Measuring Collaborative Research and Building Performance

Tim Evans AIA LEED BD+C
Principal, SRG Partnership
Learning Objectives

> Identify critical factors in building design that facilitate collaborative research activity and social interaction

> Case study in using post-occupancy analysis to evaluate user behavior relative to project goals
Knight Cancer Research Building
PORTLAND, OREGON
Completed 2019
320,000 GSF
$190 million Total Project Cost
LEED Platinum Certified
Team Science
Multidisciplinary research teams will work together toward a common goal
Team Results

One common goal or set of goals will unite research teams, focusing on collaboration and sharing of knowledge to achieve collective success.
Intellectual and Social Hub

Services and amenities in the building will draw people from the entire Institute to meet and collaborate, promoting a sense of community.
Vertical Campus Function

The building will function like a vertical campus; the first floor will be public space and amenities and the upper floors will be secure while providing an engaging community feel and creative team environment.
Shared Scientific Resources

Optimum efficiency and increased opportunities for researcher interaction will result from appropriate centralizing and/or sharing of scientific resources.
<table>
<thead>
<tr>
<th></th>
<th>PROPOSED DESIGN</th>
<th>PRE-PROGRAMMING</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXPERIMENTALISTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimentalist Lab</td>
<td>29,760</td>
<td>28,560</td>
<td>1,200</td>
</tr>
<tr>
<td>Experimentalist Lab Support</td>
<td>29,040</td>
<td>26,520</td>
<td>2,520</td>
</tr>
<tr>
<td>Experimentalist Offices</td>
<td>17,040</td>
<td>25,500</td>
<td>(8,460)</td>
</tr>
<tr>
<td>Experimentalist Admin Support</td>
<td>2,280</td>
<td>1,500</td>
<td>780</td>
</tr>
<tr>
<td>Experimentalist Meeting</td>
<td>5,760</td>
<td>3,000</td>
<td>2,760</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>83,880</strong></td>
<td><strong>85,080</strong></td>
<td>(1,200)</td>
</tr>
<tr>
<td><strong>COMPUTATIONALISTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computationalist Offices</td>
<td>7,200</td>
<td>7,040</td>
<td>160</td>
</tr>
<tr>
<td>Computationalist Support</td>
<td>1,060</td>
<td>1,036</td>
<td>24</td>
</tr>
<tr>
<td>Computationalist Meeting</td>
<td>3,990</td>
<td>1,800</td>
<td>2,190</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>12,250</strong></td>
<td><strong>9,876</strong></td>
<td><strong>2,374</strong></td>
</tr>
<tr>
<td><strong>SHARED CORES &amp; RESOURCES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined Core Labs</td>
<td>2,000</td>
<td>1,200</td>
<td>800</td>
</tr>
<tr>
<td>Unassigned/ Future Core labs</td>
<td>5,700</td>
<td>11,400</td>
<td>(5,700)</td>
</tr>
<tr>
<td>Biostatistics Shared Core</td>
<td>1,860</td>
<td>0</td>
<td>1,860</td>
</tr>
<tr>
<td>Vivarium</td>
<td>9,100</td>
<td>8,000</td>
<td>1,100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>18,660</strong></td>
<td><strong>20,600</strong></td>
<td>(1,940)</td>
</tr>
</tbody>
</table>
## Public Spaces & Meeting

<table>
<thead>
<tr>
<th></th>
<th>Proposed Design</th>
<th>Pre-Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Spaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Spaces</td>
<td>8,520</td>
<td>7,000</td>
</tr>
<tr>
<td>Conference Center</td>
<td>7,640</td>
<td>6,600</td>
</tr>
<tr>
<td>Intellectual Pub</td>
<td>3,100</td>
<td>1,200</td>
</tr>
<tr>
<td>Shared Meeting Rooms</td>
<td>4,220</td>
<td>1,700</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>23,480</td>
<td>16,500</td>
</tr>
</tbody>
</table>

## Administration (plus Building Support)

<table>
<thead>
<tr>
<th></th>
<th>Proposed Design</th>
<th>Pre-Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knight Administration Offices</td>
<td>6,080</td>
<td>6,960</td>
</tr>
<tr>
<td>Knight Administration Support</td>
<td>430</td>
<td>525</td>
</tr>
<tr>
<td>Knight Administration Meeting</td>
<td>2,090</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>8,600</td>
<td>TOTAL 7,485</td>
</tr>
</tbody>
</table>

## Proposed Design vs. Pre-Programming

<table>
<thead>
<tr>
<th></th>
<th>Proposed Design</th>
<th>Pre-Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL GSF</td>
<td>262,000</td>
<td>TOTAL GSF 239,228</td>
</tr>
<tr>
<td>TOTAL ASF</td>
<td>146,870</td>
<td>TOTAL ASF 139,541</td>
</tr>
<tr>
<td>Efficiency</td>
<td>0.56</td>
<td>Efficiency 0.58</td>
</tr>
</tbody>
</table>

**TOTAL ASF 146,870**

**TOTAL GSF 262,000**

**Efficiency 0.56**
Building Connections
Optimizing People Density
Building Connections Integrating Wet & Dry Labs

- Wet Labs
- Dry Labs
- Intellectual & Social Hubs
- Administration Spaces
Building Organization

Connection to Research Offices
Building Organization
Access to Daylight
Design Strategies Intellectual & Social Hub
Design Strategies

Intellectual & Social Hub
Design Strategies Intellectual & Social Hub
Design Strategies

Vertical Campus Function
Methods for Evaluating Building Performance

> Pre- and Post-Occupancy Scientist Shadowing

> Pre- and Post-Occupancy User Survey
Scientist Shadowing / Experimentalist Lab

Pre-Occupancy

Principal Investigator

<table>
<thead>
<tr>
<th>Time</th>
<th>8:00</th>
<th>9:00</th>
<th>10:00</th>
<th>11:00</th>
<th>12:00</th>
<th>13:00</th>
<th>14:00</th>
<th>15:00</th>
<th>16:00</th>
<th>17:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meetings</td>
<td>19%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meetings</td>
<td>75%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Missy**

Principal Investigator

Wong Lab - RJH 5

Wednesday, April 1, 2015

8:00 - 17:00

**I N D I V I D U A L M E E T I N G**

**T R A V E L**

**D U R A T I O N**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Trip</td>
<td>10 minutes</td>
</tr>
<tr>
<td>5 Trips</td>
<td>45 minutes</td>
</tr>
<tr>
<td>10 Trips</td>
<td>1.5 Hours</td>
</tr>
<tr>
<td>15 Trips</td>
<td>1 Trip</td>
</tr>
</tbody>
</table>
Scientist Shadowing / Experimentalist Lab

Post-Occupancy

Principal Investigator

- Individual Work: 49%
- Meeting - Scheduled: 23%
- Face-to-Face Ad Hoc: 15%
- Lunch: 4%
- Break: 4%
- Travel: 6%

Time Spent at Location:
- 1/2-hour: 10 trips
- 1-hour: 5 trips
- <=15-min: 2 trips

Note: Trips are defined by one-way travel.
Lab Manager

Scientist Shadowing / Experimentalist Lab Pre-Occupancy
Lab Manager

- **Individual Focus**: 67%
- **Meeting - Scheduled**: 5%
- **Face-to-face Ad Hoc**: 10%
- **Lunch**: 5%
- **Break**: 5%
- **Travel**: 8%

**Time Spent at Location**
- <=15-min: 10 trips
- 1/2-hour: 5 trips
- 1-hour: 2 trips

Note: trips are defined by one-way travel.

**2nd Floor**

- **Time**: 8:00 to 17:00
- **Activity Distribution**
  - **Individual Work**: 67%
  - **Face-to-Face Ad Hoc**: 10%
  - **Meeting - Scheduled**: 5%
  - **Lunch**: 5%
  - **Break**: 5%
  - **Travel**: 8%

- **Travel Notes**: 10 trips <=15-min, 5 trips 1/2-hour, 2 trips 1-hour
Graduate Student
Graduate Student

- **Individual Focus**: 87%
- **Meeting - Scheduled**: 0%
- **Face-to-face Ad Hoc**: 0%
- **Lunch**: 6%
- **Break**: 0%
- **Travel**: 7%

**Time Spent at Location**
- <=15-min: 10 trips
- 1/2-hour: 5 trips
- 1-hour: 2 trips

Note: trips are defined by one-way travel
Research Associate
Research Associate

- **Individual Focus**: 84%
- **Meeting - Scheduled**: 9%
- **Face-to-face Ad Hock**: 3%
- **Lunch**: 0%
- **Break**: 0%
- **Travel**: 4%

**Time Spent at Location**
- 1/2-hour: 10 trips
- 1-hour: 5 trips
- ≤15-min: 2 trips

Note: trips are defined by one-way travel
Research Associate

- **Individual Meeting Break Travel**
  - Individual: 51%
  - Meeting: 28%
  - Break: 15%
  - Travel: 6%

**Travel Time Duration Frequency**
- 1 Trip
- 5 Trips
- 10 Trips
- 15 Trips

**Meeting Break Time**
- 8:00 - 18:00
- 9:00
- 10:00
- 11:00
- 12:00
- 13:00
- 14:00
- 15:00
- 16:00
- 17:00
- 18:00
- 10 minutes
- 45 minutes
- 1.5 Hours
Research Associate

Time Spent at Location

- Individual Focus: 76%
- Meeting - Scheduled: 0%
- Face-to-face Ad Hock: 8%
- Lunch: 5%
- Break: 5%
- Travel: 6%

3rd FLOOR

Time

- 8:00
- 9:00
- 10:00
- 11:00
- 12:00
- 13:00
- 14:00
- 15:00
- 16:00
- 17:00

Individual Work
- 8:00
- 9:00
- 10:00
- 11:00
- 12:00
- 13:00
- 14:00
- 15:00
- 16:00
- 17:00

Break
- 12:00
- 13:00
- 14:00
- 15:00

Face-to-Face Ad Hock
- 11:00
- 12:00

Lunch
- 12:00
- 13:00

Note: trips are defined by one-way travel

1-hour

1/2-hour

<=15-min

10 trips
- 5 trips
- 2 trips
Pre-Occupancy Post-Occupancy

Pre/Post-Occupancy Survey Give Advice / Mentorship

Pre-Occupancy

Post-Occupancy
Pre/Post-Occupancy Survey Energizes
Pre/Post-Occupancy Survey

All Questions Combined

Pre-Occupancy

Post-Occupancy
Bias vs inclusivity
Hostile vs warm
Siloed vs collaborative
Caution vs innovation
Unfocused vs common goal
Secrecy vs transparency
Money-centric vs patient- or research-focused

<table>
<thead>
<tr>
<th></th>
<th>Negative</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bias vs inclusivity</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>Hostile vs warm</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>Siloed vs collaborative</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Caution vs innovation</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>Unfocused vs common goal</td>
<td>34</td>
<td>48</td>
</tr>
<tr>
<td>Secrecy vs transparency</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>Money-centric vs patient- or research-focused</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Comparison</td>
<td>Negative</td>
<td>Positive</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Bias vs inclusivity</td>
<td>1</td>
<td>44</td>
</tr>
<tr>
<td>Hostile vs warm</td>
<td>1</td>
<td>51</td>
</tr>
<tr>
<td>Siloed vs collaborative</td>
<td>9</td>
<td>118</td>
</tr>
<tr>
<td>Caution vs innovation</td>
<td>5</td>
<td>74</td>
</tr>
<tr>
<td>Unfocused vs common goal</td>
<td>14</td>
<td>90</td>
</tr>
<tr>
<td>Secrecy vs transparency</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Money-centric vs patient-focused</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

Pre/Post-Occupancy Survey Post-KCRB Knight Culture