



University of California
San Francisco

Research Space Working Group (RSWG)

December 20, 2018
PMP Steering Committee Meeting

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Andrei Goga
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Research Space Working Group Charge

- **Research Space Working Group (RSWG):** A representative committee reporting to campus leadership as part of the Comprehensive Parnassus Heights Plan project.
- **RSWG Charge:** To develop guiding principles for research space at Parnassus Heights.

How much research space does PH need?

What kind of research space does PH need?

Before we start...

PH research space planning in a 2018 context

- Development of the UCSF-MB campus nearing completion.
- Relative neglect of the UCSF-PH campus threatening its viability as a world class research campus.
- Groundswell of support from faculty and leadership to rejuvenate the PH campus.
- \$500MM Diller gift for a new PH hospital.
- Comprehensive Parnassus Heights Plan (CPHP) - possibility for PH to be “re-born.”

UCSF Helen Diller Medical Center at PH



Mark Laret

*“The new hospital
...will be embedded
within a campus that
includes leading
clinicians & scientists
focused on translating
discoveries into
treatments & cures for
conditions ranging
from diabetes to
neurological diseases
to organ failure.”*

UCSF Helen Diller Medical Center at PH

RSWG

Recognition of the unique opportunity to create an integrated campus at UCSF-PH comprising cutting edge patient care, world class biomedical research, & highest standard education programs in life sciences & health professions.

The background of the slide features a large, light blue, semi-transparent seal of the University of California, San Francisco. The seal is circular with a dotted border. Inside the border, the words "UNIVERSITY OF CALIFORNIA" are written in an arc at the top, and "1868" is at the bottom. In the center of the seal is a five-pointed star with radiating lines.

UCSF Mission

Advance health worldwide through ..

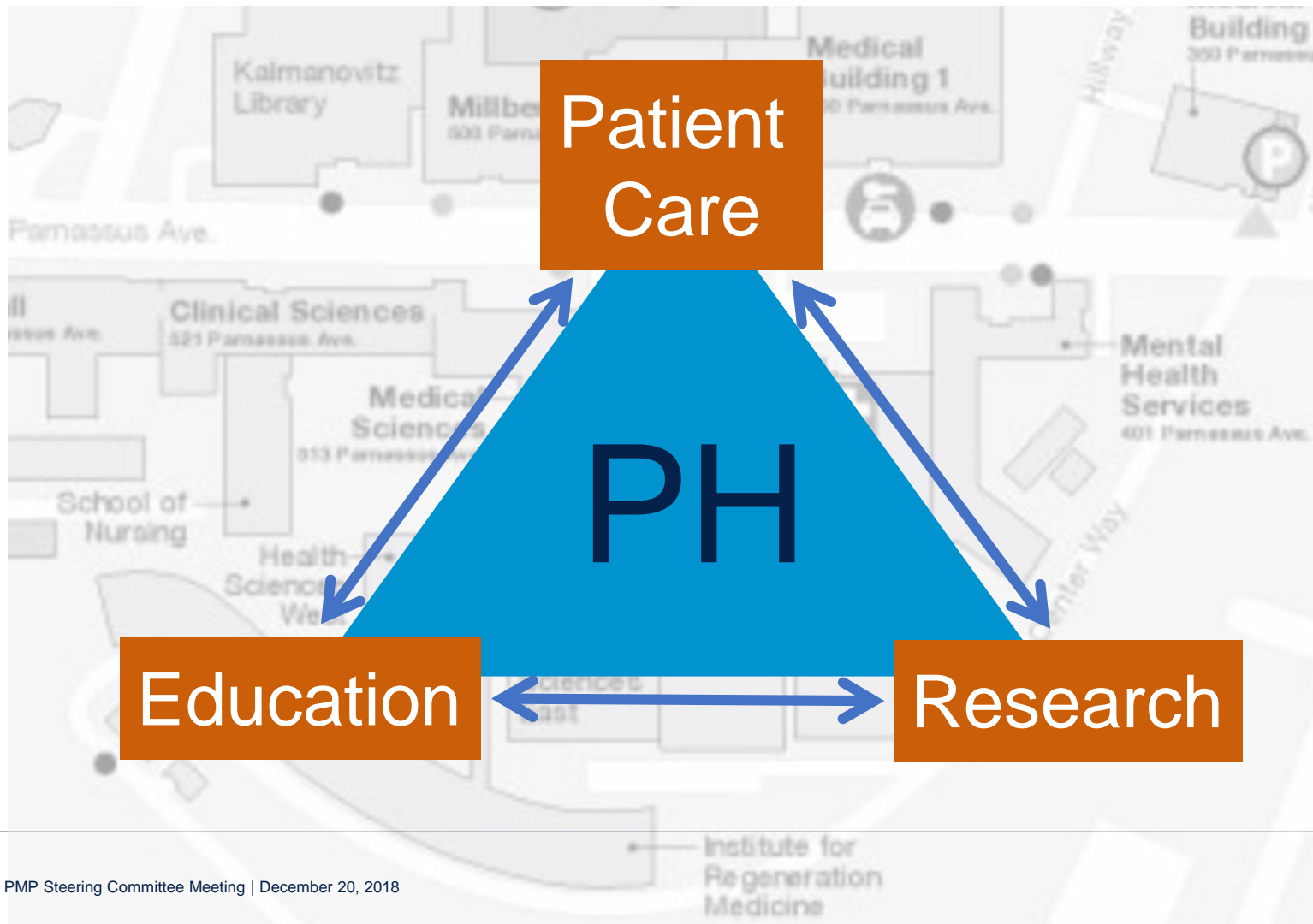
preeminent biomedical **research**

graduate-level **education** in the life sciences and
health professions

and excellence in **patient care.**

RSWG and the CPHP process

The unique opportunity to create an integrated world-class UCSF campus at PH



Overview of RSWG Guiding Principles for the PH Research Enterprise

1. World-class biomedical research campus:
 - a magnet science community
 - architecture and design that inspires innovation & discovery
2. Blend of research activities - basic, clinical, translational:
 - not dominated by any research category or program
 - each research activity represented by a critical mass of faculty
3. Research activities that are integrated with one another and:
 - UCSF Helen Diller Medical Center
 - UCSF education programs

RSWG - Main Recommendation

- Immediately expand and transform the Parnassus Heights research campus to meet the urgent needs of current and future research programs.
- Plan for an increase in research space from current 550,000 ASF to proposed 875,000 ASF.

Phase 1 (immediately):

- (i) Build **Parnassus Discovery Hall** - 150,000 ASF.
- (ii) Build **Center for Innovative Medicine** - 75,000 ASF.
- (iii) Renovate HSIR-East, HSIR-West, and Medical Sciences.

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Phase 2 (5-10 years)

New Research Building(s) – 100,000 ASF

Why should PH accommodate 875K of research space?

1. Overview of RSWG Process
2. Overview of Current PH Research Enterprise
 - Space
 - Investigators
 - Programs
3. Recommendations for space and other research needs

RSWG - Overview of Process

1. Meetings

- RSWG: monthly, March – December 2018.
- RSWG Executive Team: weekly, March – December 2018

2. Sources of Information

- Research survey - Vice Chancellor of Research - Spring 2018
- Research space data - Campus Planning, Space Management
- Research funding data – Budget and Resource Management
- National research space ‘benchmarks’ – Perkins Eastman, Jacobs
- Grassroots and leadership – Stakeholder outreach and meetings

Overview of Current PH Research Enterprise – Research Space

How much research space is available at PH?

558,000 ASF ^a currently available

Completed	Building	Space (ASF)
1917	UC Hall	26,000
1941	Langley Porter (LPPI)	26,000
1954	Medical Science Building	117,000
1955	Millberry Union	9,000
1955	Moffitt Hospital	14,000
1956	Proctor Foundation	4,000
1964	HSIR East	130,000
1964	HSIR West	109,000
1964	LPPI Butler Building	1,000
1966	Surge	5,000
1972	ACC Building	10,000
1972	School of Nursing	19,000
1979	School of Dentistry	11,000
1982	Long Hospital	3,000
1986	Koret Vision Research	21,000
1991	Kalmanovitz Library	4,000
2005	PSB	8,000
2010	Dolby	41,000
	Total	558,000

- Total space at PH

= 1,777,000 ASF

- 31% = research space

10 Buildings are more
than 50 years old

(a) Research Space includes: academic office, dry lab, wet lab, wet lab support, & Medical Center academic space = broader characterization than for ICR (only considers academic office space assigned to PI with awards).

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20 of 28 HSE/HSW
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10 buildings are more than 50 years old

20 of 28 HSE/HSW floors remodeled

49,000 ASF research space in last 20 years

(a) Research Space includes: academic office, dry lab, wet lab, wet lab support, & Medical Center academic space = broader characterization than for ICR (only considers academic office space assigned to PI with awards).

How much research space is available at PH?

550,000 ASF ^a available when accounting for decanted buildings

Completed	Building	Current	2019-2030
1917	UC Hall	26,000	
1941	Langley Porter (LPPI)	26,000	
1954	MSB	117,000	117,000
1955	Millberry Union	9,000	9,000
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2005	PSB	8,000	8,000
2010	Dolby	41,000	41,000
2020	Clinical Sciences		75,000
	Total	558,000	550,000

6 buildings to be
decanted

Clinical Sciences
is re-opening in 2020

(a) Research Space includes: academic office, dry lab, wet lab, wet lab support, & Medical Center academic space = broader characterization than for ICR (only considers academic office space assigned to PI with awards).

How does PH compare to MB: ASF?

	Current	2019-2030
Parnassus Heights		
Total ASF	1,777,000	1,656,000
Research ASF	558,000	550,000
% Research ASF	31	33
% Growth in Research ASF		-1%
Mission Bay		
Total ASF	1,497,000	2,238,000
Research ASF	546,000	864,000
% Research ASF	36	39
% Growth in Research ASF		58%

How does PH compare to MB: Space Utilization?

1. A healthy research campus requires some underutilized space.
2. Old space drives PH space underutilization
 - 30% of HSE/HSW has not been remodeled.
3. Remodeled PH research space is hyper-utilized.
 - Current PH research is projected to require 600K ASF, but has 550K.

Parnassus Heights: 55% Utilized			
	% Utilization	Building	Completed
Most Utilized	87%	HSE 15	2010
	73%	Dolby	2010
Least Utilized	49%	HSE	1964
Average	55%	HSW	1964
Mission Bay: 70% Utilized			
	% Utilization	Building	Completed
Most Utilized	83%	Byers	2005
	50%	Smith CVRI	2010
Least Utilized	65%	Genentech	2002
Average	72%	Cancer Center	2008

**Remodeling old PH research space
will not accommodate growth.**

Overview of Current PH Research Enterprise – Investigators and Programs

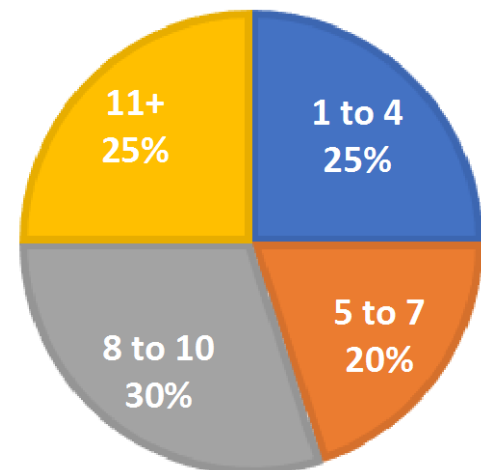
Current PH Research Enterprise

PH Investigators

- Number of PH PIs^a: 427 PIs (40% of UCSF PIs)
- Academic research benchmarks suggest even faculty rank distribution.
- 55% Senior Faculty: Full Professors are overrepresented at PH
- 23% Junior Faculty: 1/3 fewer Assistant Professors at PH than MB
- PH Group Size: 25% small, 50% medium, 25% large research groups

(a) PI: all PI's of Sponsored Research Projects.

Researchers per PH PI

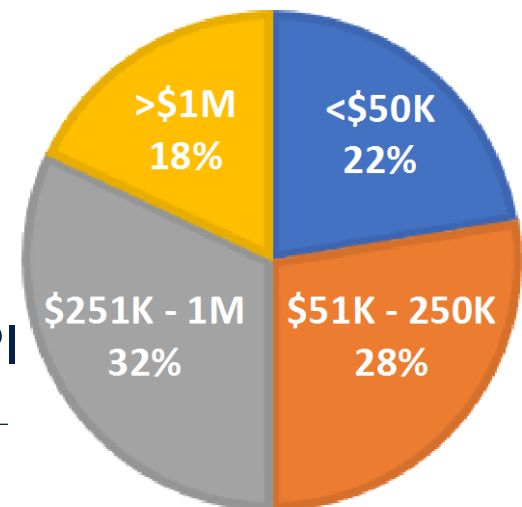


Current PH Research Enterprise

PH Investigators – Robust Funding

- Funding: \$309 MM in annual research funding (direct & indirect, 2016)
- PH ICR/ASF is 14% lower than MB
 - PH ICR/ASF: \$153
 - MB ICR/ASF: \$177
- Modern space design affords a 15% efficiency
- Suggests that PH ICR/ASF is on par with MB

Direct Costs per PH PI



Current PH Research Enterprise

Types of Research and Research Space

Types of Research

(*2018 Research Survey data).

Precision Medicine

Continuum of Research

1. Basic (40%)
2. Translational (21%)
3. Clinical (27%)
4. Population (12%)

Many PIs moving to MB (Block 33).
Staying at PH: Tobacco Center, SOD, some SON.

Types of Research Space

ASF/Researcher

1. Bench/Wet 200
- Hybrid 150
2. Computational 100
- Hybrid 150
3. Patient Facing 225
4. Hospital & Clinics
5. Community

Current PH Research Enterprise Basic Science Program

History of Strong PH Research Programs

Longstanding Programs

Cancer
Diabetes
Liver Science
Lung Science

Research that 'stayed' at PH

Cell Biology (SOD)
Research in Clinical Depts
(OB/Gyn, Orthopaedics, etc.)

'Post-MB' PH Programs

Craniofacial
Dev & Stem Cell Biology
Human Genetics
Immunology
Microbial Pathogenesis

Present: Diverse mix of outstanding investigators

- High-impact fundamental & translational discoveries
- Many #1 programs and investigators
- Strong Centers and Programs (P30, T32 etc.)
- New initiatives that synergistically advance UCSF mission at PH (i.e. Aging)

Current PH Research Enterprise Basic Science Program

Challenges:

- **Insufficient space** quality and quantity - no room to grow
- **Gridlock** to remodeling
- **Difficulty recruiting** faculty & trainees – ‘2nd tier campus’
- **Fragmented programs** – difficult to colocate collaborators
- **Shortage of core resources**

“Despite its international preeminence and extraordinary success by all objective measures including the highest levels of indirect costs per square foot at Parnassus, the center is bursting at the seams...”

- Matthias Hebrok, Diabetes Center

Current PH Research Enterprise

- Clinical Research programs involving patient contact

- 239 faculty^a
- 45% are female
- 190 are PIs on PH-based sponsored projects that involve patient-facing research.
- 226 clinical research coordinators.
- Diverse, successful & growing programs in multiple clinical departments across schools.
- A large portion of UCSF's research funding (\$117.1MM) annually in research funding.

(a) 79% of faculty are "PI" with Sponsored Research Projects.

Current PH Research Enterprise

- Clinical Research programs involving patient contact

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- Organ diseases (heart, lung, liver, kidney, brain, bowel)
- Transplant medicine & surgery
- Heme malignancies, immuno-oncology, neuro-oncology
- Rheumatology & orthopaedics
- Symptom science
- Diabetes & endocrine diseases
- Dental & oral diseases
- Health disparities
- Hospital medicine, palliative care
- Imaging & devices

Current PH Research Enterprise Clinical Science Programs - Challenges

1. History of **poor advocacy** to generate research resources from campus leadership.
2. Lack of **properly designed space** for research involving patient cohorts, clinical trials and mechanism-oriented clinical research in human subjects
3. Lack of **designated research space** in patient care areas of the hospitals and clinics.
4. Suboptimal **interactions and collaborations** with UCSF Health.

How much research space is needed to properly support current and future basic, clinical, and translational research at PH?

How much research space is needed at PH?

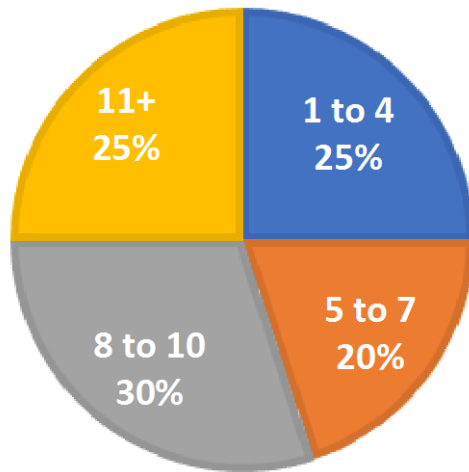
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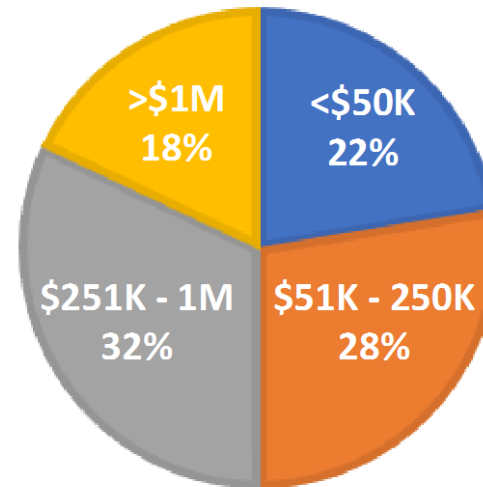
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Growth over 20 Years	1-2%	• 1% Growth: 521 PIs	• 2% Growth: 634 PIs

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Researchers per PH PI



Direct Costs per PH PI

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Type of Research	All Types <i>New: Clinical</i>	<ul style="list-style-type: none"> Addresses the need for all types of research at PH. Addresses unmet need for clinical research space 	
ASF/Investigator	Core-centric Standards	<ul style="list-style-type: none"> Wet: 170 ASF 	<ul style="list-style-type: none"> Hybrid: 135 ASF
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Type of Research Space	Computationally integrated	<ul style="list-style-type: none"> Wet: 45% 	<ul style="list-style-type: none"> Hybrid: 18%
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Core Space	20% Cores 15% Animals	<ul style="list-style-type: none"> 20% of new ASF of non-computational space for Cores 15% of new ASF of wet research space for Animal Space Percentages derived from industry standards 	

How much research space is needed at PH?

Growth in PIs	Group Size: 9 (PI+8)
1%	722,106 ASF
2%	878,724 ASF

Modest growth projections yield a research space calculation of 722,000 - 875,000 ASF.

Realizing the transformative potential of PH requires that we right size the research for growth and success.

Why should PH accommodate 875K of research space?

1. A vibrant UCSF campus of the future requires **transformative new space for research and discovery**.
2. To realize the impact of new hospital and to support the flourishing PH clinical research enterprise, **clinical research** space is urgently needed.
3. PH can achieve the UCSF vision for **Precision Medicine** with an integrated network of outstanding investigators across the **continuum of research**.
4. To realize the potential of **world-class PH-based research programs**, such as ImmunoX and others, space for growth is needed.
5. To **pioneer new research areas**, such as aging, metabolomics, microbiome, and others, space for growth is needed.
6. To **attract and retain junior faculty** to balance 55% senior faculty, space is urgently needed.

Recommendation 1

How much research space does PH need?

Recommendation 1

Expand and transform the PH research campus to meet the urgent needs of current and future research programs.

TWO PHASE APPROACH

Phase 1 (Immediate, near term):

- **Construct** cores and a new research building with 150,000 ASF for research to accommodate growth of existing programs and development of new programs.
- **Construct** a clinical research building with 75,000 ASF as a Center for Innovative Medicine.
- **Renovate** the main research buildings (HSIR East and West, Medical Sciences) to modern gold-standard research space.

Phase 2 (Medium term):

- **Build** 100,000 ASF of additional research space to meet the ongoing needs of strong and emerging research programs.

Future Research Space at UCSF-PH: Phase 1

Completed	Building	Current	2019-2030
1917	UC Hall	26,000	
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2010	Dolby	41,000	41,000
2020	Clinical Sciences		75,000
Immediate Future	"Parnassus Hall" Research Building		150,000
Immediate Future	Center for Innovative Medicine		75,000
	Total	558,000	775,000

**Propose
775,000 ASF for
Research at PH
In Phase 1**

**Renovate HSIR
East and West and
MSB**

**Construct
Parnassus Hall
and the Center for
Innovative Medicine**

Future Research Space at UCSF-PH: Phase 2

Completed	Building	Current	2019-2030
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2020	Clinical Sciences		75,000
Immediate Future	"Parnassus Hall" Research Building		150,000
Immediate Future	Center for Innovative Medicine		75,000
"Phase 2"	Additional Research Space		100,000
Total		558,000	875,000

**Propose
875,000 ASF for
Research at PH
In Phase 2**

**Renovate HSIR
East and West and
MSB**

**Construct
Parnassus Hall
and the Center for
Innovative Medicine**

**Construct Additional
Research Space
in Phase 2
To Provide Needed
Space for Growth of
Research Programs**

Constructing the new Parnassus Heights research space infrastructure

Critical considerations

1. Speed is paramount to rejuvenate PH research space.
 - capture current momentum of world-class programs
 - prevent talent flight
 - compete for best recruits (faculty and students)
2. Urgency in resolving the unmet need for clinical research space and infrastructure.
3. Mindful of unique space needs of each type of researcher.
4. Inclusive and transparent mechanism to solicit input from the research community on space design and adjacencies.

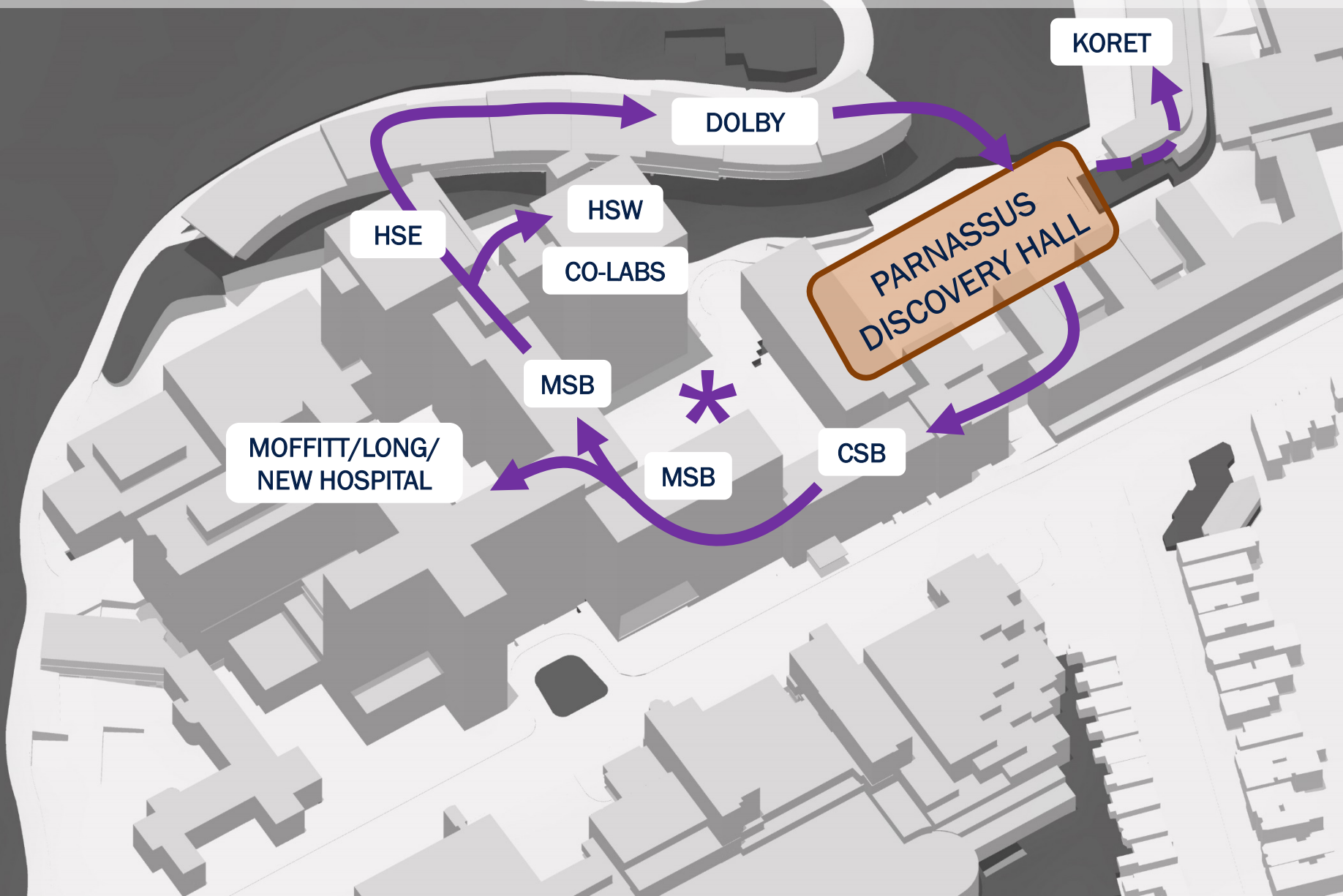
Parnassus Discovery Hall

A new building with 150,000 ASF for research

- A **large, modern, and inspiring** new research building to be a **centerpiece** for the rejuvenated Parnassus Heights
- **Speed** of implementation is a crucial design factor
- **Centrally located** near Saunders Court
- Focus on basic and translational science – **wet lab space** with modern space for cores and animal research
- **Near term flexibility** to facilitate renovation of existing research buildings.
- **Physically connected** to other PH research buildings (i.e. concourses to Dolby).

Parnassus Discovery Hall

A new building with 150,000 ASF for research



Parnassus Discovery Hall

A new building with 150,000 ASF for research

Programmatically connected

- Innovation thrives with fluid boundaries and self-assembled collaborative networks at UCSF
- Create space that encourages this prized aspect of our community
- Focus on interdisciplinary programs nucleated by faculty from multiple departments
- Grow existing world-class research programs
- Create space for emerging programs

Center for Innovative Medicine (75,000 ASF)

Research space for patient-facing clinical research

- A home for **patient-facing clinical research** at PH (cohort studies, clinical trials, mechanism-oriented clinical research).
- **Located on Parnassus** (adjacent to Helen Diller Hospital).
- Accommodating 12 investigator-led **clinical research units (CRUs)**
 - customized to needs of investigator groups
 - desks for coordinators, program managers, data managers
 - study rooms (visits, procedures)
 - storage (supplies, records).
- Space for **shared needs** – greeting, waiting, phlebotomy, training, compliance, seminars, communication, recruitment.

UCSF Center for Innovative Medicine

A home for clinical research (75,000 ASF)

Center For Innovative Medicine

Cohort Studies, Clinical Research, & Clinical Trials

12 Investigator Led CRUs

Investigator-led units of groups (coalitions) of 5-10 investigators. Modeled on the Multidisciplinary Clinical Research Unit and the Airway Clinical Research Center.

Complex Clinical Trials Unit

Shared Resources for Training, Compliance, Recruitment, Other

UCSF Center for Innovative Medicine

A home for clinical research (75,000 ASF)

Center For Innovative Medicine

Cohort Studies, Clinical Research, & Clinical Trials

12 Investigator Led CRUs

Investigator-led units of groups (coalitions) of 5-10 investigators. Modeled on the Multidisciplinary Clinical Research Unit and the Airway Clinical Research Center.

Complex Clinical Trials Unit

Shared Resources for Training, Compliance, Recruitment, Other

“..actual clinical research activities (such as participant recruitment, interviews, etc.) take place in clinical areas, typically occupying a room that could otherwise be used for clinical work. And often that clinical work (not inappropriately) takes precedence, cutting short research participant interaction”.

Greg Marcus, M.D.,
Director of Clinical Research
UCSF Cardiology

UCSF Center for Innovative Medicine

A home for clinical research (75,000 ASF)

Center For Innovative Medicine

Cohort Studies, Clinical Research, & Clinical Trials

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Investigator-led units of groups (coalitions) of 5-10 investigators. Modeled on the Multidisciplinary Clinical Research Unit and the Airway Clinical Research Center.

Complex Clinical Trials Unit

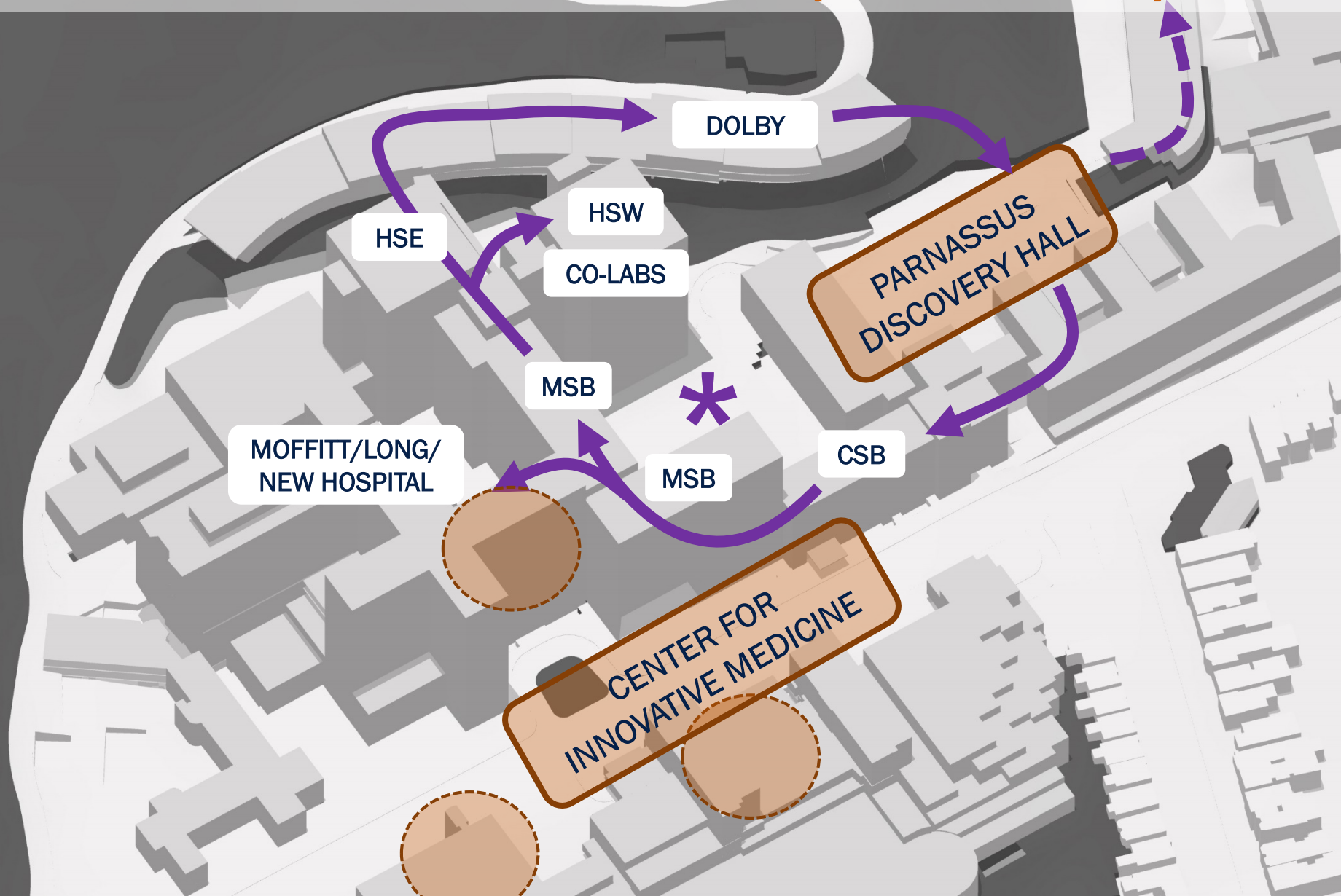
Shared Resources for Training, Compliance, Recruitment, Other

Other proposed clinical research infrastructure for PH

- (i) Designated research areas in the new hospital (some shared with education (“*Designated academic areas*”))
- (ii) Overnight stay clinical research unit (OSCRU)
- (iii) Right sized Investigational Drug Pharmacy (IDP)

UCSF Center for Innovative Medicine

A home for clinical research (75,000 ASF)



Center for Innovative Medicine

75,000 ASF for patient facing research

1. Provides currently missing clinical research infrastructure

1. Fosters clinical research

- showcases UCSF research; encourages patient participation
- attracts trainees to careers in clinical research
- builds community among CRCs.

3. Allows **links** between CRUs and basic & translational programs:

- fosters disease biology research & multidisciplinary research
- strengthens grant applications (PO1s, P30s, CTSI).

4. **Enables** Helen Diller Medical Center to position for **innovation**.

Recommendation 1

Expand and transform the PH research campus to meet the urgent needs of current and future research programs.

TWO PHASE APPROACH

Phase 1 (Immediate, near term):

- **Construct** cores and a new research building with 150,000 ASF for research to accommodate growth of existing programs and development of new programs.
- **Construct** a clinical research building with 75,000 ASF as a Center for Innovative Medicine.
- **Renovate** the main research buildings (HSIR East and West, Medical Sciences) to modern gold-standard research space.

Phase 2 (Medium term):

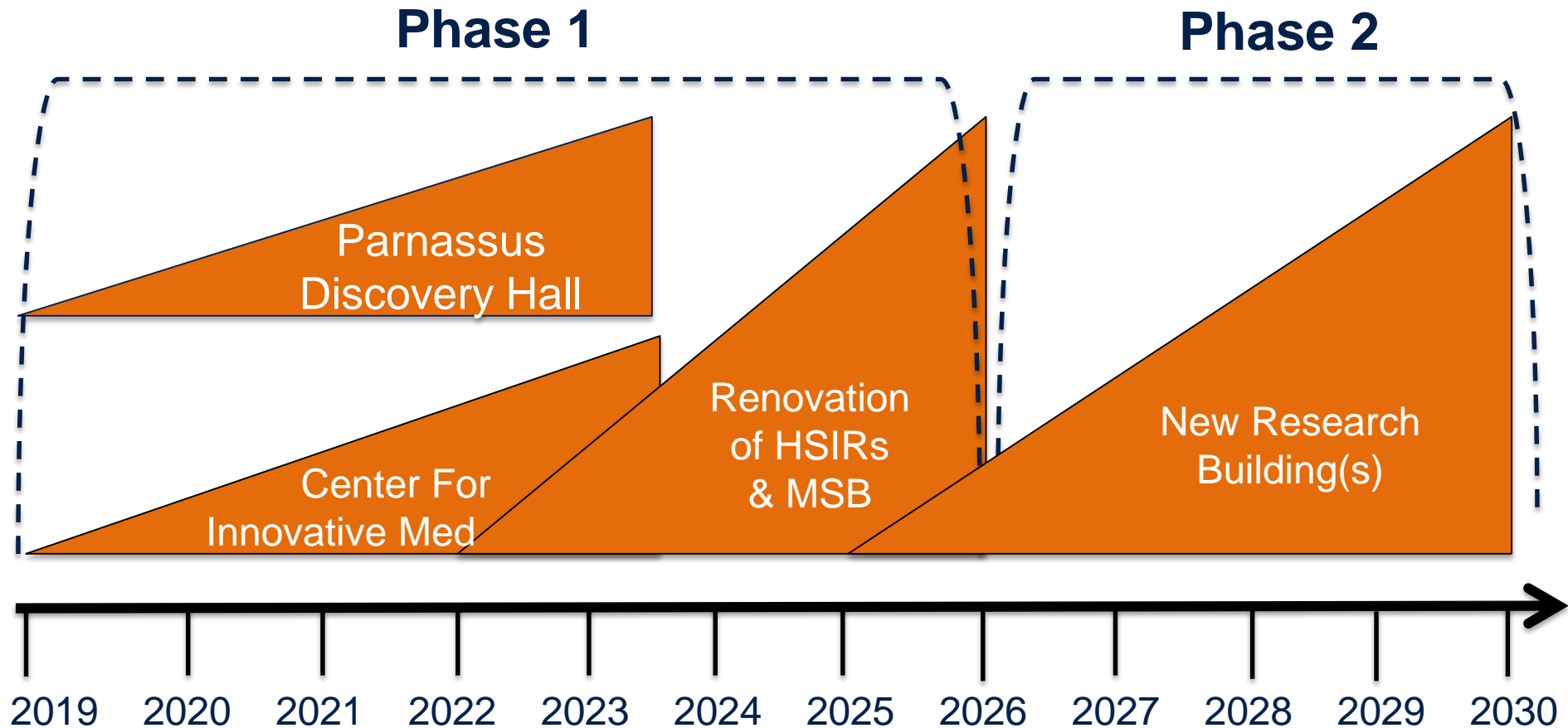
- **Build 100,000 ASF of additional research space** to meet the ongoing needs of strong and emerging research programs.

Phase 2: (Medium term)

100,000 ASF of additional research space

1. Allow for growth of the PH research enterprise (basic, translational, clinical, population).
2. Provide flexibility for research space that meets future research needs, with new programs across the research spectrum and in emerging disciplines, i.e. AI.
3. New space should be centrally located, connected to other research functions, and foster programmatic research interactions

Quickly Realizing the new UCSF-PH Research Campus



Recommendation 2

What kind of research space does PH need?

Recommendation 2

Create inspiring research space with adjacencies and design elements that spur connectivity, community, innovation, and celebration.

- (i) Connectivity:** Center research space activities around Saunders Court.
- (ii) Community:** Create physical and digital connectivity, thoughtful adjacencies, and inviting, right-sized, formal and informal interaction spaces to overcome disciplinary and geographic boundaries.
- (iii) Innovation:** Co-locate programmatic research groups with critical mass in high quality space that is designed and allocated using inclusive and transparent mechanisms.
- (iv) Celebration:** Attract and inspire researchers and partners by celebrating UCSF science with art, architecture, and natural beauty.

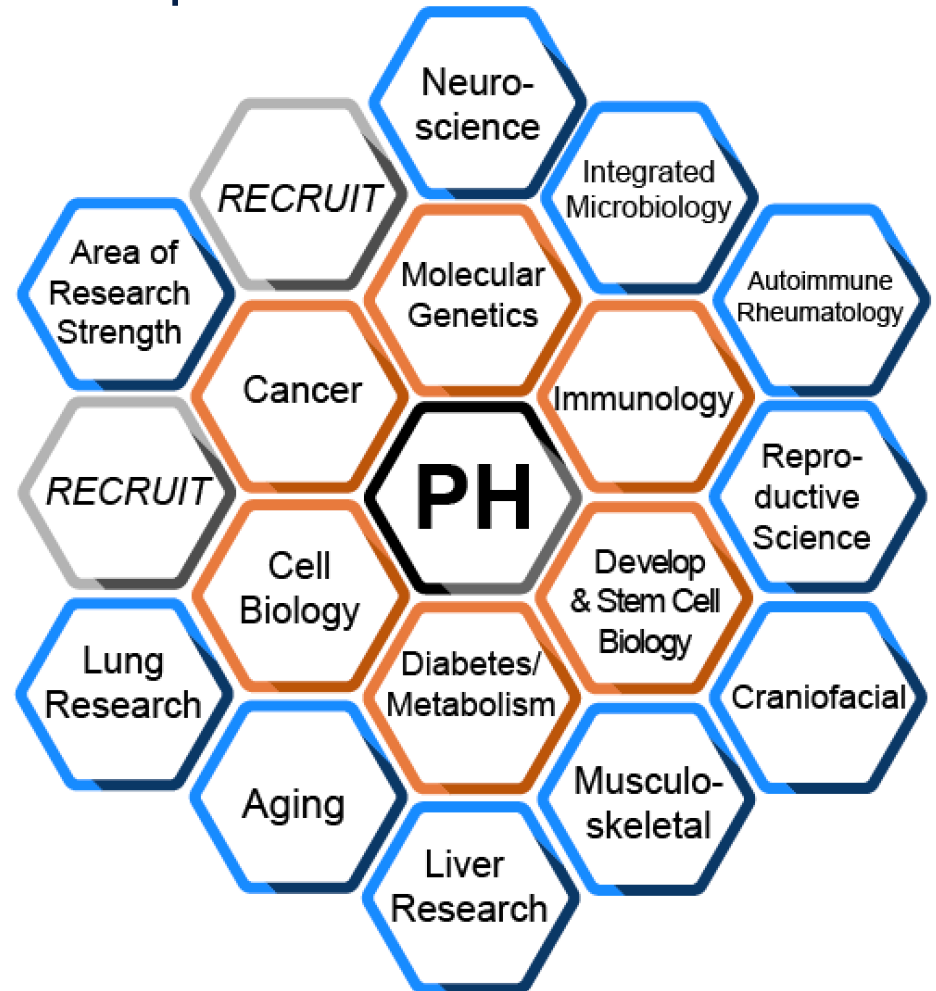
Integration of the PH Research Enterprise Basic Science Programs

Challenge: What are the research space needs of each critical mass of researchers?

One size does not fit all.

Disciplines: research areas with the most PH investigators that integrate all PH researchers

Topics: research areas
with a critical mass of PH
investigators

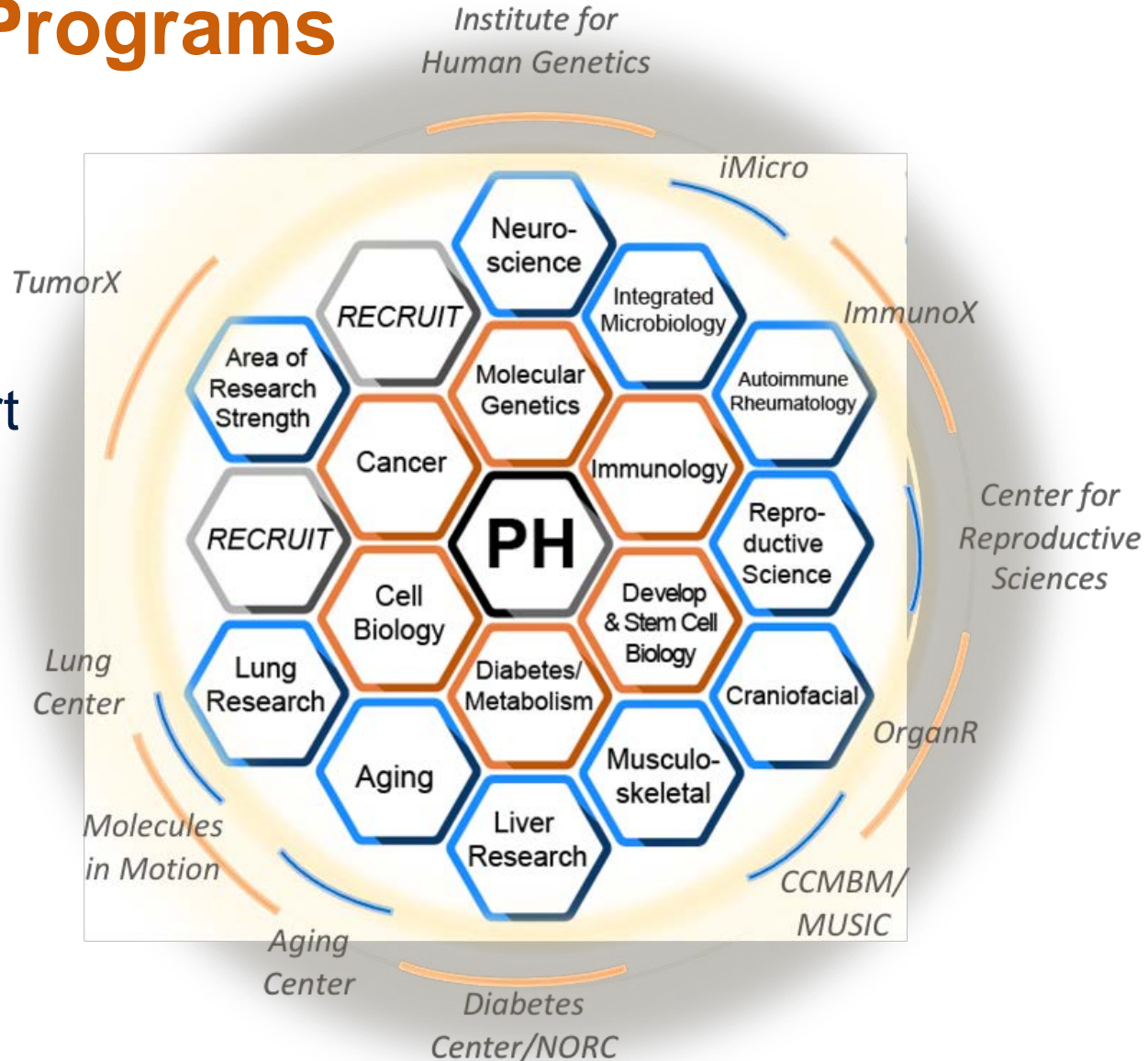


*Research Survey for PH basic scientists with 50%+ effort: "Please list 2 you identify with most and would like to be collocated with." Survey data supported by funding, Centers, ORUs, and conversations.

Integration of the PH Research Enterprise

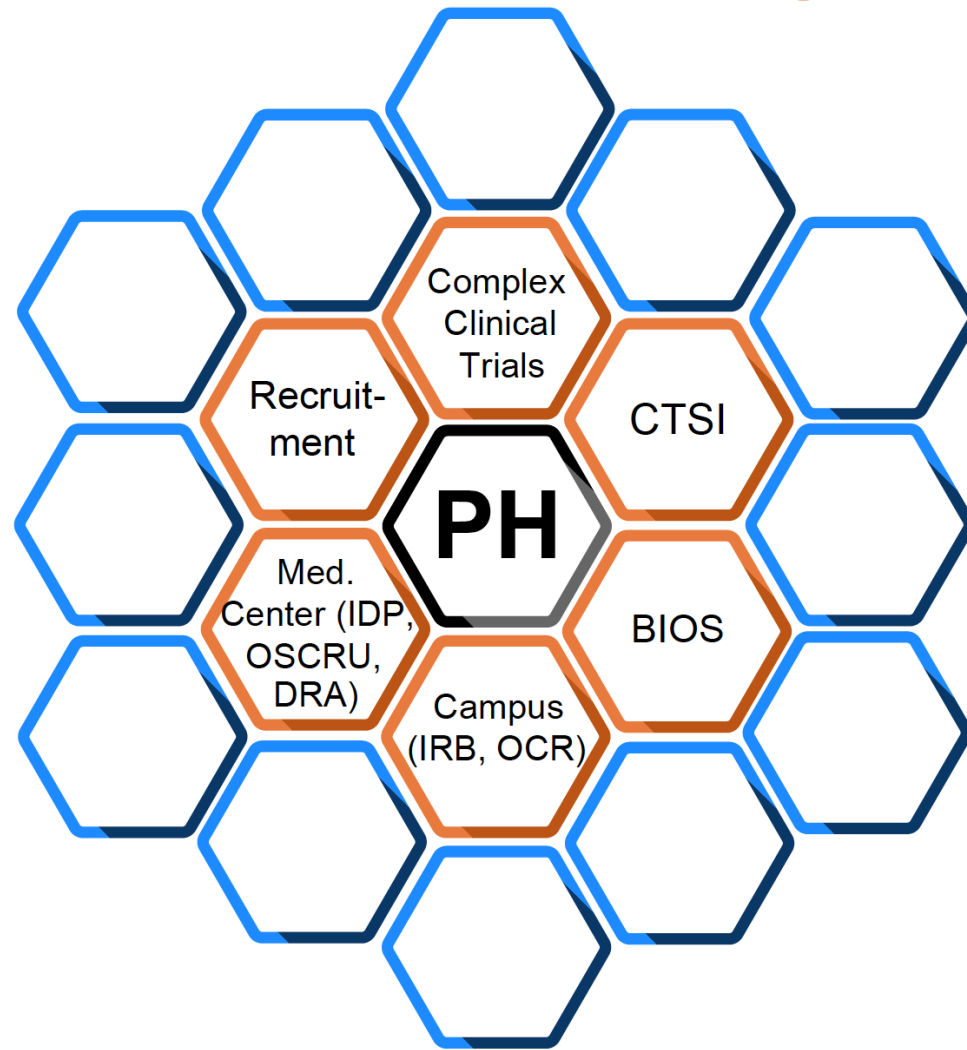
Basic Science Programs

- Programs, Centers, ORUs, and Cores support PH research.
- The same model applies to other types of research.



*For illustration purposes, many other Programs, Centers, ORUs, and Cores are not shown here.

Integration of the PH Research Enterprise Clinical Research Programs



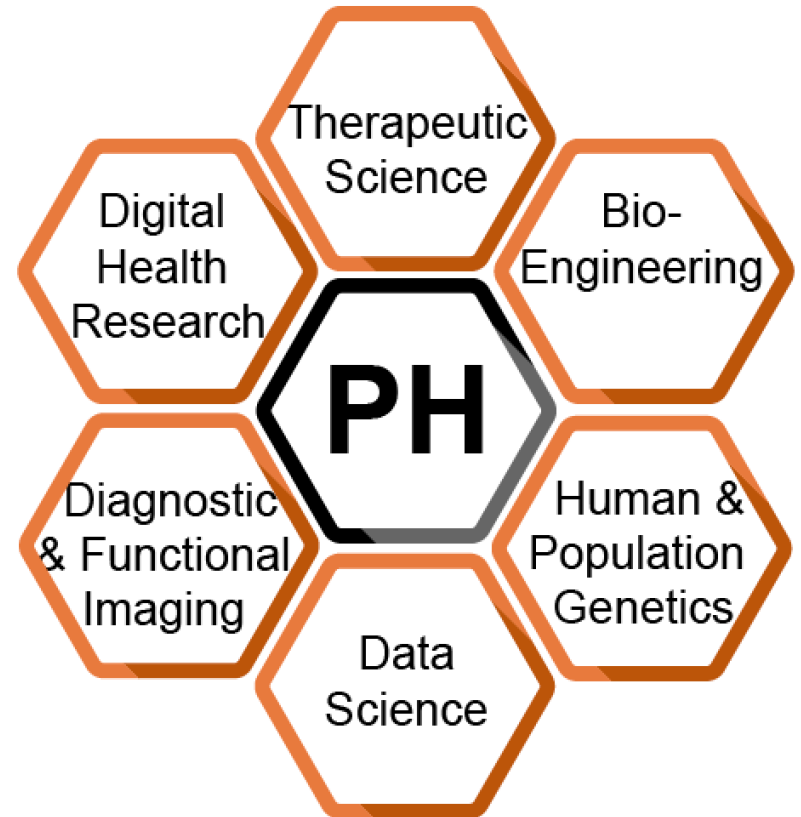
Investigator led
clinical research
units in the Center
for Innovative
Medicine

Centralized
Services
For
Clinical
Research

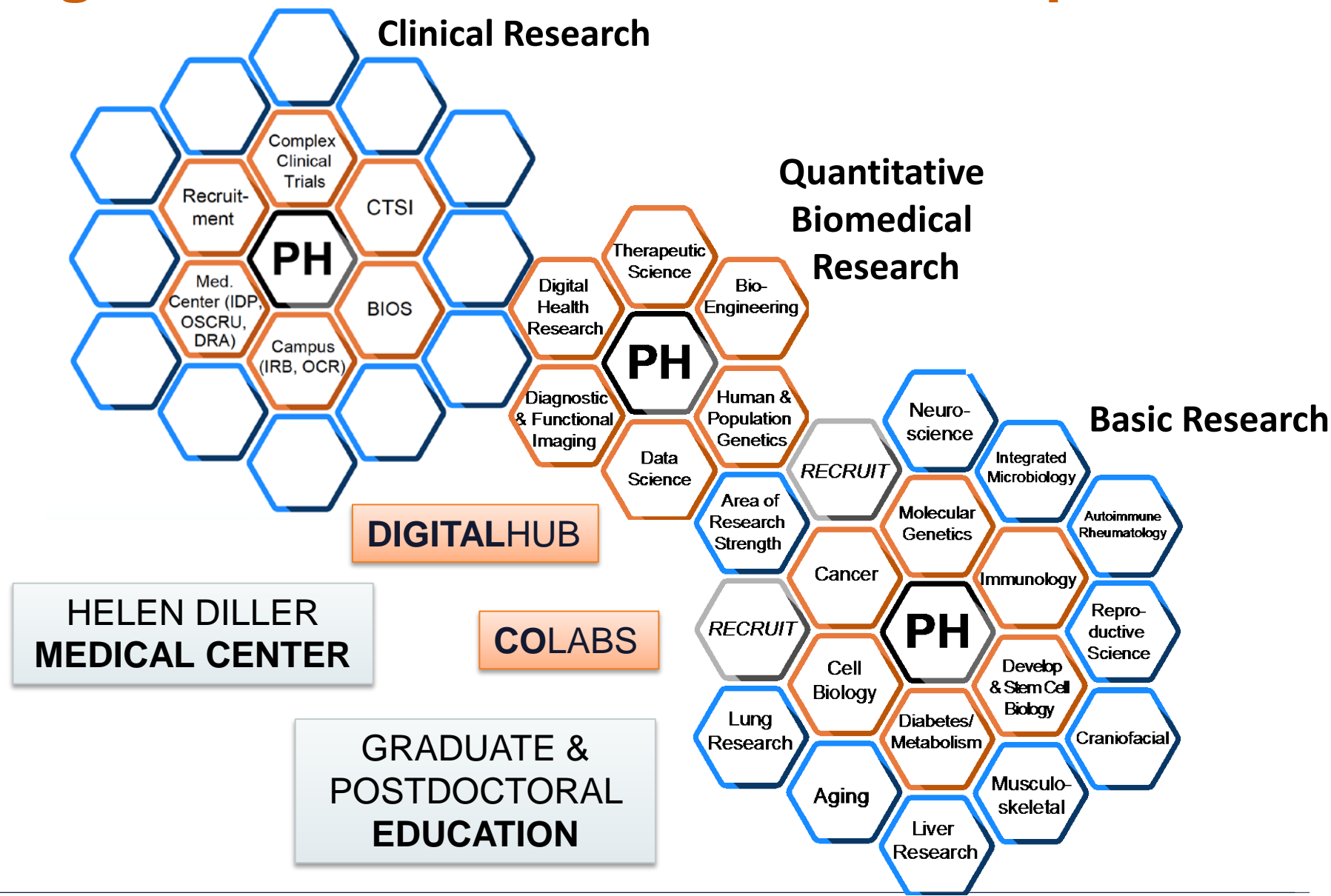
Integration of the PH Research Enterprise

Quantitative Biomedical Research

- Some groups are currently below critical mass.
- Disperse investigators (many schools, departments, disciplines, and buildings).
- Strategic investment will augment PH fundamental and clinical impact.
- Aligned with Precision Medicine Initiative
- Additional outreach still needed.



Integration of the PH Research Enterprise



Summary and Conclusions

UCSF PH Research

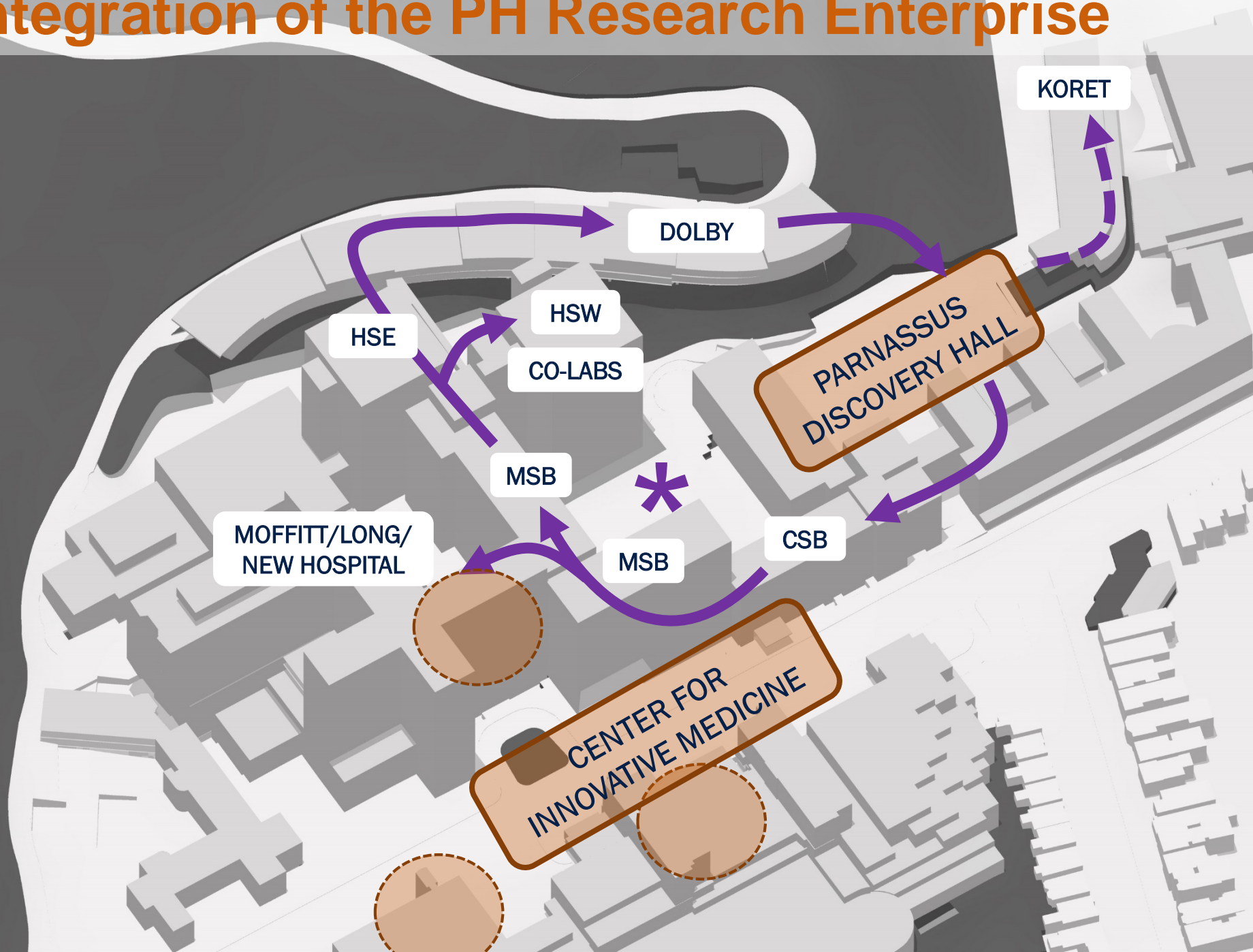
A world class and thriving enterprise

Multi-faceted strength across research disciplines, including basic, clinical, translational and computational.

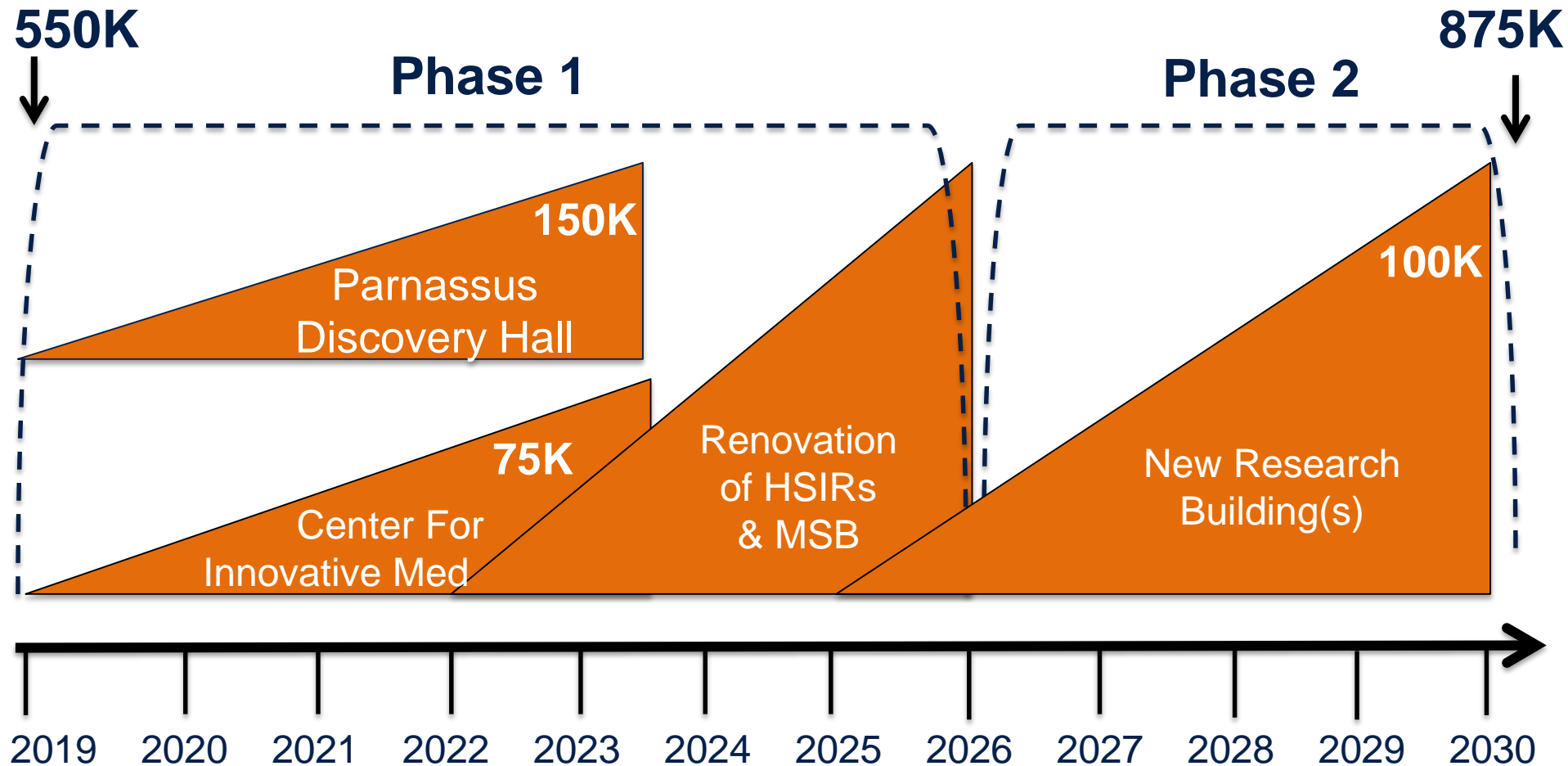
The new Helen Diller Medical Center and PMP process sparks a unique opportunity to create **transformative new space for research and discovery** that will:

- Realize the potential of outstanding PH research programs
- Pioneer clinical research infrastructure and innovation
- Cultivate exciting new research programs
- Advance a vision for impactful integrated research
- Attract and retain talented faculty and trainees

Integration of the PH Research Enterprise



Quickly Realizing the new UCSF-PH Research Campus



Appendix

Current PH Research Enterprise Basic Science Programs

	Basic Science Research Programs	Representatives
1.	Cancer	Jay Debnath, Andrei Goga, Jeroen Roose, Valerie Weaver
2.	Cell Biology	Bassem Al-Sady, Rushika Perera, Noelle L'Etoile, Fred Chang, Sophie Dumont, Diane Barber
3.	Developmental & Stem Cell Biology	Licia Selleri, Holger Willenbring, Sarah Knox
4.	Diabetes/Metabolism	Matthias Hebrok, Christian Vaisse
5.	Immunology	Matthew Krummel, Jeroen Roose, Jason Cyster, Mark Ansel, Mark Anderson
6.	Molecular Genetics	Neil Risch, Ophir Klein, Nadav Ahituv, Kathy Giacomini
7.	Aging	Saul Villeda, Andrew Brack
8.	Autoimmune/Rheumatology	Mary Nakamura, Lindsey Criswell
9.	Craniofacial	Ophir Klein
10.	Integrated Microbiology	Joanne Engel, Anita Sil
11.	Liver	Jacquelyn Maher, Holger Willenbring
12.	Lung	Mark Looney, John Fahy
13.	Musculoskeletal	Edward Hsiao, Rich Schneider, Jeffrey Lotz
14.	Neuroscience	Arnold Kriegstein, Arturo Alvarez-Buylla, Daniel Lim
15.	Reproductive Sciences	Marco Conti

Current PH Research Enterprise Clinical Science Programs

UCSF PH-Based Clinical Research Groups Engaged in Patient-Facing Clinical Research (Cohort Studies, Mechanism-Oriented Research in Human Subjects, Clinical Trials)				
Group	Research Areas	Investigators ^a	Funding (ICR+TDC, 2016-17)	Approx# of CRCs ^b
Oncology	(i) Heme Malignancies (ii) Immuno-Oncology	P Sayre, L Fong, P Munster, N Shah, J Rubenstein, T Martin, C Andreadis, C Smith, E Bergsland, A Logan, W Ai, G Mannis, L Kaplan, R Olin, L Damon, J Wolf, S Wong	\$19.6MM	25
Surgery and Surgical Subspecialty	(i) Liver Transplant (ii) Kidney Transplant (iii) Pancreas & Pancreatic Islet Transplant (iv) HIV Transplantation (v) Treg immunology (vi) Thyroid disease & cancer (vii) Thoracic (lung cancer) (viii) Lung Transplant (ix) Vascular (aneurysms, peripheral artery disease) (x) Urology (prostate cancer) (xi) Cardiac Surgery (xii) Otolaryngology (head & neck cancer, polyps, sinusitis) (xiii) Hemias (xiv) Geriatric surgery	JA Sosa, H Harris, J Kukreja, M Conte, S Feng, P Stock, F Vincenti, C Freise S Kang, J Roberts, A Posselt, Q Tang, H Willenbring, M Sarwal, G Roll, S Syed, E Finlayson, C Lebares, D Jablons, G Wieselthaler, J Kratz, C Eichler, L Reilly, J Hiramoto, P Carroll, A Tward, S Pletcher, A Goldberg	\$13.8MM	15
Lung	(i) Airway Diseases (asthma, COPD, CF) (ii) Interstitial Lung Diseases & Sarcoidosis (iii) Acute lung injury (iv) Lung Transplant	J Fahy, P Woodruff, M Matthay, H Collard, C Calfee, P Wolters, L Koth, J Golden, S Lazarus, S Christenson, E Gordon, N Bhakta, M Peters, B Ley, J Singer, J Gotts, <i>K Liu</i>	\$12.0MM	15
Symptom Science	(i) Chemotherapy-induced peripheral neuropathy (CIPN), tinnitus, deafness (ii) Lymphedema in breast cancer survivors (iii) Bioethics (iv) Exercise & weight loss	C Miaskowski, J Levine, <i>S Chung</i> , M-O Kim, M Schumacher, G Abrams, K Topp, A Olshen, K Kober, B Smoot, B Koenig, C Dawson-Rose, Y Fukuoka, G Dowling, J Johnson, C Stephens, S Weiss, A Alkon, C Leung, D David, M Pelter	\$8.3MM	16*
Neurological Surgery (Speech)	(i) Sensors/implants (ii) Deep brain stimulation	E Chang, S Nagarajan	\$7.1MM	4
Center for Cerebrovascular Research	(i) Stroke trials (ii) Intracranial aneurysms AVMs, & atherosclerosis (iii) Pulsatile tinnitus (iv) Medical device trials	H Kim, N Ko, W Smith, K Meisel, A Kim, C Halabi, D Saloner, M Amans, S Helts, D Cooke, A Abl, C Hess, X Hu (anesthesia, neurology, radiology, neurosurgery, nursing)	\$6.0MM	10

^aNames italicized for those whose funding is handled by a different department, thus not included in group funding total.

^bAsterisk for CRCs counts pulled solely from HR database of active employees in CRC job family at PH

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Group	Research Areas	Investigators ^a	Funding (ICR+TDC, 2016-17)	Approx# of CRCs ^b
Health Disparities / Internal Medicine	(i) Cancer control and prevention (ii) Tobacco control (iii) Health disparities	L Karliner, A Huang, P Ling, T Nguyen, C Kaplan, R Gonzales, J Walsh-Cassidy, V Yank, M Feldman	\$5.9MM	14*
Cardiology	(i) Arrhythmias (ii) Heart Failure (iii) Cardiac Imaging (iv) General & Interventional Cardiology (v) Adult congenital heart disease (vi) Health eHeart Study; (vii) Eureka platform	J Olgin, G Marcus, T DeMarco, M Aras, L Klein, R Abraham, M Albert, F Dellling, B Lee, R Lee, V Mahadevan, J Moss, R Redberg, N Schiller, M Scheinman, V Selby, E Stock, E Weiss, E Gerstenfeld, G Fung, N Parikh	\$5.7MM	20
Nephrology	(i) Chronic kidney disease (ii) Kidney transplant (iii) Acute kidney injury (iv) Hypertension (v) Polycystic kidney disease	K Liu, K Johansen, D Tuot, M Lunn, M Park, C Hsu, R Hsu, E Ku, R Dubin, C Peralta, M Estrella, A Webber, S Gluck, S Kung, <i>F Vincenti</i>	\$5.6MM	8
Rheumatology / Autoimmune Disease	(i) Rheumatoid arthritis (ii) Lupus (iii) Vasculitis (iv) Scleroderma (v) Ankylosing spondylitis	L Criswell, M Dall'Era, P Katz, J Graf, M Nakamura, C Ye, F Boin, C Lanata, J Ashouri, L Gensler, R Nayak, G Schmajuk, J Yazdany, S Chung	\$4.9MM	12
GI	(i) Hepatitis (ii) Inflammatory bowel disease (iii) Steatohepatitis (iv) Acute liver injury	J Maher, M Khalil, J Baron, B Hameed, U Mahadevan, J Lai, M Peters, J Price, D Bissell, N El-Nachef, D Brandman, M Sarkar, F Yao, N Mehta, M Arain	\$4.6MM	20*
Diabetes	(i) Diabetes management (ii) Obesity (iii) Pancreas & pancreas islet transplantation	U Masharani, S Koliwad, M Anderson, <i>P Stock</i>	\$4.2MM	3*
Neurological Surgery (Brain Tumor Center - Medical and Surgical Neuro-Oncology)	(i) Tumors (brain, spine, & PNS; metastases) (ii) Immuno-oncology (iii) Neurofibromatosis & meningiomas (iv) Novel medical and surgical therapies	N Butowski, J Clarke, J Taylor, N Oberheim-Bush, S Chang, M Berger, M Aghi, M McDermot, S Jumper, P Larson, <i>C Christine</i>	\$3.9MM	21

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Current PH Research Enterprise Clinical Science Programs

UCSF PH-Based Clinical Research Groups Engaged in Patient-Facing Clinical Research (Cohort Studies, Mechanism-Oriented Research in Human Subjects, Clinical Trials)				
Group	Research Areas	Investigators ^a	Funding (ICR+TDC, 2016-17)	Approx# of CRCs ^b
Anesthesia	(i) Critical care (e.g.: ARDS, sepsis) (ii) Organ transplantation (iii) Perioperative medicine and outcomes (iv) Neuromuscular blockade (v) Pain	M Gropper, J Leung, J Hellman, J Sall, J Ramsay, P Bickler, J Lee, A Prakash, J Feiner, C Lee, C Niemann, M Bokoch, K Kolodzie	\$2.8MM	9*
Dentistry / ENT / Craniofacial Research	(i) Dental caries, composites, & implants (ii) Dental quality (iii) HIV related oral mucosal disease (iv) Sjogren's syndrome	S Ho, C Shiboski, E Kalendarian, T Lang, P Leake, J Houde, S Kapila, D Fried	\$2.6MM	2
Geriatrics	(i) Dementia (ii) Disability (iii) Quality of Life	C Ritchie, M Steinman, K Covinsky, B Williams, J Newman, S Rogers, C Ahalt, M Greene, T Allison	\$2.5MM	8
Infectious Disease	(i) Human papilloma virus (HPV)	J Palefsky, P Chin-Hong	\$2.4MM	11
Dermatology	(i) Pemphigus vulgaris (ii) Scleroderma (iii) Inflammatory skin diseases	M Rosenblum, A Haemel, H Naik	\$1.6MM	0*
Endocrinology	(i) Metabolic bone disease	E Hsiao, M Rao	\$1.5MM	6
Palliative Care	(i) Pain (ii) Advance care planning (iii) Ethics	S Pantilat, W Anderson, M Rabow, E Dzung	\$960K	0*
Hospital Medicine	(i) Quality improvement (ii) Implementation science (iii) Digital health (iv) Clinical informatics	M Fang, A Auerbach, K Kangellaris, J Harrison, S Shah, P Prasad, N Najafi, J Adler-Milstein	\$491K	0*
Neurology	(i) Parkinson's disease (ii) Neuromuscular disease (iii) ALS studies (iv) Neuroprotection	M Aminoff, C Christine, <i>P Larson</i> , C Lomen-Hoerth	\$266K	8*
Orthopaedics	(i) Spine disorders (ii) Intervertebral Disc Degeneration (iii) Bone Cancer	R O'Donnell, S Berven, V Deviren, S Burch, B Tay, L Metz, R Wustrack	\$264K	9

^aNames italicized for those whose funding is handled by a different department, thus not included in group funding total.

^bAsterisk for CRCs counts pulled solely from HR database of active employees in CRC job family at PH

Guiding Principles

1. World-class biomedical research campus - a magnet science community.
2. Blend of research activities - basic, clinical, translational - not dominated by any research category or program and with each research activity populated by a critical mass of faculty.
3. High quality shared research resources for both bench and clinical sciences.
4. Integration with the UCSF-PH clinical enterprise.
5. Inspiring interaction and research space intentionally designed to provide:
 - high quality research space, co-location of collaborating researchers, and high quality shared space for community, collaboration and communication.
6. Secure space allocation that accommodates dynamic needs and opportunities, programmatically and scientifically.