Non-hazardous nucleic acid(s)				

Human and Animal Established Cell Lines	Source	Contains	BSL	ABSL
HEK293	Human		2	
Biological Link(s)				
Nucleic Acid: Non-hazardous nucleic acid(s)				
HL60	Human		2	
Biological Link(s)				
Nucleic Acid: Non-hazardous nucleic acid(s)				
HeLa	Human		2	
Biological Link(s)				
Nucleic Acid: Non-hazardous nucleic acid(s)				
K562	Human		2	
Biological Link(s)				
Nucleic Acid: Non-hazardous nucleic acid(s)				
MCF-7	Human		2	
Biological Link(s)				
Nucleic Acid: Non-hazardous nucleic acid(s)				
SW982	Human		2	

Recombinant DNA/RNA

Plasmid Vectors

BSL 1

Biological Link(s)

Invertebrate: Caenorhabditis Elegans

Nucleic Acid: Non-hazardous nucleic acid(s)

Nucleic Acids	Hazard
Markers, Fluorescent proteins	Non-hazardous nucleic acid(s)

Animals

Invertebrate	Protocol	Transgenic	Pathogenic	Pathogens	BSL
Caenorhabditis Elegans		No	No		1

6. NIH Guidelines

Section	Explanation
III-F	III-F-8, Appendix C-II

7. Risk Assessment

Experimental Procedures :
Users will culture the listed biohazardous materials in their own lab and bring a small volume (usually <100 mL) to this space. The experimental procedures allowed in this lab will be limited to centrifugation, vortex mixing, pipetting and pumping at slow flow rates (typically <10 uL/min) through the microfluidic channels. Pipetting will be conducted in a biosafety cabinet. The microfluidic devices containing the biohazardous materials may be kept on a fluorescence microscope for up to a few days for time-lapse observation. Lab coat, gloves and safety glasses are mandatory in this lab. All liquid biological wastes will be collected and decontaminated in 10% bleach/water for at least 30 minutes before disposal. Solid biohazardous wastes will be collected in double red bags and disposed in the EH&S approved biohazardous waste collection location.

Risk Assessment - Infectious Agents :
The core is limiting users to BSL-2 cells and blood from relatively healthy populations. Infectious bacteria and viruses are not permitted in this space.

Transformation Methods :
Transformation, transfection and transduction are not allowed in this space.

Risk Assessment - Research Materials :

N/A

9. PI Contact

Contact Name	Contact Type	Office Phone	Email Address
Long, Zhicheng	Lab	() -	z1long@ucsd.edu

10. Authorized Personnel

Personnel Name	Email Address	Required Training		
		Viral Vector Training	Bloodborne Pathogen Training	ATD Training
Holzhall, Conor Joseph	cholzhall@ucsd.edu	No	Yes	No
Long, Zhicheng	z1long@ucsd.edu	No	Yes	No
Rao, Fubo	furao@ucsd.edu	No	Yes	No

12. Hazard Control Plans

HCP Names
BIOSAFETY LEVEL 1
BLOODBORNE PATHOGENS