

Environmental Systems I

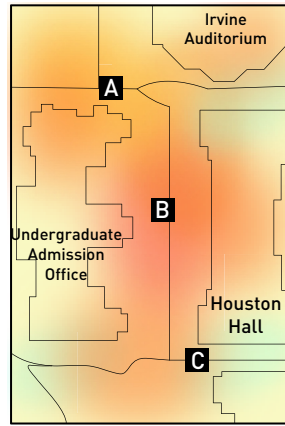
Assignment III- Outdoor Thermal Comfort
Jason Jongwon Lee / Moise Yamba / Ayo Ogunmoyero
September 16, 2017

Analysis Site

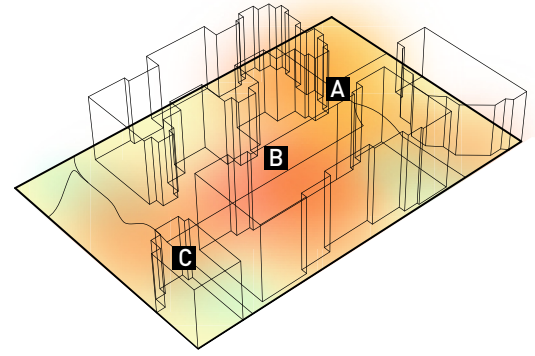
Houston Hall / Convention Hall
3417 Spruch St, Philadelphia, PA, 19104

Observation I 10:30 a.m.

	A	B	C
Dry Air Temperature	74.1 F	80.3 F	75.8 F
Phone Temperature	74 F	74 F	74 F
Relative Humidity	48 %	48 %	48 %
Wind Speed	1.6 m/s	1.7 m/s	1.5 m/s
Comfort Condition	Cool	Slightly hot	Good



Houston Hall Site Plan

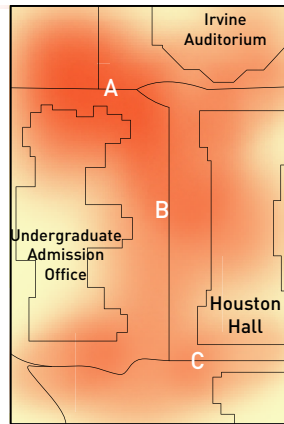
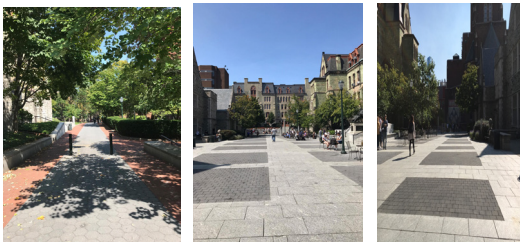


Houston Hall Site Axon

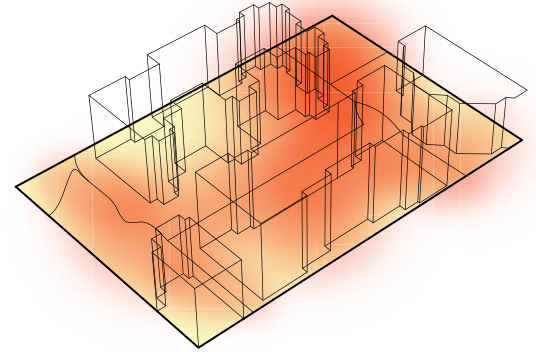
We noticed that the front yard between Undergraduate Admission Office and Houston hall takes the most heat, and thus people stay on the peripheries. One week ago, due to the high exposure to radiation at site B, there was a temporary tent for a community event, but the sudden air flow from point A to point B brings a huge wind with pressure difference, and gives good circulation along the aisle towards point C.

Observation II 12:25 p.m.

	A	B	C
Dry Air Temperature	80.3 F	87.5 F	94.4 F
Phone Temperature	75F	75 F	75 F
Relative Humidity	46 %	46 %	46 %
Wind Speed	1.8	1.4	0.9
Comfort Condition	Chill	Warm	Hot



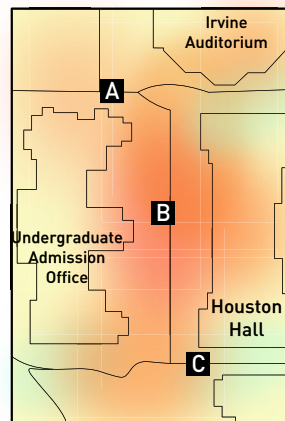
Houston Hall Site Plan



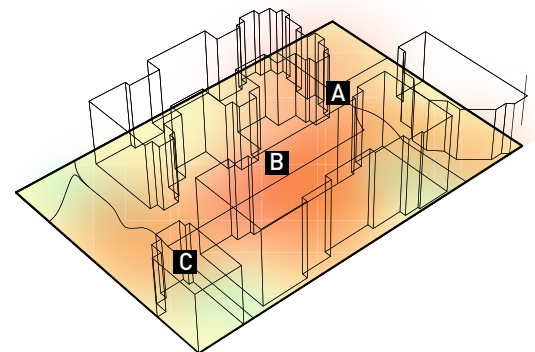
Houston Hall Site Axon

Observation III 3:55 p.m.

	A	B	C
Dry Air Temperature	89.6 F	98.6 F	71.6 F
Phone Temperature	77 F	77 F	77F
Relative Humidity	33%	33 %	33 %
Wind Speed	3.6 m/s	2.9 m/s	3.1 m/s
Comfort Condition	Hot	Hot	Good/Cool

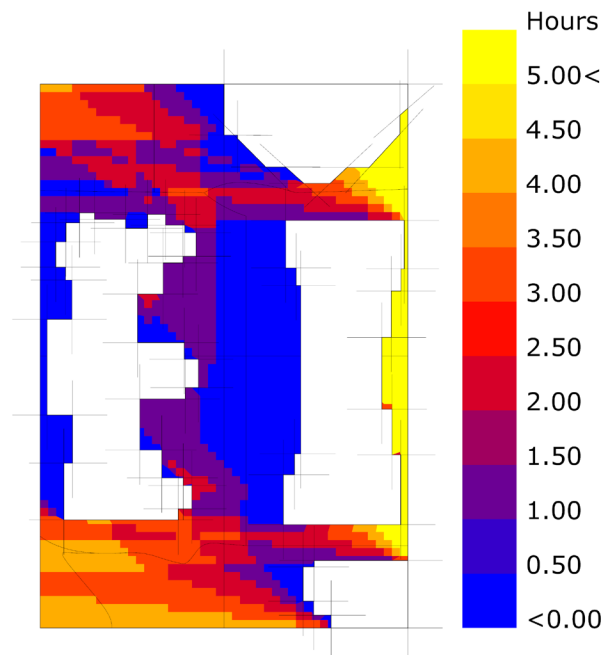


Houston Hall Site Plan



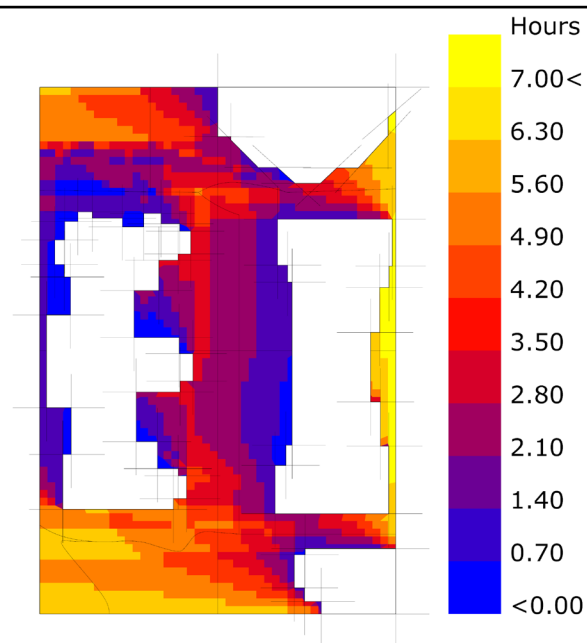
Houston Hall Site Axon

Observation I	A	B	C
9/11 10:30 a.m.			
Dry Air Temperature	74.1 F	80.3 F	75.8 F
Phone Temperature	74 F	74 F	74 F
Relative Humidity	48 %	48 %	48 %
Wind Speed	1.6 m/s	1.7 m/s	1.5 m/s
Comfort Condition	Cool	Slightly hot	Good



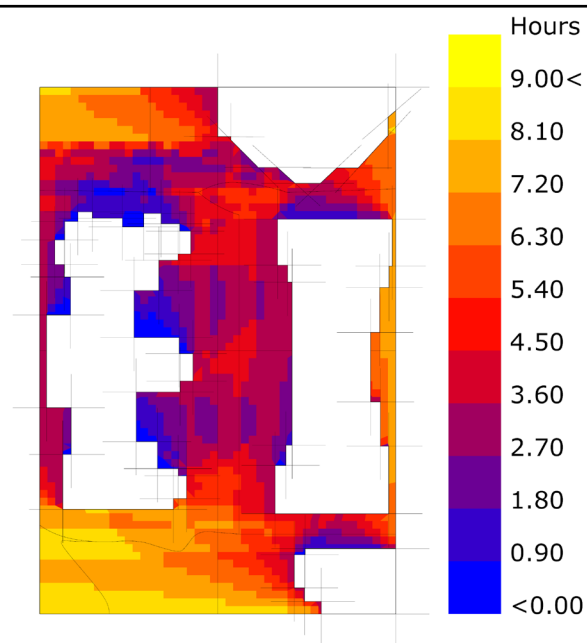
SunlightHours Analysis

Observation II	A	B	C
9/11 12: 25 p.m.			
Dry Air Temperature	80.3 F	87.5 F	94.4 F
Phone Temperature	75F	75 F	75 F
Relative Humidity	46 %	46 %	46 %
Wind Speed	1.8	1.4	0.9
Comfort Condition	Chill	Warm	Hot



SunlightHours Analysis

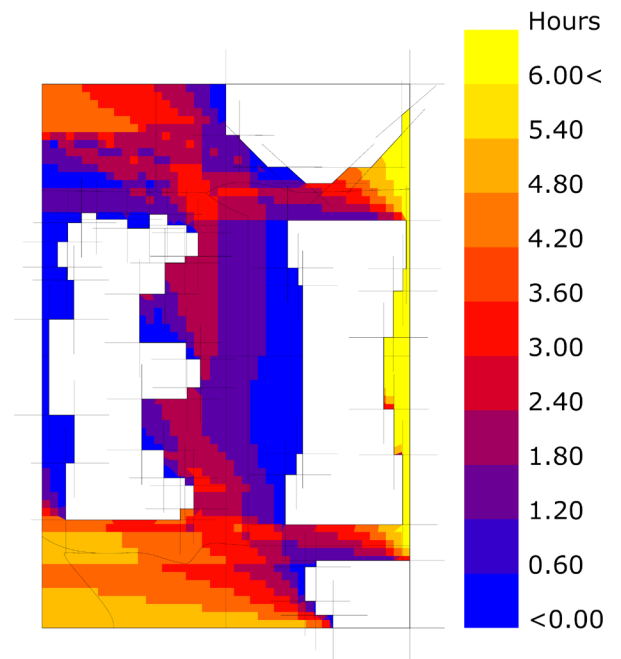
Observation III	A	B	C
9/11 3:55 p.m.			
Dry Air Temperature	89.6 F	98.6 F	71.6 F
Phone Temperature	77 F	77 F	77F
Relative Humidity	33%	33 %	33 %
Wind Speed	3.6 m/s	2.9 m/s	3.1 m/s
Comfort Condition	Hot	Hot	Good/Cool



SunlightHours Analysis

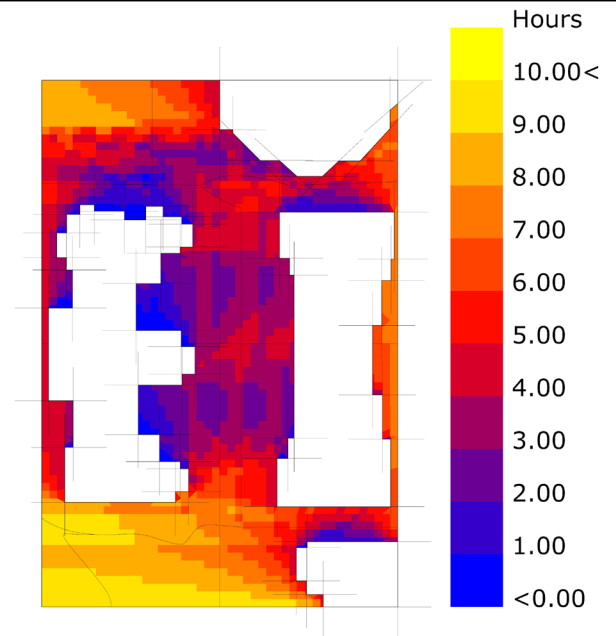
Observation I	A	B	C
9/16 11a.m.			
Surface Temperature	104 F	-	-
Dry Air Temperature	77.2 F	86 F	88 F
Relative Humidity	42 %	49 %	61 %
Wind Speed	1.7 m/s	4.35 m/s	5.2 m/s
Comfort Condition	Hot	(84 F)	-

A - Measured Data
B - Satallite/Phone Data
C - EPW Weather Data



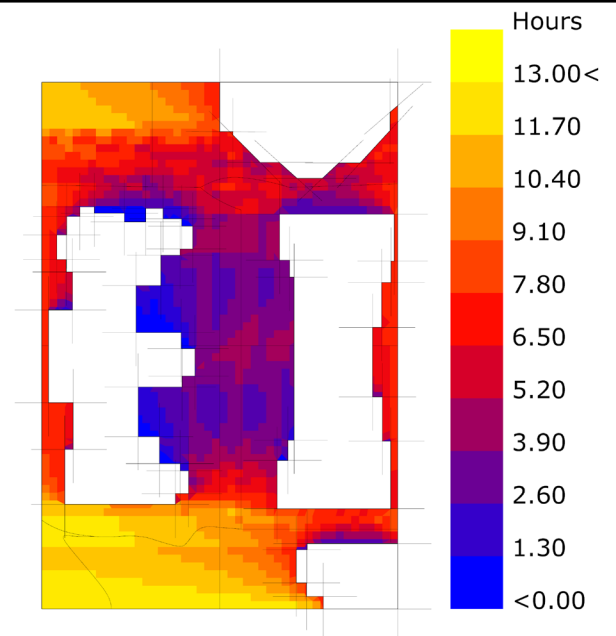
SunlightHours Analysis

Observation II	A	B	C
9/16 3: 00 p.m.			
Surface Temperature	90 F	- F	-
Dry Air Temperature	73.5F	77 F	88 F
Relative Humidity	54.5 %	74 %	59 %
Wind Speed	0.7 m/s	6 m/s	4.6 m/s
Comfort Condition	Warm	(91 F)	-



SunlightHours Analysis

Observation III	A	B	C
9/16 7 p.m.			
Surface Temperature	82.5 F	- F	-
Dry Air Temperature	73.5 F	79 F	88F
Relative Humidity	81%	89 %	73 %
Wind Speed	4.4 m/s	6.2 m/s	4.6 m/s
Comfort Condition	v. cool	(72 F)	-



SunlightHours Analysis

Design Proposals

1. Shading: Providing shading conditions with trees would make the space more comfortable
2. Cross ventilation: Opening up the buildings in the NE direction would allow for more winds and better cross ventilation in the courtyard.

Differences in Data

There are slight differences in the weather data collected from the station and epw data as you would expect but the comfort levels seem to be about the same.