

Research

Wet Laboratory

**FUNCTION**

At UCSF wet laboratory research environments are dynamic. The types of science and their specific needs are diverse and ever changing. Its architectural design embodies versatility and connectivity, facilitating collaboration and innovation among research teams, and supports hands-on learning. Lab planning and design concepts prioritize a culture of safety, efficiency, and flexibility to accommodate evolving research needs. The Parnassus Research and Academic Building vision resonates, “People-focused and mission-driven, it will accelerate impactful innovation, discovery, and learning; foster thriving collaborations across multiple, diverse communities; and inspire all who enter for generations to come.”

**SPATIAL COMPONENTS**

Wet lab research areas offer a secure environment for both individual researchers and collaborative teams. These work spaces span across various locations:

- Open wet lab benches
- Write-up desks
- Specialized equipment stations (e.g., fume hoods or biosafety cabinets)
- Support rooms (e.g., dark rooms, cold rooms, tissue culture rooms, etc.)

During the design phase, identifying precise programmatic and equipment needs informs the allocation of open lab workstations and support rooms. Additionally, assess how these areas relate to

adjacent support zones beyond the conventional wet laboratory, such as conference rooms, computational dry labs, break rooms, and staff amenities.

Transitional Zones:

- Areas designated for transitioning activities like handwashing, donning and doffing personal protective equipment (PPE), storing PPE, and displaying safety messages.
- Controlled access points equipped with proximity readers, where necessary.
- Doorway and corridor dimensions tailored to facilitate the movement of materials and equipment within the lab spaces and throughout the larger facility.



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**SPATIAL COMPONENTS****Open lab spaces:**

- Provisioned where research activities can be conducted safely and in compliance with environmental regulations.
- Designed with a standardized modular approach to enhance flexibility, allowing for adaptation to specific programmatic needs.
- Incorporate adjustable and movable laboratory casework to accommodate wet bench research and data analysis activities at write-up desks.
- Utility access and placements are strategically positioned to facilitate changes in equipment, casework, and types with minimal disruption to operations.
- Accessible wet lab benches should be adjustable and situated near lab support spaces and exit routes supporting an efficient and accessible work flow.



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SPATIAL COMPONENTS

Laboratory support spaces:

- These areas accommodate equipment and research activities requiring segregation from the open lab due to unique requirements, including specialized lighting, environmental controls, directional airflow, airlock isolation, excess heat, noise reduction, higher biosafety or security levels, and sensitive equipment needs.
- Locate support spaces along common pathways to encourage collaboration, equitable sharing, and ease of access.
- Ensure utility accessibility for simplified maintenance procedures.
- Consider open corridor alcoves adjacent to benches for support equipment and design bracing, flooring, ventilation, plumbing, electrical and other infrastructure to support flexible uses.
- Standardize lab support room sizes to improve flexibility and accommodate future equipment and evolving science programs.
- Foster collaboration and streamline workflows through shared resources, ensuring efficiency and preventing duplication of equipment and support services.



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SPATIAL COMPONENTS

Consider resource sharing, flexibility and future planning:

- Continuous and open laboratories allow for flexibility in space allocation and assignment.
- Standardize dry room sizes such as PI (Principal Investigator) offices, huddle rooms, and conference rooms to accommodate repurposing in the future.
- Consider providing in-room infrastructure (i.e. power and data) to provide flexible needs, as well as logical floor infrastructure (i.e. water and lab gases) distribution routes for future adaptation.
- Emphasize intentional utility organization to accommodate changing equipment and spaces

while minimizing disruption to major utility infrastructure, i.e. ceiling infrastructure trays, utility drops, and access panels.

- Quick disconnect, modular furniture, and flexible infrastructure enable less disruptive reconfiguration of the research program.
- Make alcove spaces flexible by installing a unistrut system on walls and providing power throughout. Avoid floor mounted bracing whenever possible.
- Feed electrical and infrastructure from ceiling to wet lab benches, avoid floor coring.
- Take into account existing MEP (Mechanical, Electrical, Plumbing) to facilitate lab space planning.

Research Neighborhoods Comparison

GENENTECH HALL
Neighborhood
40 researchers



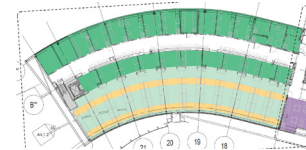
20 researchers
Area of Wet Lab: 3,708 sf
Lab Support: 3,705 sf
of PIs: 5 PIs
of Bench Positions: 40 benches
of Write-up Desks: 40 desks

HISR
Neighborhood
48 researchers



24 researchers
Area of Wet Lab: 4,601 sf
Lab Support: 2,870 sf
of PIs: 8 PIs
of Bench Positions: 48 benches
of Write-up Desks: 48 desks

DOLBY
Neighborhood
48 researchers



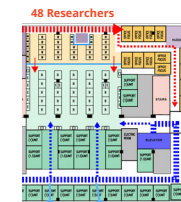
48 researchers
Area of Wet Lab: 3,881 sf
Lab Support: 5,480 sf
of PIs: 9 PIs
of Bench Positions: 48 benches
of Write-up Desks: 48 desks

WEILL
neighborhood
72 researchers



72 researchers
Area of Wet Lab: 3,454 sf
Lab Support: 5,003 sf
Desk Area: 3,900 sf
of PIs: 11 PIs
of Bench Positions: 72 benches
of Write-up Desks: 80 desks

PRAB - EMBARCADERO
East Neighborhood
48 Researchers



48 Researchers
Area of Wet Lab: 3,300 sf
Lab Support: 3,300 sf
Desk Area: 3,200 sf
of PIs: 6 PIs
of Bench Positions: 48 benches
of Write-up Desks: 30 desks outside; 18 desks inside open lab

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EXPERIENTIAL QUALITY

Encourage a culture that prioritizes safety and fosters a spirit of exploration and innovation:

- Ensure distinct transitions and clear markings between common areas and laboratory zones to facilitate navigation and safety protocols.
- Consider utilizing transitional spaces as opportunities for information display, communicating scientific concepts, training, promoting safety awareness, showcasing research, and inspiring researchers.
- Promote team cohesion by designing dedicated zones for team identity within each neighborhood that allows researchers to showcase collective goals, achievements, and lab team personality.
- If program allows, utilize interior glass partitions and half lites in doors to promote daylight penetration, enhance safety, and increase visibility of research activities. Balance this with glare mitigation at work surfaces.
- Consider utilizing flexible furniture systems and white boards to promote collaboration, idea exchange, and foster innovation.
- Identify zones for signage and safety protocols to ensure proper handling of materials. Ensure signage is adaptable to changes in research zones, allowing for expansion or contraction as needed. Utilize UCSF signage standards.
- Take into account laboratory safety by incorporating design features such as strategically locating eyewash and shower stations near circulation nodes.



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EXPERIENTIAL QUALITY

Enhance researcher wellness and productivity:

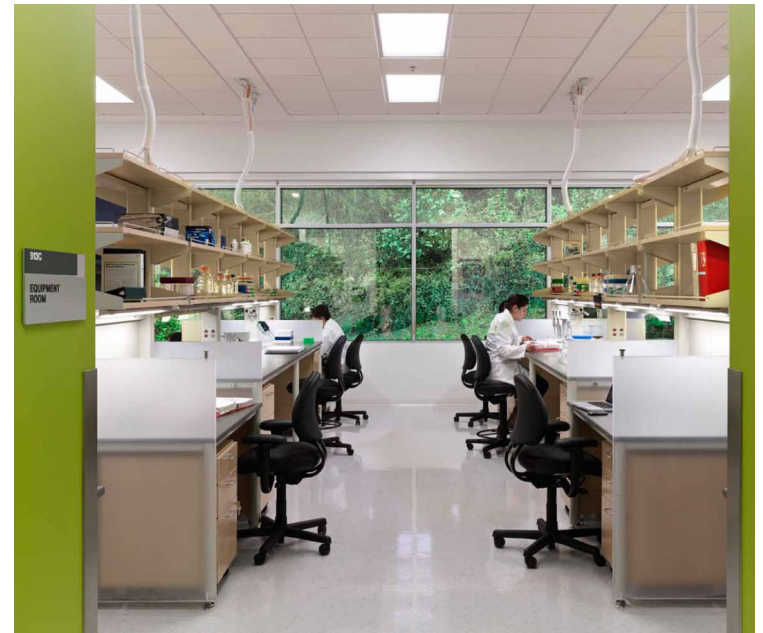
- Researchers encounter setbacks as a routine part of their work in experimentation and learning, which can be stressful. Research spaces should be designed to reduce stress, restore focus, and foster a sense of community.
- Promote a connection with nature: exposure to natural elements such as sunlight, greenery, and views of nature can have positive effects on mood, stress reduction, cognitive function, and physical health.
- A key factor for a productive, healthy workday is choice. Provide appropriate settings for the variety of activities that might occur during the research day. From solitary spaces for concentration to places

for gathering, experimentation to informal break areas, ensure that spaces are available to all and convenient to each other.

- Space should encourage movement. When possible encourage use of stairs. Create overlapping pathways that facilitate interaction and peak curiosity.
- Incorporate view corridors and access to natural light and outdoor scenery to enhance the well-being of occupants, while carefully managing concerns related to heat gain and glare to create a comfortable environment.
- If program allows, provide indoor and outdoor break, respite and amenity areas.
- If feasible, support employee wellness and productivity by

providing designated write-up spaces outside of the traditional wet lab setting, offering a quieter and safer environment for focused work.

- Apply ergonomic principles to workstation design to enhance researcher comfort and reduce fatigue.
- Maintain optimal light levels across all areas to ensure safety and quality of work.
- Ensure PI offices have visual and acoustical privacy.
- Incorporate natural, healthy materials.
- Ensure access to lactation and wellness rooms within the project area or nearby locations.



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**MATERIALITY**

Wet labs require robust contamination controls, such as, air filtration systems, and stringent cleaning protocols, to maintain an environment conducive to scientific research.

- Assess material specifications against program requirements.
- Materials should be robust and durable, easily cleanable, chemically resistant, and slip resistant.
- Consider the selection of materials together to minimize eye strain. Utilize accent colors strategically.
- Prioritize International Living Future Institute Red List Free strategy materials, which do not cause harm to health and environment.

Floors:

- Provide monolithic sheet flooring with integral coved bases for wet lab areas. For dry lab areas, follow office standards.
- Floors must be chemical resistant and impermeable to liquids.
- Install additional floor protection in areas where specialty gases or other corrosive materials are stored.

Walls

- For wet lab areas, walls shall be durable, monolithic, and resistant to chemicals and disinfectants. For dry lab areas, follow office standards.
- Wall finishes should be protected from impact and wear utilizing guards, crash rails, FRP panels or other methods in vulnerable areas.

Ceilings:

- Consider acoustical properties of ceilings in open work environments.
- Provide cleanable ceilings in wet lab areas.
- Utilize monolithic, modular ceiling systems that provide ease of access and support flexibility in reconfiguration of infrastructure. Avoid hardlid ceiling where possible, if unavoidable, provide large access panels for maintenance and future renovations.
- Confirm with facilities and define large access panels to be no less than 30" x 30".

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LESSONS LEARNED

- Create efficient connections between computational and experimental lab spaces.
- Incorporate controllable daylight access to reduce glare and thermal impact.
- Avoid counter-mounted utilities.
- Use appropriate wall construction to support unistrut for seismic bracing for equipment.
- Lab support rooms are reconfigured and/or remodeled more often than open bench areas.
- Install doors with kick or armor plates as equipment and cart movement necessitates.
- Consider automatic door openers, ramp and door widths to accommodate equipment movement and maneuvering, going beyond minimum exiting requirements.
- Ensure that Biological Safety Cabinets (BSCs) are positioned at least six feet away from doors and high-traffic areas, and that air supply diffusers do not disrupt airflow at the BSC face. Allow at least six inches of clearance from rear and side walls for BSC cleaning and maintenance.
- Provide sufficient counter space and individual storage in Town Centers for each research teams' coffee, snacks, dishes, and small appliances.
- Explore the use of color for wayfinding and team identification purposes.
- Design labs to help occupants remain compliant to code and laboratory best practices.
 - Keep shelving to a maximum of 6 feet above finished floor level, including over the bench shelving. Avoid placing fire sprinklers directly above shelving.
 - Create alcoves outside the required width of corridors to maintain egress paths.
 - Install sufficient open shelving near the entrance of wet lab areas for users to store their beverages and other items prohibited within the wet lab area.
 - Provide hooks for lab coats at the entrances to the wet bench and lab support areas.