Why Tailoring?
Post Occupancy Analysis
Post Occupancy Analysis

Three Undergraduate Science Buildings
All Under 10 Ten Years Old
All Roughly 120,000 GSF
Minimizing Cost
Maximizing Value

The Things that are Unique to Your Project

Focus on Value

Number

Design options available

The building doesn’t fall down

Cost of changes

Planning

Time

Launch
Dramatization

Jimmy

Mikey
Jimmy the Architect asks Mikey the Biologist,

“How many teaching labs do you need?”
Dramatization

“22”
Case Study #1

Public Institution
Comprehensive College
Science Facility
120,000 GSF
Case Study #1

Biology
Chemistry
Environmental Science
Physics, Astronomy, and Meteorology
Case Study #1

Amphibian & Fish Lab
Analytic Chemistry Lab
Anatomy & Physiology Lab
Animal Physiology Lab
Astronomy Lab
Bio-Chemistry Lab
Botany/Ecology Lab
Cellular Biology Lab
Computer Aided Physics Lab
Biology Concepts Lab
Electronics Lab
EveryDay Chemistry Lab

General Chemistry Lab
Genetics Lab
Geology Lab
Instrumental Lab
Meteorological Lab
Meteorology Lab
Microbiology Lab
Organic Chemistry Lab
Physical Chemistry Lab
Physics Lab
Plant Physiology Lab
Survey of Chemistry Lab
Zoology Lab
Case Study #1
Case Study #1
Case Study #1
The Noise & The Signal

Roberta Wohlstetter
The Noise

Design
Overhead
25 “Person Months”
25 “Person Months”
Maximizing Value
Maximizing Speed

I FEEL THE NEED...
THE NEED FOR SPEED.
-TOP GUN
Scientific Offerings in WSCH

- Thermodynamics
- General Biology II
- Concepts of Electronics
- Inorganic Chemistry
- General Physics I
- Energy
- Developmental Biology
- Plants and Society
- Physical Chemistry I
- Human Biology
- Animal Behavior
- General Physics I (Calculus)
- Group Senior Research
- Ecology
- Analytical Chemistry Lab
- Genetics
- Microbiology
- Everyday Chemistry I
- Organic Chemistry I
- General Biology I
- General Chemistry I
- Survey of Chemistry
- Concepts of Biology
- Anatomy & Physiology I
Case Study #1
Casting A Wider Net

More Signal But Also More Noise
Casting A Wider Net

Preliminary Report by the STEM Division on the Construction of a New STEM Building & STEM Middle College at Naugatuck Valley Community College Waterbury, Connecticut

December 12, 2015
Casting A Wider Net

Omission Bias
Case Study #2

Northeast Public Institution
Liberal Arts College
Science Facility
120,000 GSF
Case Study #2

Biology
Chemistry
Geological Sciences
Physics & Astronomy
Case Study #2

Classrooms

Biology

Chemistry

Geological Sciences

Physics & Astronomy
Case Study #2

**Biology Lab Utilization**

Weekly Student Contact Hours

<table>
<thead>
<tr>
<th>Column</th>
<th>Contact Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>0101</td>
<td>300.00</td>
</tr>
<tr>
<td>0103</td>
<td>300.00</td>
</tr>
<tr>
<td>0105</td>
<td>150.00</td>
</tr>
<tr>
<td>0107</td>
<td>150.00</td>
</tr>
<tr>
<td>0147</td>
<td>250.00</td>
</tr>
<tr>
<td>0202</td>
<td>100.00</td>
</tr>
<tr>
<td>0203</td>
<td>100.00</td>
</tr>
<tr>
<td>0206</td>
<td>100.00</td>
</tr>
<tr>
<td>0302</td>
<td>50.00</td>
</tr>
<tr>
<td>0304</td>
<td>50.00</td>
</tr>
<tr>
<td>0306</td>
<td>50.00</td>
</tr>
</tbody>
</table>
Case Study #2

Biology & Chemistry Lab Utilization

- Biology
- Chemistry
### State Guidelines

#### Example: Biology Department

<table>
<thead>
<tr>
<th></th>
<th>Classrooms/Lecture Halls</th>
<th>Class Labs &amp; Services</th>
<th>Individual Study Labs &amp; Services</th>
<th>Research &amp; Support Faculty</th>
<th>Faculty Office</th>
<th>General Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Average Weekly Contact Hours per FTE</td>
<td>LD</td>
<td>UD</td>
<td>G1</td>
<td>G2</td>
<td>LD</td>
<td>UD</td>
</tr>
<tr>
<td>(3) Average Square Foot per Station</td>
<td>14</td>
<td>10.1</td>
<td>2.7</td>
<td>2.7</td>
<td>11.84</td>
<td>12.8</td>
</tr>
<tr>
<td>(4) Weekly Contact Hours per Station</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>28</td>
<td>28.3</td>
</tr>
<tr>
<td>(1) Space Factor</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>28</td>
<td>28.3</td>
</tr>
</tbody>
</table>

#### Example: Math Department

<table>
<thead>
<tr>
<th></th>
<th>Classrooms/Lecture Halls</th>
<th>Class Labs &amp; Services</th>
<th>Individual Study Labs &amp; Services</th>
<th>Research &amp; Support Faculty</th>
<th>Faculty Office</th>
<th>General Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Average Weekly Contact Hours per FTE</td>
<td>LD</td>
<td>UD</td>
<td>G1</td>
<td>G2</td>
<td>LD</td>
<td>UD</td>
</tr>
<tr>
<td>(3) Average Square Foot per Station</td>
<td>14</td>
<td>14.3</td>
<td>12</td>
<td>12</td>
<td>22.66</td>
<td>22.66</td>
</tr>
<tr>
<td>(4) Weekly Contact Hours per Station</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>22.66</td>
<td>22.66</td>
</tr>
<tr>
<td>(1) Space Factor</td>
<td>28</td>
<td>28.3</td>
<td>28.32</td>
<td>28.32</td>
<td>22.66</td>
<td>22.66</td>
</tr>
</tbody>
</table>
State Guidelines

Three Biology Departments’ DNA

ECSU WSCH  
WCSU WSCH  
SCSU WSCH
Benchmarking

ASF per Student FTE

- Hamilton College
- St. Lawrence College
- Barnard College
- Manhattan College
- Adelphi University
- Hamilton College's ISF
Case Study #3

Northeast Private Institution
Liberal Arts College
Science Facility
120,000 GSF
Case Study #3

Biology
Chemistry
Environmental Studies
Geology
Mathematics
Physics
Psychology
Case Study #3

Classrooms

Biology
Chemistry

Environmental Studies

Geology
Mathematics
Physics
Psychology
Case Study #3

Lab Utilization - Fall and Spring Semester

- Biochemistry Teaching Lab
- Biochemistry Teaching Lab
- Ethnobotany Teaching Lab
- Ethnobotany Teaching Lab
- Field & Animal Teaching Lab
- General Biology Teaching Lab
- General Biology Teaching Lab
- Micro & Genetics Teaching Lab
- Mycology & Ecology Teaching Lab
- Neuroscience Teaching
- Neuroscience Teaching
- Neuroscience Teaching

Percentage Utilization

Fall
Spring
Case Study #3

Weekly Student Contact Hours - Fall 2011
Case Study #3

Biology Fall WSCH Distribution

- Teaching Biology
- Lab Animals
- Biochemistry
- Neuroscience
- Plant Science
- Ethnobotany
- Mycology w/Lab
- Human Anatomy and Physiology
- Animal Physiology
- Microbiology
- Biometrics
- Cell Biology
- Ecology
- General Biology
Case Study #3

Lab Utilization - Fall and Spring Semester

Percentage Utilization

- Fall
- Spring
Bill James
Metrics

OBP
Metrics

WSCH
Metrics

PA  Plate Appearances
BB%  Walk Rate
K%  Strike Out Percentage
BABIP  Batting Average on Balls in Play
AVG  Batting Average
OBP  On Base Percentage
SLG  Slugging Percentage
wOBA  Weighted On-Base Average
wRC+  Weighted Runs Created
Dramatization

“22”
Dramatization

TANK
LOAD THE JUMP PROGRAM!
Dramatization

Jimmy

Mikey

Scotty
Scotty to Mikey the Biologist,

“You have eight teaching labs”

“Your utilization of those lab are…”
Closing

ANCHORING BIAS
Planning fallacy
Overconfidence effect
Omission Aversion
Choice Paralysis
Herding
Preference for Stories versus Analysis
Recency Bias
The Bias Blind-Spot
Selection Bias
Selection Bias

Muddled But Not A Good Story

Perfect Projects

Good Story That Can Be Told In Under 45 Minutes

Good Story That Cannot Be Told In 45 Minutes

Cannot Be Easily Explained Given Almost Any Amount Of Time
Maximizing Value

The Things that are Unique to Your Project

Focus on Value:

- Design options available
- The building doesn't fall down
- Cost of changes

Number

Planning

Time

Launch